



Worldwide Satellite Magazine

June 2012

SatMagazine

Asia-Pacific

Executive Spotlights

Scott Sprague, ABS

Paul Weldon, ASC Signal

Jay Monroe, Globalstar

Ahsun Murad, Optimal Satcom

Plus

Forrester, Heyman, Antonovich

Remote Communications

The Need For Speed...

M2M Market

Australasia Showcase

DVB-S2 Technology

Space: The Evolution Continues

Isle of Man Developments

Offshore Connectivity

Requirements @ Sea

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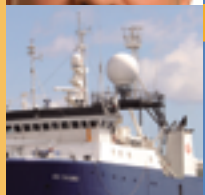
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Executive Spotlight: Scott Sprague, COO, Asia Broadcast Satellite

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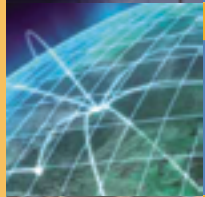
Scott Sprague brings a myriad of experiences to Asia Broadcast Satellite (ABS) and, most importantly, the experience of successfully running a sales organization of a global satellite operator while he was with SES—*by the editors*



Uplink: Standardized + Customized Service Requirements @ Sea

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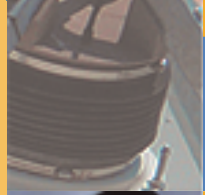
Increasing data throughput and enhancing network efficiency are important aspects of the fast-paced development of standardized and customized satellite communications at sea, according to Marlink. —*by Tore Morten Olsen, Marlink Group*



Insight: The Global, Wireless, M2M Market

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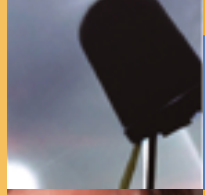
The global wireless M2M market was strong in 2011, displaying growth in all major world regions and vertical segments. Berg Insight estimates that shipments of cellular M2M devices increased by 35.3 percent to a new record level of 50.8 million units — *by Tobias Rybert, Berg Insight*



Executive Spotlight: Paul Weldon, Senior Vice President, ASC Signal

Page 38

Paul Weldon joined ASC Signal's team as Senior Vice President of Global Sales in January, 2010. He is responsible for leading the company's worldwide sales team and driving revenue growth by more than 100 percent within five years. — *by the editors*



Antonovich On SatBroadcasting™: What A Different A Decade Makes

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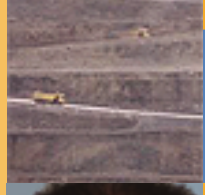
What a difference a decade makes—has the Asia-Pacific (APAC) now become a net exporter of a wealth of programming? — *by Mike Antonovich, Roberts Communications Network*



Executive Spotlight: Jay Monroe, Chairman + CEO, Globalstar

Page 42

Jay Monroe has held the Chairman position at Globalstar since the purchase of the assets of the Company by Thermo Capital Partners in April 2004. — *by the editors*



Focus: Remote Communications In The Mining Industry

Page 46

Creating an effective network infrastructure in the world's remotest locations is increasingly essential for mining companies. Modern communications solutions deliver the same levels of performance and availability as they expect from their corporate networks — *by Bernie Franfield, Datasat Communications*



Executive Spotlight: Ahsun Murad, President + CEO, Optimal Satcom

Page 52

Ahsun Murad is the President and CEO of Optimal Satcom, which he co-founded as a spin-off from Lockheed Martin Corporation in 2002. — *by the editors*



Insight: The Need For Speed...

Page 54

In today's global business environment, it's all about speed: a quicker time-to-service or time-to-market, swifter exchanges of information, faster decision making, the "I want it now" mentality
 — *by Tom Lukevitch + Fernando Klurfan, Emerging Markets Communications*



Forrester's Focus: 3DTV... Back On The Menu

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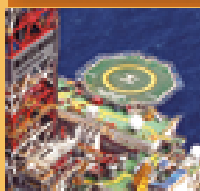
Despite some previous—and perhaps justifiable—doom and gloom, there was a noticeable spirit of optimism at the Cannes MIPTV programming market in April, and we make no apology for using the 3DTV 'focus' at Cannes as our reason for a major examination of 3D's prospects for satellite operators.
 — *by Chris Forrester, Broadgate Publishing*



Uplink: Showcasing Australasia's SATCOM Opportunities

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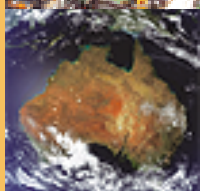
Satellite communications is a growing global market due to an ever increasing demand for bandwidth to support fast, high quality communications across a wide variety of industries and geographical regions.



A Case In Point: Offshore Connectivity With Satellites

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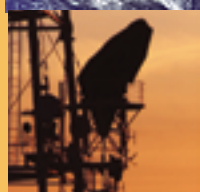
China National Offshore Oil Company (CNOOC) needed to provide integrated voice, video and data network to improve communications among its offshore oil and gas drilling rigs, production platforms, offshore facilities, corporate headquarters, Internet and local PSTN networks.



Heyman's Focus: Australia's Communication Satellites

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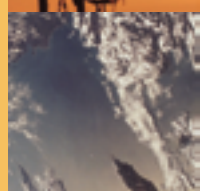
Australia received its first taste of space communications on 23 January 1970 when the Oscar-5 Australis radio amateur satellites was placed into orbit aboard a Delta DSV3M launch vehicle — *by Jos Heyman, TIROS Space Information*



SatBroadcasting™—Tech'd Out: The Benefits Of DVB-Sw Multistream Technology

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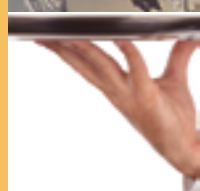
Twenty years ago, MPEG transport stream was the premier audio and video container format. Content was transmitted over a DVB-S carrier with an inherent static signal of constant modulation, packet size and data rate — *by Jörg Rockstroh, WORK Microwave*



Insight: It's All About Development, Development, Development

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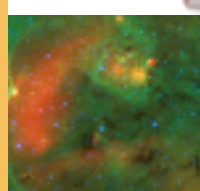
Back in the mid nineties, if you had rated on a scale of one to ten the prospects of the Isle of Man developing a successful space and satellite industry, most savvy observers would probably have opted for a figure near to zero.



Insight: Business Productivity Assured

Page 82

Thousands of times each day, business owners and IT managers diligently search for communications services that can help meet their demanding networking requirements at a reasonable price
 — *by Chris Frith, SatCHOICE*



Focus: The Evolution Continues... Executive Summary Of The Space Report

Page 86

Each passing year brings advances in space systems and technologies, as well as new applications and services that rely on them. There is a natural evolution of capabilities as governments and companies push the boundaries of what is possible, seeking ways to improve the lives of their citizens or customers.



Uplink: Connectivity Without Compromise

Page 90

Mobile operators are navigating the lofty challenges that come with unprecedented demand from increasingly sophisticated subscribers around the world. Upgrading their 2G networks to high performance 3G and 4G platforms is no easy task — *by Steve Collar, O3b Networks*

A Rapid Rise For These Dual Passengers

Arianespace provided another on-time Ariane 5 launch by orbiting a pair of telecommunications spacecraft at the service of Asian region operators, on a mission that included multiple numerical milestones for the company and its customers.

The two passengers lofted on today's mission were the 100th and 101st commercial geostationary communications satellites from Lockheed Martin Space Systems, as well as the 42nd and 43rd platforms from this U.S. spacecraft manufacturer launched by Arianespace. Both

launched in its operations from French Guiana, a count that does not include some 50 additional auxiliary or secondary payloads.

Le Gall also noted the mission continues a 23-year relationship of Japan's SKY Perfect JSAT Corporation with Arianespace, which began in 1989 when JCSAT-1 was orbited on an Ariane 4. With tonight's flight, JCSAT-13 become the 27th satellite that Japanese operators have entrusted to commercial launch services with the Ariane family of vehicles.

JCSAT-13 is to be positioned in geostationary orbit at 124 degrees East, providing direct TV broadcast links to all of Japan as a replacement satellite for JCSAT-4A, and its capacity will meet satellite relay coverage demands in Southeast Asia. Weighing nearly 4,530 kg. at launch, JCSAT-13 is equipped with 44 Ku-band transponders and has a design life exceeding 15 years.

VINASAT-2 is the second satellite launched by Arianespace for operation by the Vietnam Posts and Telecommunications Group, and follows the lofting of VINASAT-1 on an Ariane 5 flight in April 2008.

Equipped with 24 Ku-band transponders to handle radio, television and telephone links for all of Vietnam, VINASAT-2 had a liftoff mass of approximately 2,970 kg. and will operate from an orbital position at 131.8 degrees East during a design lifetime of 15-plus years.

Ariane 5 is shown prior to liftoff from the Spaceport's ELA-3 launch complex with its dual-passenger payload of JCSAT-13 and VINASAT-2.

For the 62nd liftoff of an Ariane 5 since its introduction, the vehicle's delivery capabilities were confirmed once again—with the following estimated orbital parameters at the cryogenic upper stage's injection—Perigee: 250.2 km. for a target of 250.0 km.—Apogee: 35,927 km. for a target of 35,909 km.—Inclination: 1.97 deg. for a target of 2.00 deg.

This second heavy-lift launch of 2012 will be followed by the next flight on June 19th. In the upcoming dual-payload mission, the workhorse will carry the Space Systems/Loral-produced EchoStar XVII high-throughput telecommunications platform for Hughes Network Systems, along with the Meteosat Second Generation-3 (MSG-3) weather satellite for EUMETSAT that was built by a Thales Alenia Space-led industry consortium.

Russian Ramp Up For Iridium

Iridium Communications Inc. has announced that OOO Iridium Communications ("Iridium Russia") has received authorization from Russian authorities for commercial operations in the country.

Iridium Russia expects to launch service in the second quarter of 2012, once all technical licensing requirements are complete. Iridium anticipates expanded demand for its products and services in Russia as a result of this authorization for commercial operations. In 2009, Iridium formed Iridium Russia to conduct business in the country due to strong regional interest in its innovative voice and data communications capabilities. Iridium is making a significant, multi-year investment as part of its commitment to the Russian market.

The company is actively engaging new and existing distribution relationships in the country to support customer demand.



Lifting off from the Spaceport in French Guiana, Arianespace's heavy-lift workhorse delivered the JCSAT-13 and VINASAT-2 relay platforms into geostationary transfer orbits on the 48th consecutive success for Ariane 5.

relay platforms are similar in overall configuration, as they are based on Lockheed Martin's A2100 spacecraft platform design. According to Arianespace Chairman and CEO Jean-Yves Le Gall, this flight also enabled his company to surpass the 300th mark for the total number of primary satellite passengers

Also Relishing A New Russian Response

A mere 200 meters away from the Kremlin, Thuraya Telecommunications Company has announced the launch of its mobile satellite services in Russia in partnership with GTNT.

The announcement was made at a press conference at the Congress Centre of the Chamber of Commerce and Industry of the Russian Federation in Moscow and was attended by Thuraya's Chief Executive Officer, Mr. Samer Halawi, GTNT's General Director, Mr. Alexey Ostapchuk and invitees from the corporate and Telco sectors and the media.

Spanning more than 140 countries, Thuraya's sophisticated satellite communications network guarantees reliable, secure

and affordable communications within the world's largest country, especially in remote and rural locations typically underserved by terrestrial networks. Thuraya's portfolio of products includes high-speed data, voice and maritime offerings that are tailored for the vertical markets.

Through its partnership with GTNT, Thuraya will provide uninterrupted satellite communications services to federal, departmental and corporate users in energy, petrochemical, construction, logistics, forestry, relief and media sectors. GTNT is Thuraya's sole Service Partner in Russia authorized to distribute Company products, solutions and services across the country.

In addition to the most advanced satellite-based voice and data services, Thuraya will offer GSM consumers satellite roaming facilities, effectively ensuring universal coverage all across Russia.

By simply inserting their GSM SIM cards into a Thuraya handset, GSM consumers can instantly roam on Thuraya's network and make and receive calls.

Covering more than one-eighth of the Earth's inhabited land area, Russia extends across the whole of northern Asia and across 40 percent of Europe, spanning nine time zones. It has the world's largest reserves of mineral and energy resources and is the second largest oil

producer and second largest natural gas producer globally.

Communities in remote corners of Russia can rely on Thuraya for instant access to modern data and voice telecommunications facilities. More prominently, Thuraya is poised to serve the Russian maritime market with a special focus on the fisheries and the cargo sectors.

Thrane & Thrane's SAILOR Now Hears Many Voices



When one is good, how much better are nine?

Thrane & Thrane has launched Inmarsat Multi-voice across its entire SAILOR FleetBroadband portfolio. The new service, which Inmarsat made live in May 2012, is standard on all new SAILOR FleetBroadband systems and is accessible on existing terminals with a straightforward software update.

Multi-voice enables FleetBroadband users to expand from the original single voice line to a maximum of nine simultaneous voice lines, on a single SAILOR FleetBroadband terminal.

SAILOR 500 FleetBroadband offers the full nine simultaneous voice lines available through Multi-voice, while a SAILOR 250 FleetBroadband can offer up to six concurrent calls and a SAILOR 150 FleetBroadband up to four concurrent calls.

With no requirement for extra hardware besides the

additional handsets, existing users can upgrade their SAILOR FleetBroadband terminals quickly and easily via the free software update. With the software update in place, all users need to do is configure their SAILOR FleetBroadband terminal via the user-friendly web-interface and attach the required number of Thrane & Thrane or third party handsets, or if desired connect an existing PBX.

Users selecting the sophisticated Thrane IP Handset for Multi-voice on SAILOR FleetBroadband benefit from high-quality hardware, functionality, flexibility and ease-of-use. It offers extra convenience as it provides easy access to a dedicated BGAN menu via the integrated screen, where value-added supplementary voice services, such as phone book and call forwarding, can be operated from the handset itself.

Enhancing Crucial Capabilities

This Company has delivered a novel CubeSat solar array drive assembly (SADA) to MMA Design LLC, for integration into their High Watts per Kilogram (HaWK) tracked power system.



MMA's HaWK array is a modular dual-wing solar array deployment and tracking power system designed to provide enhanced capability for CubeSats, increasing orbit average power (OAP) by more than 300 hundred percent and enables new high performance applications in Earth imaging, space science and situational awareness.

Measuring just 6.5mm—thinner than the world's thinnest smartphone—the CubeSat SADA provides +/- 180 degrees of smooth, low power tracking motion along a single axis. The SADA incorporates power transfer, tracking motion and control electronics, and is designed to accommodate orbit average power of 22 watts (11 watts per wing), and peak power of 36 watts (18 watts per wing) with the modular HaWK-2 power system. The SADA is capable of transferring 100 watts peak power with alternate HaWK modular configurations. Existing CubeSat power capabilities are limited to only 5 watts of orbit average power.

Designed to maximize mission payload volume and mass on standard CubeSat platforms, Honeybee's SADA module is compliant with the 3U CubeSat bus form factor. The module occupies the vacant space between CubeSat and P-POD, eliminating the need for any changes to bus geometry. MMA Design is developing HaWK under a Phase II SBIR sponsored by the Air Force Research Laboratory (AFRL).

The Learning Connection

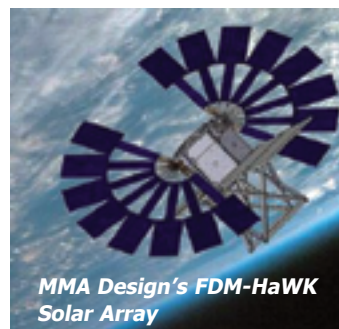
Optus has signed a five-year contract estimated at \$15 million with the New South Wales (NSW) Department of Education and Communities (Australia) to deliver an enhanced satellite service to improve the distance learning experience for the state's most remote students

The enhanced satellite solution will improve Internet access and support a range of new services such as two-way video conferencing and interactive media applications to enrich the learning experience for remote students.

Optus' satellite service will cover NSW public schools that cannot be serviced by fibre under the Department's Connected Classrooms Program, which aims to give all schools and TAFE campuses access to high-speed broadband.

The enhanced satellite service will benefit students at the 22 schools, six TAFE campuses and 165 homesteads currently enrolled in the Department's distance education program.

NSW Minister for Education, Optus has five satellites currently in orbit, with a new satellite, Optus 10, scheduled for launch in 2013.



MMA Design's FDM-HaWK Solar Array

Nimiq 6 Gets Carried Away



International Launch Services (ILS) has successfully carried the Nimiq 6 satellite into the planned orbit on an ILS Proton for Telesat, a leading global fixed satellite services operator headquartered in Ottawa, Canada.

The ILS Proton Breeze M launched from Pad 24 at the Baikonur Cosmodrome at 1:12 a.m. local time (19:12 GMT, 3:12 p.m. EDT, on May 17th). After a 9-hour, 14-minute, 5-burn mission, the Breeze M successfully released the satellite, weighing approximately 4.5 metric tons, into the planned geostationary transfer orbit. This was the 377th launch for the Proton vehicle since its inaugural flight in 1965 and the 73rd ILS Proton launch. The launch of the Nimiq 6 satellite was the 5th Proton launch in the past 93 days.

Telesat's Nimiq 6 satellite was built by Space Systems/Loral (SS/L) using the flight proven SS/L 1300 platform. Nimiq 6 has 32 high powered Ku-band transponders that will provide coverage to Canada from its orbital location of 91.1 degrees West. Telesat's Nimiq fleet is comprised of direct broadcast satellites used by Telesat's customers to provide Direct-to-Home (DTH) television services to consumers in North America.

ILS President Frank McKenna said, "With the ILS Proton launch of Nimiq 6, ILS Proton has launched all of the Nimiq series satellites built for Telesat. This is an accomplishment we are very proud of and reflects a level of confidence and trust by Telesat in the performance of the ILS Proton vehicle. Our strong relationship with Telesat spans over 12 years and 8 satellites launched to date. We thank

the collective mission teams of ILS, Khrunichev, Telesat and Space Systems/Loral for their outstanding work on the Nimiq 6 launch and look forward to the ILS Proton launch of Anik G1 later this year."

"Launching our satellites on schedule is of great value to Telesat," said President and CEO of Telesat, Dan Goldberg. "With the successful ILS Proton launch of the Nimiq 6 satellite we are meeting demand for additional high-powered Ku-band capacity for DTH services. Nimiq 6 joins our existing Nimiq fleet and will provide Bell TV with improved performance to deliver the very latest video services for their subscriber base across Canada. The ILS, Khrunichev, Telesat and Space Systems/Loral teams are to be commended for another mission well-executed."

Satellite Spies On Sites

The Russians launched it and now military installations, troop movements, and other sites of interest around the globe will be photographed... spy anyone?

A Russian Soyuz rocket was successfully launched on May 17th that performs as a photo surveillance satellite designed to collect intelligence on strategic sites around the world for Russian defense purposes.

The Soyuz-U launcher lifted off from the Plesetsk Cosmodrome in northern Russia at 1405 GMT (10:05 a.m. EDT), 6:05 p.m. Moscow time. The Plesetsk launch site is a military-run facility in Arkhangelsk Oblast. The payload will be named Kosmos 2472 in the Russian military's nomenclature for defense spacecraft.

Thursday's mission marked the last flight of a Soyuz-U rocket from Plesetsk, known for their launches of satellites headed for polar orbits. The rocket flew north from Plesetsk to reach a high-inclination orbit carrying its payload over the poles, an orbit in which the satellite will observe nearly all of the planet. It is believed that the cargo is a Kobalt M reconnaissance satellite carrying an optical camera that will orbit between 150 miles and 300 miles above Earth. Kobalt spacecraft reportedly carry canisters to return film to Earth during the satellite's mission, which will last at least several months.

Thursday's Soyuz launch was the first of three space missions due to blast off in a span of about five hours. A Japanese H-2A rocket was in the final countdown at the time of the Soyuz launch. It will deliver four satellites into orbit, including a research craft to probe the link between water and climate change.

Satellite Control Center Awarded To GMV

GMV has been awarded its first contract with the THAICOM Public Company Limited to provide the satellite control center for the THAICOM 6 communications satellite.

The project builds on GMV's extensive satellite control center experience, including work with operators such as Eutelsat, Star One, SES, MEASAT, Hispasat as well as successful support for satellite manufacturers such as Orbital and Space Systems Loral.

THAICOM PLC. is a satellite and telecommunications operator with customers throughout Asia, Africa, Europe and Australia. Currently, the Company operates two THAICOM satellites at geostationary orbit. THAICOM 5 carries more than 400 television channels at its "hotbird" location of 78.5 degrees East, while THAICOM 4 (IPSTAR) delivers broadband services to millions of users across 14 countries in Asia Pacific.

THAICOM 6 will be a Star-2 platform, Orbital Sciences geostationary telecommunications spacecraft located at 78.5 degrees east that will be co-located with THAICOM 5. THAICOM 6 is a three axis stabilized type satellite with 26 transponders.

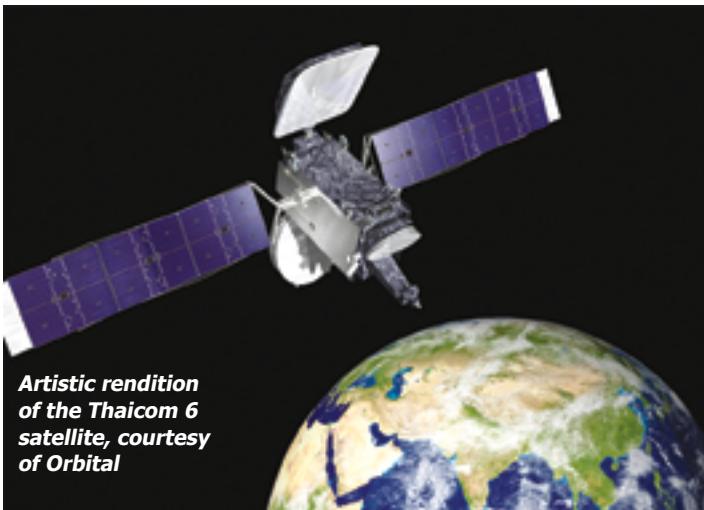
The launch of Thaicom 6 will increase THAICOM'S ability to provide satellite services; most notably broadcasting services, such as satellite television and HDTV platform. THAICOM 6 satellite's payload will offer Ku- and C-band services to the South and Southeast Asia and Southern Africa regions. The satellite will generate approximately 3.7 kilowatts of payload power and will be located at 78.5 degrees East Longitude.

GMV will bring its 25 years of experience to develop, test and install the satellite control center for THAICOM 6. This control center is based upon commercially available hardware for the baseband equipment and timing system—GMV's proven software product highly for satellite monitoring and control and focussuite for space craft flight dynamics. The control center also integrates the ground system monitoring and control.

"GMV is proud to offer exceptional technical competency that enabled us to stand out from the competition to be selected for the THAICOM 6 project," said Theresa Beech, president of GMV USA. "We are pleased to bring our experience in successful communications satellite control center installation and operation around the globe to THAICOM 6 and to build our relationship with THAICOM an important spacecraft operator in Southeast Asia."

THAICOM 6 is expected to launch into orbit in mid 2013. THAICOM has contracted its launch vehicle to SpaceX, aboard the Falcon 9 rocket.

Forty-five percent of the commercial telecommunications satellites launched in 2011 use GMV technology. GMV has been providing satellite ground systems to satellite manufacturers, commercial operators, integrators, and Space Institutions around the world for more than 25 years. In addition, more than 280 space missions have selected GMV technology, and GMV's operational systems are currently installed on six continents in 25 countries. More info at <http://www.usa.gmv.com>.



Artistic rendition of the Thaicom 6 satellite, courtesy of Orbital

Cloud Technology Assists African Firms

VT iDirect, Inc. (iDirect), a company of VT Systems, Inc. (VT Systems), has announced that Q-KON, a leading African satellite network operator, and Business Connexion, a leading African ICT service provider, have partnered to deploy iDirect's iDX 3.1 software upgrade and newly released Evolution X1 remotes.

Through iDX 3.1, Q-KON and Business Connexion can enhance their services for enterprise customers and scale their iDirect networks to a much greater number of sites.

Q-KON anticipates strong demand from its service provider partners for iDX 3.1 to support enterprise-class networks for corporations.

In the case of Business Connexion, iDX 3.1 enables the company to enhance its enterprise cloud services solutions, offering corporations the benefits of virtualization at a lower cost. iDX 3.1 is a great fit for Business Connexion because it is specially designed for the large network deployments required to run an efficient and affordable cloud infrastructure.

iDX 3.1 includes a new 16-channel licensing option for the Evolution XLC-M Line Card that, when paired with the new lower-cost X1 remote, is an ideal solution for large networks featuring one large outbound and numerous small return channels.

Additionally, iDX 3.1's built-in Group Quality of Service (GQoS) enhancements allow service providers to serve customers with large dormant networks more efficiently and affordably by lowering the amount of bandwidth needed to keep idle remotes in network.

Finally, the Evolution X1 Outdoor remotes, which are designed for durability in difficult terrain and weather conditions, offer a reliable solution for sensor-management applications such as SCADA, as well as environmental and surveillance monitoring. To download a spec sheet for the Evolution X1 satellite router, [access this direct link](#).



iDirect's Evolution X1 Satellite Router

MSS Research + Analysis

Amidst an uncertain environment where funding is leveling off due to government budget reductions, mobility via satellite has reached a new level of recognition across the board and is expanding its reach across the globe.

With more than a half-million subscribers on the Iridium platform, Inmarsat having completed designs for three high-power Ka-band satellites, and Globalstar successfully launching the first 18 of its next-generation satellite constellation, the MSS market is poised for the next phase of growth.

NSR has researched and followed growth in the Mobile Satellite Services (MSS) market since its inception, and this coverage enables a complete assessment of MSS opportunities worldwide.

NSR's Mobile Satellite Services, 8th Edition report is a key element of this industry-leading research effort and is a must-have for anyone tracking future demand for satellite-based mobility solutions.

Sounding out the ebb and flows of the MSS market as it navigates to new shores with more handsets, greater bandwidth solutions and new products that are blurring the lines between MSS and FSS providers, this report is the definitive tool to help you track the evolution of this ever-changing marketplace.

Previous editions of NSR's MSS report indicated that satellites with unprecedented

amounts of capacity would lead to a strong battle between MSS and FSS operators, which we are seeing now particularly in maritime markets. However, NSR's reports also noted that even if subscriber base growth would be concentrated mostly in data services, these would not generate enough revenues to ensure future growth prospects. Thus the 'coalition' efforts noted by NSR between MSS and FSS operators to move clients to Ku- and Ka-band, while keeping L-band as a back-up and critical communications solutions, has been validated for a growing number of maritime, aeronautical and land-mobile customers.

This longest-running report on the MSS market provides a completely updated assessment to give readers highly valuable information and data points to examine where the market is headed globally and by region.

NSR's **Mobile Satellite Services, 8th Edition** offers an objective view of the trends underlying the growth and the major impact of drivers and restraints to growth in both commercial and government segments.

By evaluating and forecasting in-service units, equipment and services revenues, average revenues per user, and capacity demand for mobility services, NSR provides the most complete and thorough analysis of expectations in the MSS market for the next ten years.

Serving APAC Communities With 3G Mobile Broadband

Ireland-based Altobridge Limited (Altobridge) has obtained exclusive rights to a mobile data optimization technology that bridges the mobile broadband divide between rural and urban areas.

"After five years of operations in Malaysia, we are currently looking at providing 3G mobile broadband to the remote communities. The new technology, Data-at-the-Edge, delivers mobile data backhaul reductions of over 50 percent, profoundly impacting the costs of delivering mobile broadband via backhaul constrained cellular base stations," Altobridge chief executive officer (CEO), Mike Fitzgerald told *The Borneo Post*.

As such, the technology could be applied to base stations that serve remote communities, remote enterprises and macro urban areas in emerging markets and developing nations.

Also the co-founder of Altobridge, Fitzgerald explained that his experience in China and the U.S. had led him to encounter the same challenges—inability to connect when you get to the rural areas. As such, the company had spent 10 years driving down the cost of remote communications access.

The lite-site™ was the lowest power consumption mobile communications systems for remote communities, using 50 percent less backhaul than competing optimized solutions.

Fitzgerald highlighted that Altobridge had maintained a successful long-term partnership with Maxis Bhd in Malaysia and had its regional headquarters in Kuala Lumpur. It had also identified Sabah and Sarawak as having the greatest demand for its low-cost mobile broadband solutions.

"Over the last three years, we have concentrated on mobile broadband optimisation and this turnkey solution enables the world's mobile network operators to truly bridge the mobile broadband divide," the CEO added.

When asked if Altobridge had faced any challenges in its local operations, Fitzgerald revealed that the company had expected deployment to be a challenge during the initial years of its operation, but he was impressed by the support provided by the local partners.

The company is currently expanding its influence in countries such as Indonesia, Papua New Guinea, the Solomon Islands, among others. Fitzgerald believed

"The high costs have deterred people from putting transmission towers in these rural areas. However, we have since developed 'light on transmission' and 'light on power' method through our Altobridge lite-site," Fitzgerald said.

that it was the dominant supplier in the Southeast Asia and is also looking at Africa and South America in the near future. (Source: *Borneo Post Online*, Chai Li Tiing)



Ku- With An Altitude

Gogo will partner with satellite equipment provider AeroSat to bring a Ku-satellite solution to commercial airlines.

A Ku-satellite solution will allow Gogo to offer airlines connectivity services that extend beyond the United States, including transoceanic routes, and will serve the needs of some of our airlines partners in the near-term until Inmarsat's Global Xpress Ka-satellite service becomes available.

AeroSat will deliver the Ku-satellite antenna, radome, antenna control and modem unit and high power transceiver to Gogo. The AeroSat equipment will be coupled with Gogo's onboard hardware and software (server and access points) to deliver a complete solution to the airlines. The components have already been developed and are currently going through the airworthiness qualification and certification process. Gogo expects to be able to install the Ku-systems on commercial aircraft as soon as the fourth quarter of 2012.

Gogo also recently announced that it will be one of two global service providers of Inmarsat's Global Xpress™ Ka-satellite service. Working with Inmarsat, Gogo expects to begin testing of the Global Xpress Ka-aeronautical services after the launch of the first of the three Inmarsat-5 satellites, which is scheduled for mid-2013. Gogo expects to offer Global Xpress Ka-satellite service after the launch of all three I-5 satellites starting in late 2014 or early 2015.



They're In The Loop

DeLorme is contributing an inReach™ two-way personal satellite communicator and airtime to support Beneteau Powerboats' Greatest Loop Expedition.

The DeLorme inReach product, which won the National Marine Manufacturers Association Innovation Award at the 2012 Miami International Boat Show, is the first consumer-affordable personal satellite communication device offering two-way Follow-Me/Find-Me tracking and locating, text messaging and SOS alerting anywhere on the face of the Earth through the Iridium satellite network.

For the Greatest Loop Expedition, a new Beneteau Swift Trawler 34, crewed by teams of Beneteau dealers and journalists from major U.S. boating magazines, will circumnavigate Eastern North America. The voyage will launch from Annapolis, Maryland, today and will include inland rivers and canals, the Great Lakes, Gulf of Mexico, Atlantic Ocean and Intracoastal Waterway, returning to Annapolis in September.

History Flies On A Falcon While A Dragon Roars

"...I think I would count today as a success no matter what happens with the rest of the mission... For us it is like winning the Super Bowl."—Elon Musk

Space Exploration Technologies (SpaceX) successfully launched its Falcon 9 rocket carrying a Dragon spacecraft to orbit in an exciting start to the mission that will make SpaceX the first commercial company in history to attempt to send a spacecraft to the International Space Station— something only a handful of governments have ever accomplished. Follow SpaceX's liftoff here

started SpaceX, nor could we have reached this point without the help of NASA... It's really been an honor to work with such great people."

The vehicle's first stage performed nominally before separating from the second stage. The second stage successfully delivered the Dragon spacecraft into its intended orbit. This marks the third consecutive successful Falcon 9 launch and the fifth straight launch success for SpaceX.

"We obviously have to go through a number of steps to berth with the Space Station, but everything is looking really



At 3:44 a.m. EDT, the Falcon 9 carrying Dragon launched from SpaceX's launch pad at the Cape Canaveral Air Force Station, heading toward the International Space Station. On that journey it will be subjected to a series of tests to determine if the vehicle is ready to berth with the station.

Broadcast quality videos, including video inside of the SpaceX factory, may be downloaded at vimeo.com/spacexlaunch and high-resolution photos are posted at spacexlaunch.zenfolio.com.

At a press conference held after the launch, SpaceX CEO and Chief Designer Elon Musk began, "I would like to start off by saying what a tremendous honor it has been to work with NASA. And to acknowledge the fact that we could not have

good and I think I would count today as a success no matter what happens with the rest of the mission," Musk said.

He continued by expressing his gratitude to the more than 1,800 SpaceX employees. "People have really given it their all." Describing the scene inside of SpaceX headquarters in Hawthorne, California, he said, "We had most of the company gathered around SpaceX Mission Control. They are seeing the fruits of



Spectators cheer the launch.



It's Clean Channel Technology Authorization

Newtec has received authorization from Intelsat, S.A. for use of its Clean Channel Technology™ (CCT) on Intelsat satellites.

CCT is Newtec's first step toward extending the current DVB-S2 digital signal

transmission standard. The technology further improves satellite transmission efficiency by up to 15 per cent compared to the current DVB-S2 standard for IP trunking, backhauling, government networks and broadcast

contribution. This data is based on live tests conducted in Newtec's laboratories and Intelsat's teleport in Fuchsstadt, Germany. Newtec's customers will be able to use CCT, as it is available as a software field upgrade for existing Newtec equipment.

During the test at Intelsat's Fuchsstadt teleport, Newtec demonstrated

their labor and wondering if it is going to work. There is so much hope riding on that rocket. When it worked, and Dragon worked, and the solar arrays deployed, people saw their handiwork in space operating as it should. There was tremendous elation. For us it is like winning the Super Bowl."

Explaining the significance of the day, Musk stated, "This mission heralds the dawn of a new era of space exploration, one in which there is a significant commercial space element. It is like the advent of the Internet in the mid-1990s when commercial companies entered what was originally a government endeavor. That move dramatically accelerated the pace of advancement and made the Internet accessible to the mass market. I think we're at a similar inflection point for space. I hope and I believe that this mission will be historic in marking that turning point towards a rapid advancement in space transportation technology."

This is SpaceX's second demonstration flight under a 2006 Commercial Orbital Transportation Services (COTS) agreement with NASA to develop the capability to carry cargo to and from the International Space Station. Demonstration launches are conducted to determine potential issues so that they might be addressed; by their very nature, they carry a significant risk. If any aspect of the mission is not successful, SpaceX will learn from the experience and try again.

throughput over a 72 MHz C-band transponder on an Intelsat satellite, or nearly seven bits per hertz. The transmission used CCT and Newtec Bandwidth Cancellation technology alongside a Newtec Wideband modem.

[Link to Newtec's Clear Channel Technology](#)

An App For All Reasons

NASA has just released an updated version of the free NASA App for iPhone and iPod touch.

The NASA App 2.0 includes several new features and a completely redesigned user interface that improves the way people can explore and experience NASA content on their mobile devices. A team at NASA's Ames Research Center in Moffett Field, California, completely rebuilt the NASA App for iPhone and iPod touch. It now has a fast and intuitive interface for the approximately 4.7 million people who've downloaded it so far.

Other new features of NASA App 2.0 include weather forecasts in the spacecraft sighting opportunities section; maps, information and links to all of the NASA visitor centers; a section about NASA's programs, as well as the ability to print, save and access favorite items, and bookmark images. The NASA App 2.0 requires iOS 5.0 or later.



VSAT Solutions Are At The Hub Of The Matter

Comtech Telecommunications Corp. has announced that its Tempe, Arizona-based subsidiary, Comtech EF Data Corp., was awarded a \$3.5 million in Advanced VSAT Solution orders from Harris CapRock Communications, a premier global provider of managed solutions for remote and harsh environments and a business division of Harris Corporation.

Harris CapRock will deploy the Advanced VSAT Solutions throughout five of their operational hubs and onboard its maritime customers' vessels, including Royal Caribbean Cruise Ltd.'s cruise ship fleets.

A suite of Advanced VSAT products was ordered, including the CDM-800 Gateway Router, the CDD-880 Multi-Receiver Router, the CDM-840 Remote Router, the CTOG-250 Traffic Optimization Gateway, and the Vipersat Management System (VMS). The Advanced VSAT Solutions provide high-performance satellite-based communication solutions for a diverse range of applications. Incorporating advanced technologies developed by Comtech EF Data, AHA Products Group, Memotec and Stampede, the solutions provide unmatched performance, bandwidth efficiencies and network optimization, while minimizing total cost of ownership.

The Advanced VSAT incorporates industry-leading optimization. DVB-S2 and VersaFEC with ACM/VCN enable efficient physical layer without compromising latency, while the ultra low overhead Streamline Encapsulation and

Enhanced GSE enable efficient link layer. Header compression and lossless payload compression enable efficient transport for IP datagrams, and RAN optimization minimizes the bandwidth required for mobile backhaul. WAN optimization provides TCP connection management, TCP optimization, image reduction and smoothing, caching, bandwidth pooling, and other capabilities for significant bandwidth savings. And, the Advanced QoS and Group QoS ensure the highest quality of service with minimal jitter and latency for real-time traffic, priority treatment of mission critical applications and maximum bandwidth efficiency.

The Advanced VSAT Solution hardware components will be centrally managed via the Vipersat Management System. The VMS is a feature-rich, automated bandwidth and capacity management system. It will simplify configuration and enable rapid response to network demands. The Advanced VSAT's optimization features combined with the automated bandwidth and dynamic SCPC capacity management of the VMS will facilitate bandwidth sharing and reduce space segment OPEX.

Complementing the Advanced VSAT Solutions, LPOD Block Up Converters were also ordered based on their field-proven performance characteristics and unmatched remote monitor and control capabilities.



Comtech Telecommunications' CDM-800 Gateway Router

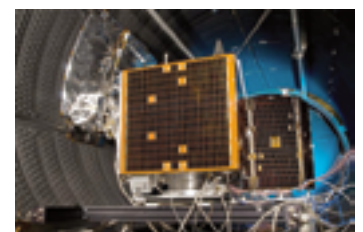
Three In The Hopper...

Prof. Ita Ewa, the Minister of Science and Technology said last Thursday that Nigeria would launch three satellites and send astronauts into space by 2015.

He said the move was part of government efforts to boost the economy through space technology. The minister enumerated the country's space program from now to 2028, when it expects to launch a made-in-Nigeria satellite into space.

"In 2015 we are preparing to launch NigeriaSAR-1 satellite. The NigeriaSAR is a security satellite with an acronym that stands for Synthetic Aperture Radar. This satellite will have a very high resolution that can cover kilometres, and for a backup of the communication satellite, there will be NigeriaSat-2 and NigeriaSat-3. Also, because of the experience we gained in Surrey, U.K., we are going to build an Assembly Integration and Testing Centre for satellite technology, it is ongoing but this year we will put in more efforts to that technology. And before I leave office in 2015 we will send a Nigerian Astronaut into space."

He said by 2018 Nigeria would launch a manufactured satellite and in 2025 develop rocket and propulsion system. Ewa enumerated the achievements of the ministry to include the launch of two low earth observation satellites—NigeriaSat-2 and NigeriaSat-X as well as a communication satellite, NigComSat-1R. He also said a rocket was recently launched from Epe, Lagos. (Source: [allAfrica.com](#))



NigeriaSat-2 + NigeriaSat-X — photo courtesy of SSTL

XBOX Nanosats—Not For Playing ‘Space Invaders’

Similar in design to STRaND-1, the Surrey Satellite Technology’s (SSTL) identical twin satellites will each measure 30cm (3 unit Cubesat) in length, and will use components from the XBOX Kinect games controller to scan the local area and provide the satellites with spatial awareness on all three axes—thus allowing them to dock.

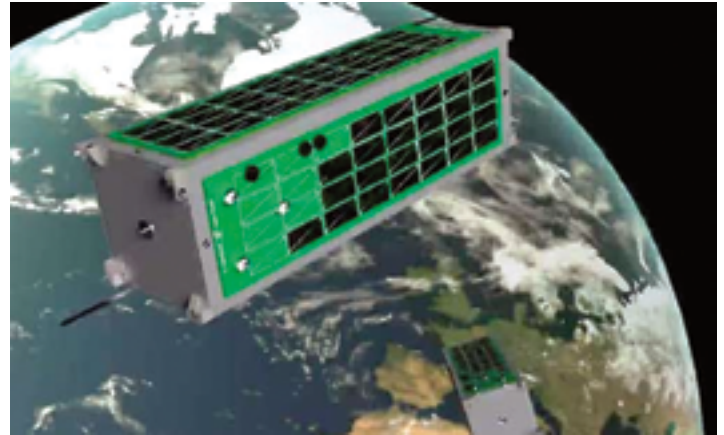
The STRaND team sees the relatively low cost nanosatellites as intelligent “space building blocks” that could be stacked together and reconfigured to build larger modular spacecraft. Learn more at.

Other applications include the safe removal of space debris and spacecraft

maintenance, with a low cost “snap-on” nanosatellite...

Space innovators at the University of Surrey and SSTL are developing ‘STRaND-2’, a twin-satellite mission to test a novel in-orbit docking system based upon XBOX Kinect technology that could change the way space assets are built, maintained and decommissioned.

STRaND-2 is the latest mission in the cutting edge STRaND (Surrey Training, Research and Nanosatellite Demonstrator) programme, following on from the smartphone-powered STRaND-1 satellite that is near completion. Similar in design to STRaND-1, the identical twin satellites will each measure 30cm (3 unit Cubesat) in length, and utilise



components from the XBOX Kinect games controller to scan the local area and provide the satellites with spatial awareness on all three axes.

Docking systems have never been employed on such small and low cost missions and are usually reserved for big-budget space missions to the International Space Station (ISS), or historically, the Mir

space station and the Apollo program. The STRaND team sees the relatively low cost nanosatellites as intelligent “space building blocks” that could be stacked together and reconfigured to build larger modular spacecraft.

SSTL Project Lead Shaun Kenyon explained: “We were really impressed by what MIT had done flying an autonomous

model helicopter that used Kinect and asked ourselves: Why has no-one used this in space? Once you can launch low cost nanosatellites that dock together, the possibilities are endless – like space building blocks.”

The STRaND-2 twins will be separated after launch. After the initial phase of system checks, the two satellites will be commanded to perform the docking procedure and, when in close proximity, the Kinect-based docking system will provide the satellites with 3D spatial awareness to align and dock.

Dr. Chris Bridges, SSC Project Lead, explains: “It may seem far-fetched, but our low cost nanosatellites could dock to build large and sophisticated modular structures such as space telescopes. Unlike today’s big space missions, these could be reconfigured as mission objectives change, and upgraded in-orbit with the latest available technologies.”

Other applications include the safe removal of space debris and spacecraft maintenance, with a low cost “snap-on” nanosatellite providing backup power, propulsion or additional on-board computing capability.

Thrust Into Orbit

China successfully sent a telecommunication satellite, ChinaSat 2A, into orbit on May 26th.

A Long March-3B carrier rocket was used to launch the satellite from the southwestern Xichang Satellite Launch Center. The rocket blasted off at 11:56 p.m., Beijing time. The satellite, developed by China Academy of Space Technology, will be used to meet the demands for China’s radio and TV broadcasting and broadband multimedia transmissions, according to China Satellite

Communications Co. Ltd. Saturday’s launch marked the 163th mission of the Long March carrier rocket series developed by China Academy of Launch Vehicle Technology under the China Aerospace Science and Technology Corporation.



Set To Develop An EO System

Korea will initiate a new system in 2018 to monitor environmental conditions by launching the world’s first satellite for monitoring climate change over the Korean Peninsula.

The Environment Ministry and the National Institute of Environment Research said Monday in a statement, “We have recently begun to develop an Earth environment satellite to monitor climate change and

air pollution in Northeast Asia.”

The ministry said the U.S. and Europe observe air pollution and global warming via a low-earth orbit satellite. It orbits about 700 kilometers above the Earth’s surface and its orbit crosses the Arctic and the Antarctic. Therefore, it can seamlessly monitor air pollution in a region and its movement as well as climate change patterns.

A geostationary orbit satellite moves like the Earth in an orientation standing of more than 36,000 kilometers from the Earth. This allows the satellite to focus on a certain point on the Earth.

The Earth environment satellite will be equipped with facilities such as an optical telescope to measure ultraviolet and visible light waves. The device will track the occurrence and movement of ozone, which causes climate change, and sulphur dioxide, nitrogen dioxide and formaldehyde across 25 million kilometers from the peninsula.

The satellite’s cost is an estimated 640 billion won (542.3 million dollars). An Environment Ministry source said, “We will manufacture the body of the satellite in 2015 and launch it in 2018 after running all sorts of tests.” (Source: The Dong-A Ilbo.)

“No” To Russia

Kazakhstan is reportedly blocking upcoming Russian satellite launches due to a dispute with Russian space authorities over the drop zone for rocket debris, this according to a report on the Radio Free Europe website.

Unnamed officials spoke about the dispute with Russia’s Kommersant daily and Interfax news agency. No public confirmation was readily available.

The dispute reportedly concerns plans for debris from Russian Soyuz rockets—which carry satellites into orbit—to fall to Earth in the northern Qostanai region after launch from the Baikonur space center. Reports say Kazakhstan wants the drop zone included in an amendment to Astana’s current launch-leasing accord with Moscow.

Qostanai is the same region where nearly 1,000 rare saiga antelopes were recently found dead following the landing of a Russian spacecraft there in April. However, no scientific link between the spacecraft and the dead saiga has been announced. And, given the less-than-friendly relationships between the two countries recently concerning Russia’s new launch site that is under construction, there may be more to this denial of launch than such might seem at first viewing.



Photo is courtesy of the European Space Agency (ESA)

There's More Asteroid Hazards Than You May Have Thought

Observations from NASA's Wide-field Infrared Survey Explorer (WISE) have led to the best assessment yet of our solar system's population of potentially hazardous asteroids.

Also known as "PHAs," these asteroids have orbits that come within five million miles (about eight million kilometers) of Earth, and they are big enough to survive passing through Earth's atmosphere and cause damage on a regional, or greater, scale. The asteroid-hunting portion of the WISE mission, called NEOWISE, sampled 107 PHAs to make predictions about the population as a whole. Findings indicate there are roughly 4,700 PHAs, plus or minus 1,500, with diameters larger than 330 feet (about 100 meters). So far, an estimated 20 to 30 percent of these objects have been found. PHA (scatter, 558px)

The WISE space telescope has been able to detect the infrared light, or heat, of asteroids, and picked up both light and dark objects, resulting in a more representative look at the entire population.

PHAs are a subset of the near-Earth asteroids (NEAs). They have the closest orbits to

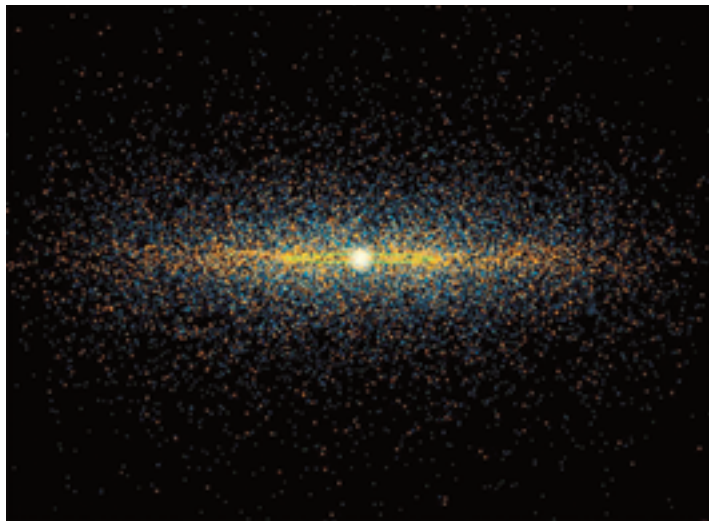
Earth's orbit, coming within 5 million miles (about 8 million kilometers), and they are large enough to survive passage through Earth's atmosphere and cause damage on a regional, or greater, scale.

The new analysis suggests that about twice as many PHAs as previously thought reside in low-inclination orbits, which are roughly aligned with the plane of Earth's orbit.

The NEOWISE analysis suggests a possible origin for the low-inclination PHAs: Many of them could have originated from a collision between two asteroids in the main belt lying between Mars and Jupiter. A larger body with a low-inclination orbit may have broken up in the main belt, causing some of the fragments to drift into orbits closer to Earth and eventually become PHAs.

The discovery that PHAs tend to be bright says something about their composition; they are more likely to be either stony, like granite, or metallic. The NEOWISE results have been accepted for publication in the *Astrophysical Journal*.

(Source: *Science@NASA*, Dr. Tony Phillips)



Edge-on View of Near-Earth Asteroids
Image credit: NASA/JPL-Caltech

Intelsat Is First...No Light Matter As They Sign On SpaceX's Falcon Heavy...

Falcon Heavy, the world's most powerful rocket, represents SpaceX's entry into the heavy lift launch vehicle category.

With the ability to carry satellites or interplanetary spacecraft weighing over 53 metric tons (117,000 lb) to Low Earth Orbit (LEO), Falcon Heavy can lift nearly twice the payload of the next closest vehicle, the US Space Shuttle, and more than twice the payload of the Delta IV Heavy.

lifting 53 metric tons (117,000 pounds) to low Earth orbit and over 12 metric tons (26,000 pounds) to GTO, Falcon Heavy will provide more than twice the performance to low Earth orbit of any other launch vehicle. This will allow SpaceX to launch the largest satellites ever flown and will enable new missions.

"Timely access to space is an essential element of our commercial supply chain," said Thierry Guillemain, Intelsat

This is the first commercial contract for SpaceX's Falcon Heavy launch vehicle. Under the agreement, an Intelsat satellite will be launched into geosynchronous transfer orbit (GTO).

Building on the reliable flight proven architecture of the Falcon 9 launch vehicle, Falcon Heavy is also designed for exceptional reliability. The vehicle is designed to meet both NASA human rating standards as well as the stringent U.S. Air Force requirements for the Evolved Expendable Launch Vehicle (EELV) program, making it an attractive solution for commercial, civil and military customers.



SpaceX' Falcon Heavy launch vehicle

Intelsat and Space Exploration Technologies (SpaceX) have announced the first commercial contract for the latter's Falcon Heavy rocket.

"SpaceX is very proud to have the confidence of Intelsat, a leader in the satellite communication services industry," said Elon Musk, SpaceX CEO and Chief Designer. "The Falcon Heavy has more than twice the power of the next largest rocket in the world. With this new vehicle, SpaceX launch systems now cover the entire spectrum of the launch needs for commercial, civil and national security customers."

Falcon Heavy is the most powerful rocket in the world and historically is second only to the Apollo-era Saturn V moon rocket. Capable of

CTO. "As a global leader in the satellite sector, our support of successful new entrants to the commercial launch industry reduces risk in our business model. Intelsat has exacting technical standards and requirements for proven flight heritage for our satellite launches. We will work closely with SpaceX as the Falcon Heavy completes rigorous flight tests prior to our future launch requirements."



Artistic rendition of the Intelsat-22 satellite.

Payloads Scorecard Developed

The Hosted Payload Alliance (HPA) has announced the launch of the research report, "Hosted Payloads: The View From Within" a joint venture between HPA and Euroconsult.

The report will serve as a "benchmarking scorecard" that will evaluate government payloads on commercial spacecraft. Compiled with the aid of HPA executive members, the report identifies all current and historic payloads. It also provides a concise overview of hosted payloads featuring the payload type, launch year, sponsor, manufacturer, host and arrangement.

Additionally, the report features a case study analysis of five hosted payload programs. The case studies were selected in consultation with HPA and cover different payload types, clients and arrangements. Each case study was conducted following a similar structure including program overview, stakeholders map, performance assessment, risk allocation matrix, major

drivers and inhibitors and key lessons learned.

"From our interviews with all of the stakeholders in the process, it was clear to us that everyone who has given serious consideration to the concept recognizes the potential value of hosted payloads", said Susan Irwin, President of Euroconsult U.S.A. "And although the challenges are not insignificant, early and careful planning, ongoing open dialogue, and trust and goodwill among the partners can result in a win-win for both industry and government".

"The Hosted Payload Alliance recognizes the success of hosted payloads will be driven by a deep and shared understanding of the issues surrounding hosted payloads", notes HPA Chairman Don Thoma. "Sustained research and analysis, as delivered in this report, allows industry and governments to respond to the dynamic business of hosted payloads. HPA members are dedicated to leading the educational campaign through partnerships with Euroconsult and other stakeholders".

The report marks HPA's first educational endeavor. HPA and Euroconsult will be presenting the key findings in an online webinar in late June, 2012. For more information about the upcoming webinar, please contact asmith@hostedpayloadalliance.org. HPA looks forward to providing subject-matter expertise on the evolving trend of hosted payloads through comprehensive data collection and analysis.

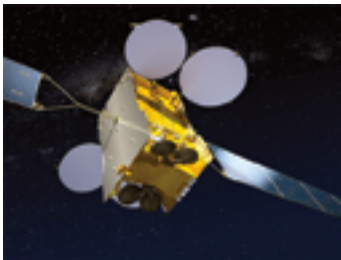
Established in 2011, HPA is an independent, not-for-profit satellite industry alliance formed to increase awareness and promote the benefits of hosted government payloads on commercial satellites. HPA's purpose is to serve as a bridge between government and private industry, fostering open communication between potential users and providers of hosted payload capabilities. HPA focuses on education, awareness and developing solutions to common challenges.

DTH Capacity Pickup

MEASAT Global Berhad ("MEASAT Global") has entered into an agreement with MEASAT Broadcast Network Systems Sdn. Bhd. ("ASTRO") for capacity on the MEASAT-3b satellite.

The agreement was executed by a MEASAT Global subsidiary. Under the agreement, ASTRO had committed to leasing 18 Ku-band transponders on MEASAT-3b for the life of the satellite for its Direct-To-Home ("DTH") services in Malaysia and Brunei.

The MEASAT-3b satellite has been designed to provide an additional 48 Ku-band transponders to the 91.5 degrees East orbital location. Operating in tandem with the MEASAT-3 and MEASAT-3a satellites, MEASAT-3b will provide high powered Ku-band capacity for DTH services across Malaysia, Brunei, Indonesia and India for growth and backup services.



Artistic impression of the MEASAT-3B satellite, image courtesy of Astrium.

A Rugged Outing

Advantech Wireless has unveiled its new KR Series of products for military applications.

This new product line was featured at the CANSEC 2012 show in Ottawa, Ontario, Canada.

The Advantech Wireless KR Series features the Mobile Communications Unit – MCU 2000, the 3G/WiFi Router, the Remote Eye wireless audio/video camera, the Wireless Bridge WBR-2000, the Eagle Eyes wireless video, voice and Location Vest Unit and the Sniper Wireless Ballistic Calculator System. Designed for in-theatre use, these products offer state-of-the-art technology in compact and rugged form factors.

In addition, Advantech Wireless will also show its newest generation Raptor/Discovery TDMA/SCPC VSAT HUB and terminals, for instant Tactical Satellite Mobile communications, the RAR9160 ruggedized router and the AMT73L MIL-STD-188-165A DISA certified FDMA modem. The performance features of Advantech Wireless products include high performance and interoperability, while meeting the demanding environmental and reliability requirements of the military.

"Maintaining secure and reliable communications is vital for military applications. This line of military products is to be used in some of the harshest places on the map," said Pierre Cardinal, VP Global Sales at Advantech Wireless. "Our proven track record in providing communication equipment to key defence agencies in deployments around the globe was instrumental in expanding our product line at this time."

Network Management That's Cost Effective

VT iDirect, Inc. (iDirect), a company of VT Systems, Inc. (VT Systems), has announced that Bentley Walker Ltd., one of the largest VSAT network operators in Europe, has upgraded its global satellite network to iDirect's iDX 3.1 platform release.

IDX 3.1 offers new hardware and software features to support large-scale narrowband networks. Through iDX 3.1, Bentley Walker can extend its reach by offering its service provider partners an efficient and affordable solution to pursue new market opportunities.

iDX 3.1, which includes iDirect's new low power, compact, and easy-to-install Evolution X1 remotes, opens the market for Bentley Walker to engage more channel partners in the SOHO, SCADA, and utilities verticals. The lower price point of the X1 remote and the enhanced efficiency of the iDX 3.1 software upgrades have also reduced the barrier to entry to become a reseller partner with Bentley Walker, allowing the company to increase its presence in price-sensitive markets such as South America and Africa.

iDX 3.1 enables Bentley Walker to scale its existing iDirect networks to a significantly greater number of sites. With Group Quality of Service (GQoS) enhancements, service providers can now manage large-scale networks more cost-effectively by lowering the amount of bandwidth needed to keep idle or dormant remotes in network.

Additionally, the new licensing option for the Evolution XLC-M Line Card enables a single XLC-M to support up to 16 narrowband return channels, making it perfect for large networks featuring one large outbound and numerous small return channels.

Turkish Delight

SES (Euronext Paris and Luxembourg Stock Exchange: SESG) has signed a multi-year contract with Turkish public broadcaster Türkiye Radyo ve Televizyon Kurumu (TRT).

The agreement is for the free-to-air broadcasting of its international digital channel TRT Turk on ASTRA's 19.2 degrees East orbital position which started on May 21st. TRT will use former analogue capacity on ASTRA that became available when broadcasters in Germany switched off the analogue satellite signals on 30 April.

With a line-up of more than 800 TV channels and access to nearly 100 million homes across Europe, ASTRA's 19.2 orbital position provides unrivalled opportunities for broadcasters and TV viewers.



Scott Sprague, Chief Operating Officer, Asia Broadcast Satellite (ABS)



Scott Sprague brings a myriad of experiences to Asia Broadcast Satellite (ABS) and, most importantly, the experience of successfully running a sales organization of a global satellite operator while he was with SES. In addition to serving as a member of the Executive Management Team, Scott is principally responsible for managing the global sales and service operations of ABS.

Prior to joining ABS, Scott Sprague was Senior Vice President, Global Sales for SES. During his tenure at SES, he was responsible for global revenue, led a sales team, and built a portfolio of businesses for media, enterprises and customers around the globe.

Mr. Sprague has held various senior management positions that have included: Vice President of Enterprise Sales for KPNQwest, Vice President of Channel Management for Infonet Service Corporation, and General Manager for AT&T. He oversaw functional activities, sales and revenues.

Mr. Sprague earned an MBA in International Business from Western International University and a BS degree in Business Administration from Illinois State University.

SatMagazine (SM)

Please explain what Asia Broadcast Satellite's (ABS) presence is within the Asia-Pacific (APAC) satellite communications markets?

Scott Sprague

Asia Broadcast Satellite (ABS) is one of the fastest growing satellite operators in the world. Established in 2006, ABS has grown from a single satellite operator to operating four satellites (**ABS-1**, **ABS-1A**, **ABS-3** and **ABS-7**) in orbit, with its fifth satellite—**ABS-2**—in construction and scheduled to launch during the second quarter of 2013. Two further **Boeing** satellites have been confirmed and are expected to launch late 2014 or early 2015. ABS serves a global customer base with representatives in Asia, the Middle East, Europe and North America. We provide tailored solutions that deliver high quality and reliable services including broadcasting, DTH, Cellular Backhaul, VSAT and Internet backbone services.

SM

Are you focused on any particular segments, due to their growth potential? (i.e., launch, manufacturing, teleport, security, milsatcom, imagery, satellite broadcast, and others) What market segments in APAC do you believe are the most promising for your Company?

Scott Sprague

Our ability to leverage our acquisitions, in-orbit assets as well as our launches, to capture some of the high growth markets of the world is a key advantage.

We see growth in all types of applications within the Asian marketplace, with DTH in Thailand, Indonesia, Vietnam, Laos and India. The enterprise market is growing but very competitive with a lot of pressure on pricing. There is strong demand coming out of Indonesia, Papua New Guinea and also India, where there are some of the world's largest VSAT networks. We continue to see increased demand for military type applications in North East Asia and the Pacific Island region.

SM

What have been your most successful projects? Why?

Scott Sprague

2011 was an exciting and transformational year for ABS as we acquired additional satellite assets that transformed the company from a regional into a global operator. There were a number of large consosat deals confirmed for ABS-2 in excess of \$200M, which provided additional funds available for our expansion plan of ordering new satellites and continuing our development of new orbital locations.

We have invested in upgrading our ground infrastructure and playout facilities in both Hong Kong and Subic Bay. This gives us the ability to consolidate some of our operational expenditure and also to potentially add more value to the service side of the business, specifically with the broadcast aspect of the operation. This will enable us to provide our customers with a richer portfolio of services that will help them to access satellite capacity to support their growing business requirements.

Our next focus will be the launch of ABS-2 launching mid next year. It will be equipped with up to 89 active C-, Ku-, and Ka-band transponders with 10 high-powered beams bringing increased capacity and coverage tailored to support the Asia Pacific, Africa, the Middle East, Eastern Europe and CIS regions. ABS-2 will provide direct TV broadcast, multimedia applications, VSAT networks, telecommunications and data services.

SM

The challenges are numerous for entry into, and for business sustainment within, this area of the world. What do you see as among the most formidable challenges to surmount?

Scott Sprague

As a young satellite operator, we are always looking for smart acquisitions which allow us to expand our business more affordably and quickly than organic growth. We continue to look for opportunities to expand our fleet, increase our global coverage and gain access into more markets.

Over the next 12 months, we will be looking for financing support from the **U.S. EXIM** bank for our growth and expansion. Secondly, we are going to start securing pre-commitments for the expansion slots where we are building new satellites. We are going to have multiple talks with potential anchor customers. All of this has to be secured in the next 12-24 months prior to the launch of these satellites. Our challenges will be to improve the balance sheet with lower cost capital, and secure more customers to enable our future expansion.

SM

Given the state of the global economy, how do you rate the APAC market as far as its viability for income generation and growth over the next year or two? Where do you see the opportunities for growth?

Scott Sprague

The APAC market is exciting because it is so diverse. We see growth opportunities across the region with each individual market segment offering different challenges. We feel that our culture of being quick to market and responsive to our customers puts us in a very good place to capture growth opportunities across the region. Some examples include our collaboration with **Korea Telecom**, our deployment of broadcast services from our *Subic Bay* facility in the Philippines, and our continued commitment to support DTH growth throughout the region.

SM

How do you believe the APAC satellite market will impact global, as well as your own Company's, business opportunities?

Scott Sprague

Our strategy is to continue to grow on a global basis. The APAC region is a key component of that strategy. Our current and future plans demonstrate our commitment to this region. With the launch of ABS-2 in 2013, we will once again confirm that ABS is investing in the APAC marketplace. We believe that satellite based services will continue to grow across the region and that ABS is well placed to benefit from this growth.

Asia Broadcast Satellite website



**Artistic rendition of the
ABS-2 satellite**

Standardized + Customized Service Requirements @ Sea

By Tore Morten Olsen, CEO, Marlink Group

Increasing data throughput and enhancing network efficiency are important aspects of the fast-paced development of standardized and customized satellite communications at sea, according to Marlink.

In March 2012, Marlink completed integration of iDirect's *Evolution® X5* platform and latest operating software release on its Ku-band network. Vessels operating Marlink's *WaveCall™* services have now all received the required on board equipment, enabling increased reliability for voice, email, Internet and remote business applications.



The upgrade to Evolution hardware and software is a key element in meeting evolving customer requirements in the maritime sector for increased bandwidth and more reliable and efficient solutions for core voice and data connectivity.

iDirect Evolution is based on DVB-S2 with *Adaptive Coding and Modulation (ACM)*, which provides significant bandwidth efficiency gains over legacy systems. ACM helps Marlink ensure maximum service uptime for maritime vessels by automatically adjusting signal strength to overcome rain fade outages. Additionally, iDirect's built-in Group Quality of Service features allow Marlink to efficiently control how it allocates and prioritizes shared bandwidth by customer group, and even application type.



iDirect initially rolled-out their technology for Ku-band services. However, at the start of May, **Marlink** introduced new C-band services on iDirect, as well, opening new options for customers using **Sealink™** global C-band coverage for business critical applications. The services will be among the first in the industry to use **DVB-S2 with ACM** on regional, multi-regional and global maritime C-band.

These developments in Marlink's VSAT network and service offerings reflect the competitiveness and fluidity of the satellite communications market at sea. No more than a decade ago, there were only five or six maritime service providers, working with platform and ship operators to pioneer high bandwidth connectivity at sea. Today, there are literally hundreds of service providers, all able to offer some form of connectivity, be it based on **Iridium, Inmarsat, Thuraya, GSM** or **VSAT**.

The defining factor differentiating suppliers is their ability to offer standardized as well as customized solutions. The customers with high bandwidth requirements in the previous decade, served by the original satellite service providers such as Marlink, were cruise vessels that needed high bandwidth as well as offshore platforms and support vessels who required the ability to monitor, collaborate and access business critical applications. Later, maritime transport vessel requirements for connectivity grew quickly, but the need for customized solutions is as strong today as it ever has been.

Customized VSAT For Specialist Applications

Marlink's role as a customized VSAT provider is usually within the offshore and cruise sectors, developing complex networks based on Ku- and C-band Sealink services. As service configuration varies in customized VSAT, it is extremely advantageous that the service provider operates its own teleports. Such ownership ensures the flexibility required to meet the specific requirements of the vessel owner. The advanced requirements of these customers is due to their sophisticated operations—communication based on customized VSAT can save time and money, by connecting them with experts, colleagues, other stakeholders and their own software and hardware systems.

GC Rieber, an offshore vessel operator, uses customized VSAT as its communication backbone. The company specializes in the operation of vessels within subsea, ice/support and marine seismic sectors. This means communications are an integral part of satisfying its own customers' needs as well as improving efficiency of the company's operations.

Essentially, the satellite communications provided by Marlink's Sealink VSAT ensures always-on and high-speed connectivity for continuous and immediate replication of information on board the vessel and onshore. The primary applications for the connectivity are email, Internet access and cost-effective voice for telephone calls as well as replication of PMS and QHSE databases.

According to GC Rieber, bandwidth provided by the VSAT is prioritized for customers hiring the vessels, which commonly includes seismic, subsea and oil research companies as well as research departments within governments or universities. If there is a charterer that's hired a vessel, it could have its own customers on board who each have their own specific needs for satellite communications. GC Rieber, therefore, has a wide-range of requirements that must be accommodated including support for the company's strategy that ensures diverse communications are available.

Providing this flexibility requires the ability to control the entire value chain. There must be a team of engineers who are able to establish the system based on specific requirements. Experience, creativity, industry weight and teleports owned by the service provider combine to enable complex systems that offer simple services to customers with very specialized needs.

Standardized VSAT For Maritime Transport

The need for customized communication services in the offshore (and cruise) maritime sectors differs from the maritime transportation market, where L-band products such as **FleetBroadband**, legacy Inmarsat services and Iridium **OpenPort/Pilot** are most prolific. Standardized Ku-band VSAT is starting to gain market share as a certain amount of commoditization has witnessed the introduction of new products

and services that enable ship owners to select off-the-shelf services and packages.

Maritime transport companies generally require less complex systems than offshore and cruise operators. This is because their core use of connectivity is mostly crew welfare and lighter operational communication. Essentially, the applications in use, such as email, web browsing, VPN and some remote monitoring of engineering and operations, are relatively standard. VSAT can be used to offer lower-cost communication and is the most common service in use. Additionally, vessels may also sail with a secondary L-band system, most commonly FleetBroadband, to ensure a base level of connectivity globally should VSAT coverage become unavailable. This approach is gaining in popularity, with 80 Marlink Bundled Offerings featuring Ku-band as primary and L-band as back-up communication being sold since the launch in 2011.

Marlink's WaveCall™ service was developed as a standardized solution to fit customer requirements with little or no customization. The service is live on hundreds of vessels worldwide and is a preferred choice for large fleets looking for the same solution across multiple vessels. For instance, over the next three years, all **Odfjell** managed vessels (40 in total) will be equipped with Internet access by installation of the WaveCall™ VSAT. The company tested several Internet access systems on board five vessels for a lengthy period of time in order to gain experience with the different VSAT technologies



The Bow Firda, photo courtesy of Odfjell



from different suppliers and to then integrate Internet access via existing ICT systems.

After evaluating several tenders from market-leading VSAT providers, Odfjell decided to implement Marlink's proposal. Alongside the WaveCall™ service were several Value Added Services such as web filtering, Voice Over IP, private networking between ship and office and a secure remote access to the vessel for remote support. The solution requires two new antennas to be installed, where an L-band antenna will act as a backup system to be used in areas where there is no VSAT coverage yet. Older satellite communication systems will be replaced by the new systems.

Although a standardized service, Marlink and the Odfjell ICT department have developed technical solutions to optimize the link as much as possible in order to enhance the user experience. In addition to Internet access, the vessels will also receive IP based phones with local Norwegian or Singaporean phone numbers—the Voice Over IP service will offer a much better voice quality as compared to regular satellite phone calls, while being less expensive for the crew to use.

A fixed, therefore predictable, monthly fee will cover the costs for the required equipment and the airtime for the Marlink WaveCall™ solution, with the option to combine with Value Added Services. This fixed monthly price of the communication package has justified roll out of this communication solution to all vessels within a maximum period of 36 months, according to an Odfjell statement.

State-of-play In The Maritime Market

From an industry perspective, maritime satellite communications are still going through a change-phase, which is being accelerated by the introduction of new services. For instance, many shipping

companies have, or are considering, a move to standardized VSAT from FleetBroadband. Operators are looking at Ku-band VSAT and the additional bandwidth benefits and fixed monthly pricing it offers as a serious alternative to L-band. Indeed, with ongoing development of global coverage, Ku-band is becoming ever more attractive to maritime companies regardless of the sector they operate in.

Ka-band is becoming more prominent too. **Global Xpress**, according to Inmarsat, will be live and fully functional in 2015 and Marlink is committed to offering this new service to the market. Likewise, the Company also demonstrates its technology and platform independence by offering alternative Ka-band services, based on the Thor satellite, which are scheduled to go live before the new Inmarsat service is fully available. These will be the first Ka-band services available for maritime customers.

As Ka-band is the target of a great deal of interest currently in the industry, it's important that ship owners recognise that Ku-band already offers near global coverage, and, with the use of DVB-S2 with ACM and Automatic Beam Switching, the services already available offer the near global seamless coverage that Ka-band providers are focusing on for their forthcoming offerings.

Recognising such flexibility is vital to ship operators. Marlink will embrace Ka-band and ensure that its customers across all sectors have access to cost-effective and available services on a global basis. Additionally, the company firmly supports other services, including **Iridium** and **Thuraya**, both of which are established as proven technologies for vessels operating across the globe.

Regardless of the platform, band or technology being used, satellite communication has become a pre-requisite for commercial vessels and certainly one of the factors that has helped shape services that offer tangible ROI. If a survey vessel costs \$100,000 per day, the communication budget is a small percentage of this expense. Over time, communication costs can become quite significant. However, if the connectivity offered by the communication services can save money in operations, such as instantly delivering seismic data to shore, then the communication budget becomes an operational cost that provides a significant return on that investment.

About the author

Tore Morten Olsen has 16 years of experience in the satellite communications sector working for Telenor and Vizada. He started in 1994 as a technical product manager and moved into the commercial field responsible for the governmental market sector in 1997. In 1999, Tore Morten moved to Slovakia to lead the international satellite communications activities of Telenor and he returned to Norway to take responsibility of Telenor Satellite Networks AS in 2004.

Since 1999 Tore Morten has held several senior positions within the company to include CEO Telenor Slovakia spol.s.r.o, Chairman of the Board of Directors in several Telenor Satellite Networks companies, Country Manager for Telenor in Slovakia, CEO of Telenor Satellite Networks. Following the establishment of Vizada, Tore Morten has taken responsibility of the Maritime VSAT and Mobile Satellite Services retail activities of the company, operating under the Marlink brand. He is currently CEO of Marlink Group and holds numerous Board positions in the Vizada group.

Tore Morten holds a M.Sc in Telecommunications from the Norwegian Technical University from 1993, and has participated in Executive MBA programs both at Wharton Business School in the U.S., Insead in France and Stockholm School of Economics in Sweden.



The Global, Wireless, M2M Market

By Tobias Ryberg, Co-Founder, Berg Insight

The global wireless M2M market was strong in 2011, displaying growth in all major world regions and vertical segments. Berg Insight estimates that shipments of cellular M2M devices increased by 35.3 percent to a new record level of 50.8 million units. Adjusted for churn, this resulted in net additions of 29.3 million M2M connections in 2011, taking the worldwide number of cellular M2M subscribers to an estimated 108.0 million. Until 2016, Berg Insight forecasts that shipments of cellular M2M devices are estimated to grow at a compound annual growth rate (CAGR) of 24.6 percent to reach 152.2 million units.



Due to the wide adoption of wireless M2M technology across many industries, a substantial share of M2M device shipments is now generated from replacement sales. As a result the net increase of M2M subscribers will be substantially lower than M2M device shipments. Berg Insight forecasts that the number of cellular M2M connections will grow at a compound annual growth rate (CAGR) of 27.2 percent between 2011 and 2016 to reach 359.3 million at the end of the period.

The most significant market development in 2011 was a major breakthrough for cellular M2M communication in Asia-Pacific. The number of M2M subscribers in the region increased by 64 percent to reach approximately 34.5 million at the year-end, fuelled by massive growth in China that almost doubled its cellular M2M subscriber base to approximately 21 million. North America and Europe recorded annual growth rates of around 26 percent each. At the end of 2011, the number of M2M subscribers in the EU and the U.S. was around 30 million and 27 million respectively. Other world regions accounted for around 20 percent of the global cellular M2M subscriber base in 2011. Latin America had an estimated 6.6 million M2M subscribers, with Brazil being the most advanced country. Southern Asia and Southeast Asia were in a very early phase of adoption with few M2M subscribers in major countries such as India and Indonesia. The Middle East and African markets were dominated by South Africa and Turkey, which had in excess of one million M2M subscribers each.

M2M's Scope

A sweeping change has transformed the wireless modules industry in the past years. The familiar brand names Siemens, Wavcom, Motorola and Enfora have disappeared and new players such as Sierra Wireless and Gemalto are now in charge of developments. Chinese vendors have taken over the domestic market and some of them are starting on international expansion. Despite a consolidation among Western vendors, average selling prices for wireless modules continue to decline and as a result industry revenues have been declining in the past years. Well executed transformational strategies will be the key to success for wireless module vendors in the years to come. Extended value propositions, product innovation and more mergers and acquisitions are some of the things to expect. Meanwhile software and system solutions has emerged as the fastest growing segment in the M2M industry.

Increasingly advanced large-scale M2M applications require advanced service enablement platforms that integrate remote devices, mobile networks and enterprise applications. A wide range of players are attracted by the market opportunities in the space, most of them having backgrounds in embedded solutions, telecom OSS/BSS systems or enterprise application platforms.

Mobile operators all over the world have announced initiatives for driving growth in the wireless M2M market over the past years. The first results are now visible through rapidly increasing numbers of M2M subscribers and higher revenues. Berg Insight estimates that the world's 10 largest telecom operators by revenues had 68.2 million M2M subscribers at the end of 2011, an increase of approximately 38 percent year-on-year. Around 3.4 percent of their aggregated base of 2.0 billion mobile subscribers was M2M devices. China Mobile is believed to have emerged as the world's largest provider of M2M connectivity during 2011, with an estimated 14 million subscribers at the year's-end. AT&T established a clear leadership in the U.S. with 13.1 million M2M subscribers—up 40 percent year-on-year. Meanwhile Verizon Wireless' M2M subscriber base increased modestly to around 8.6 million. Vodafone held the number three spot with approximately 9 million M2M connections, ahead of T-Mobile and Telefónica, which ended the year with around 6–8 million M2M connections each. China Telecom entered the top 10 with around 4.5 million M2M subscribers, racing ahead of Telenor, Sprint and Orange at 2.5–3.5 million connections each.

About the author

Tobias Ryberg is co-founder of Berg Insight and principal analyst responsible for the M2M research series. He is an experienced analyst and author of numerous articles and reports about IT and telecom for leading Swedish and international publishers. All major vertical market segments for Wireless M2M have been his major research area for the past nine years. Tobias holds a degree from the School of Economics and Commercial Law at Gothenburg University, Sweden.



Executive Spotlight

Paul Weldon, Senior Vice President, Global Sales, ASC Signal

Paul Weldon joined ASC Signal's team as Senior Vice President of Global Sales in January, 2010. He is responsible for leading the company's worldwide sales team and driving revenue growth by more than 100 percent within five years. He has been building and leading sales teams for high growth tech companies for more than 15 years. Prior to joining ASC Signal, Paul was Vice President of Sales of Trusonic Inc., a leading provider of digital audio distribution for commercial applications. During his tenure at Trusonic, Weldon helped the company achieve 40 percent sales growth in one year.

His previous roles included Vice President of Sales of Tolt Service Group, a leading provider of on-site maintenance, break/fix and life cycle management for major U.S. food retailers, where he helped the company grow to \$75 million in sales; and Vice President of Sales of Max Displays, an LCD Display company that provided multiple monitor solutions to Dell and others around the world.

Mr. Weldon serves on the Advisory Board for Concordia University's Business School in Irvine, California. He also earned a Bachelor's Degree in Business Administration from Concordia University in Irvine, California.

*Background image: ASC Signal's
3.5m Ku-, K- + Ka-band Earth Station Antenna*

SatMagazine (SM)

Would you please explain to our readers what your Company's presence is within the Asia-Pacific satellite communications and ancillary market arenas? What sort of experience does your Company possess within the Asia-Pacific satellite markets?

Paul Weldon

ASC Signal has more than 40 years experience designing and manufacturing satellite Earth station antennas from 3.5m to 9.4m apertures. These operate at the full commercial satellite frequency spectrum, C- to Ka-band, deployed within networks for broadcast and enterprise applications. ASC Signal's experience extends beyond the antenna system itself to complete Earth station configuration and integration, including RF amplifiers, up/down converters, redundancy threads, receive-chain electronics and network management software. In the Asia-Pacific (APAC) region, the Company has been providing antennas and systems for several decades, including the build-out of the region's first, and largest, commercial Ka-band network.

SM

Why did your Company enter this market? How long has your Company been involved in this segment?

Paul Weldon

We entered this market in the early '80s as many of the communications providers in the region were developing and deploying their requirements for high-performance satellite antennas. Many of the ASC antenna products installed in the early '80s are outperforming some of the new entrants' antennas installed just in the last few years.

SM

Are you focused on any particular segments, due to their growth potential? (i.e., launch, manufacturing, teleport, security, milsatcom, imagery, satellite broadcast, and others.) What market segments in Asia do you believe are the most promising for your Company? What have been your most successful products for APAC?

Paul Weldon

ASC Signal is focused on supporting commercial provider's needs for teleports and satellite broadcast applications as these are the types of high-performance networks our products are geared to serve. In addition, the Company has taken its strength in designing robust, high-performing commercial products, and been actively supplying them to meet critical defense applications. We see this opportunity in the APAC region, as well as others worldwide.

The Company has designed and provided highly advanced *sub-reflector tracking (SRT)* technology which provides a higher level of tracking accuracy and gain stability not typically achievable by most antennas in this category. IP Star, the Asia-Pacific's leading broadband satellite operator, is a strong example of a Ka-band provider which has benefitted from this advanced, accurate technology. We have also provided a significant number of transportable terminals to defense agencies within Australia.

SM

The challenges are numerous for entry into, and for business sustainment within, this area of the world. What do you see as among the most formidable challenges to surmount?

Paul Weldon

ASC does see challenges in this region, but we truly believe that our experience in supporting the new, Ka-band systems in North America, including **Hughes**, **DirectTV**, and **WildBlue**, will continue to support the growing and vibrant Asia-Pacific region. Our technology is flexible and robust, and is able to compete

against many other manufacturers of small, relatively lower-quality antennas.

SM

Given the state of the global economy, how do you rate the Asia-Pacific market as far as its viability for income generation and growth over the next year or two? Where do you believe the opportunities for growth exist?

Paul Weldon

ASC believes there is substantial growth potential over the next few years. The opportunities are in Ka-band gateways and remote terminals, and expansion of our largest aperture antennas for teleports and mobile terminals (including our 2.4m nomadic and tactical systems and our 3.5m – 4.6m Tri-fold systems).

SM

What applications are driving the demand for satellite-delivered communications in the Asia-Pacific region? What do you see as the major focuses for driving existing and new business in this arena?

Paul Weldon

The applications where we see growth are similar to those in other parts of the world: mobile terminals, Ka-band gateways and remote terminals, and large-aperture teleport gateways.

SM

Have you offered any guidance to your business teams and/or shareholders as to how you project your Company's quarterly earnings for this market, and for the global market overall?

Paul Weldon

We are optimistic about the continued growth of our business, based on the leadership position we have in providing high-performance antenna technology (especially in Ka-band) and in various mobile solutions.

SM

How do you believe the Asia-Pacific satellite market (from communications to satellite broadcasting) will impact global, as well as your Company's, business opportunities?

Paul Weldon

Some of the largest opportunities in the Earth station antenna market are being generated in the Asia-Pacific region and we see a good percentage of our future growth coming from this market.

SM

What new technologies and/or products can we expect to see or hear about from your Company over the next year?

Paul Weldon

The Company plans to deliver our 2.4m nomadic and tactical antennas to our first customers in the Asia-Pacific region in the next six months. We designed this new antenna to support the very discriminating mobile products market, where both commercial and defense users want highly-mobile, flexible and cost-effective terminals. These antennas are capable of operating in L-, S-, X-, C-, K-, Ku-, Ka-, Q- and V-bands, including our low-PIM versions. And, as we did with our Next Generation Controller (as well as the new upgrades we will release later this year), we designed this advanced antenna to be highly modular and expandable to suit a wide variety of applications. It is the most versatile, cost-effective antenna system of its type, and we're very excited about the opportunities it represents for us.

ASC Signal's website

What A Difference A Decade Makes...

By Mike Antonovich, Vice President, Roberts Communications Network

What a difference a decade makes—has the Asia-Pacific (APAC) now become a net exporter of a wealth of television programming?

For those of us who were around the satellite television distribution business in the early '90s (Pre-Stone Age; ferns, invertebrates, *AsiaSat-1*, PanAmSat *PAS-2*, first bipeds, and so on), the first decade could have been characterized as the "Western Invasion"; international news channels, lots of Hollywood movies, European racing and football, and so on. Let's call that period of time the *First Epoch*.



Satellite capacity was the only true multichannel platform out there, and there was a scarcity of channel space for analog. (Remember analog, people? We rubbed two sticks together and could light up 36MHz of bandwidth for one TV signal!) For the first generation of "not quite MPEG-2-ers," we simply couldn't wait for standards bodies to catch up, so we launched digital television with the best available technology.

Geez, it sure was swell to be a satellite carrier back during the First Epoch. Eager customers, deep pockets, unlimited opportunities... the old phrase "shooting fish in a barrel" comes to mind. Of course, it wasn't really quite that good, or really that simple. Regulatory roadblocks, the old telecoms monopoly structures, protectionist local markets.... I'm sure glad all that is behind us (uh-huh).

The demand and desire for more choices, from more audiences all over the globe, did fuel tremendous growth. Just being "new" wasn't good enough; more and more satellite channels "regionalized" with more Asia-centric content. A great many "localized" with specific language, cultural, and even religious variants to become more culturally relevant in the markets they served.

The explosive growth in the transponder inventory across Asia-Pacific from the global players, the new regional satellite entrants to the market, and now MPEG-4 compression advances, all have driven channel costs down during what I'll call the **Second Epoch**.

And, I mean *waaay down*. Depending on the bird and the bandwidth, the cost of a satellite channel across APAC might be 1/10th of the '90s cost structure. Ahhhhh, I sure miss the good old days...

What I find most interesting lately is the continuing explosive growth of "expatriate television" from the APAC region to the rest of the world. Over the last decade (what I'll call the **Third Epoch**) the vanguard of major league Asian programmers, led by the likes of **NHK, Zee, Sony, CCTV** and other programming heavyweights, have been joined by literally hundreds upon hundreds of channels emanating from Asia in languages and dialects almost too numerous to count. This increasingly diverse

content provides a far more pluralistic viewpoint on every aspect of Asian culture.

This influx of content has been assisted primarily by all of the technological advances mentioned above in compression and modulation. Additionally, advantage has been taken via video fiber transport economies of scale—dissemination to world has become increasingly easier and less expensive from virtually everywhere. That's a really good thing!

I'm not ready to claim that more programming revenue dollars are flowing into Asia than out of Asia, at least, not just yet. That will have to wait until the **Fourth Epoch**. However, if you consider the sheer number of new channels launched every year from Asia, that day may not be too far off in the future. The heat that streaming media and *Over The Top (OTT)* IP-based services are getting these days feels quite similar to the rubbing together of two sticks experienced in the **First Epoch**. When the sparks start flying...

Seriously, I recommend you stand back!

About the author

Mike Antonovich is a frequent contributor to SatMagazine, conducting most of his research within elbow reach of a pub or tavern near you. Over his 30-year career in broadcasting, satellite communications, fiber networking and managed video services, he has formed an opinion or two he feels compelled to share whenever he forgets his medication. He presently serves as VP, Sales and Marketing at Roberts Communications Network, a leading independent provider of DTH, cable distribution and streaming media services.



Executive Spotlight

Jay Monroe, Chairman + CEO, Globalstar

Jay Monroe has held the Chairman position at Globalstar since the purchase of the assets of the Company by Thermo Capital Partners in April 2004. He was previously elected as the Company's CEO in January 2005, a position he held until July, 2009. He resumed the position of CEO following the retirement of Peter Dalton in July 2011.

As Chief Executive Officer, Mr. Monroe manages the long-term strategic growth of Globalstar, Inc. and its subsidiary company SPOT LLC., and oversees daily operations. He is responsible for extending the quality and broadening the reach of the company's portfolio of satellite voice and data solutions. Mr. Monroe has been the majority owner of the Thermo Companies since its founding in 1984. Mr. Monroe has overseen operations in a wide variety of businesses at all phases of growth, from startup through maturity.

Under his direction, the Thermo Companies founded or acquired companies in diverse industries including power generation, natural resource development, industrial equipment distribution, real estate, telecommunications and leasing services. Mr. Monroe is on the Board of Directors of Thermo Capital Partners and several of its portfolio companies. Mr. Monroe is a graduate of Tulane University in New Orleans.



SatMagazine (SM)

Good day, Mr. Monroe. In 1984, you were the majority owner of Thermo Companies, which founded or acquired companies in various industries. What led Thermo into purchasing the assets of Globalstar in 2004, and what was the reason for moving even further into the communications arena?

Jay Monroe

Thermo stresses the purchase of assets in all its investments. Globalstar was appealing as it has two solid assets—the Globalstar satellite constellation and its spectrum. This investment provided an opportunity to participate in the rapidly changing data and communications marketplace.

SM

Would you please offer us some history as to when and how Globalstar was founded and the charter behind the firm's creation?

Jay Monroe

Globalstar began as a partnership of the world's leading telecommunications service providers and equipment manufacturers, led by founding partners Loral Space and Communications and Qualcomm Incorporated. The Company began commercial operations in 2000, with the goal of establishing an affordable, global communications service. In 2004, Globalstar completed its corporate restructuring as well as an IPO in late 2006. Today, Globalstar serves nearly half a million customers operating in over 120 countries around the globe.

SM

What are Globalstar's various operating divisions, and what market segment is each business focused upon?

Jay Monroe

At the highest level, Globalstar is split into two divisions: the Simplex business, which includes simplex modems and the SPOT™ family of personal GPS satellite messenger devices, and the Duplex division of products and services, which include mobile and fixed satellite telephones, Duplex satellite data modems and flexible airtime service packages.

Many land based and maritime industries benefit from Globalstar with increased productivity from remote areas beyond cellular and landline service, while outdoor enthusiasts around the world feel safer and stay connected with their SPOT devices. Global customer segments include: oil and gas, government, mining,

forestry, commercial fishing, utilities, military, transportation, heavy construction, emergency preparedness, and business continuity as well as individual recreational users. Globalstar data solutions are ideal for various asset and personal tracking, data monitoring and SCADA applications.

SM

Mobile satellite and voice and data services have a major impact upon how communication is accomplished across the globe, especially when one considers how GPS integration plays its role in such offerings—how does Globalstar manage bandwidth and capacity issues for the network?

Executive Spotlight

Jay Monroe

Due to the manner in which our network is designed, capacity has not been a major issue for Globalstar. Using a “bent-pipe” space-to-ground network architecture allows us to make major network upgrades at our ground-based satellite gateways instead of in orbit.

For example, two years ago we completed upgrades to our Simplex data network capacity and receiver sensitivity by installing new software and hardware at specific gateways around the world. These upgrades expanded our Simplex data geographic coverage and our Simplex data subscriber messaging capacity by as much as 10 times, thereby increasing the size of the customer base that we can support for our high quality and affordable M2M asset tracking and SPOT Satellite GPS Messenger™ products and services.



SM

The Company is currently promoting its “first, second-generation LEO network,” thanks to the recent launches of your firm’s updated constellation, which will be comprised of 32 satellites. Could you tell us about the LEO satellites capabilities and technical specifications, and how such improves upon the first generation constellation?

Jay Monroe

First and foremost, since our LEO satellites orbit at approximately 875 miles, our satellite phones deliver the highest voice quality (whisper clear, with far less latency or voice delay) compared to the experience delivered via GEO satellites that are orbiting approximately 23,000 miles away from Earth. Additionally, while our first-generation satellites were designed to last seven years, the new second-generation satellites are built to last 15 years. We already offer our customers the MSS industry’s fastest data speeds, but once Globalstar has completed the launch of our second-generation LEO network and our ground station upgrades are installed, our customers will enjoy even faster data speeds—up to 256 kbps. We also expect to offer additional functionality, such as MMS (multimedia messaging) and support of 3G and 4G mobile services, with the completion of our second-generation LEO satellite network.

SM

How do your new satellites manage voice and data delivery?

Jay Monroe

Globalstar’s network utilizes a “bent-pipe” system architecture. This means when a customer uses one of our phones or data products, the signal is sent into space where it is immediately relayed onto a ground station within range of the satellite. From here the call or data message accesses the PSTN or the

Internet. Because there is no need for expensive cross-linking of signals, which can drive up the cost of the service, we can provide our customers with an affordable solution to their remote communications needs.

SM

What discernible difference does a LEO satellite network provide to satellite phone service?

Jay Monroe

It all comes down to performance. Because of the way a LEO satellite network operates, our satellite customers enjoy the highest voice quality—the purest in the industry with virtually no latency—along with the data speeds that are three to four times faster than on other types of satellite networks.

SM

What role does Code Division Multiple Access (CDMA) play?

Jay Monroe

CDMA technology built into the Globalstar GSP-1700 handset provides our customers with industry-leading voice quality without the echoing or garbling experienced by other satellite handset customers. In fact, Globalstar satellite handset voice clarity is quite honestly comparable to the finest landline phones, which translates into a significant performance advantage for our customers.

SM

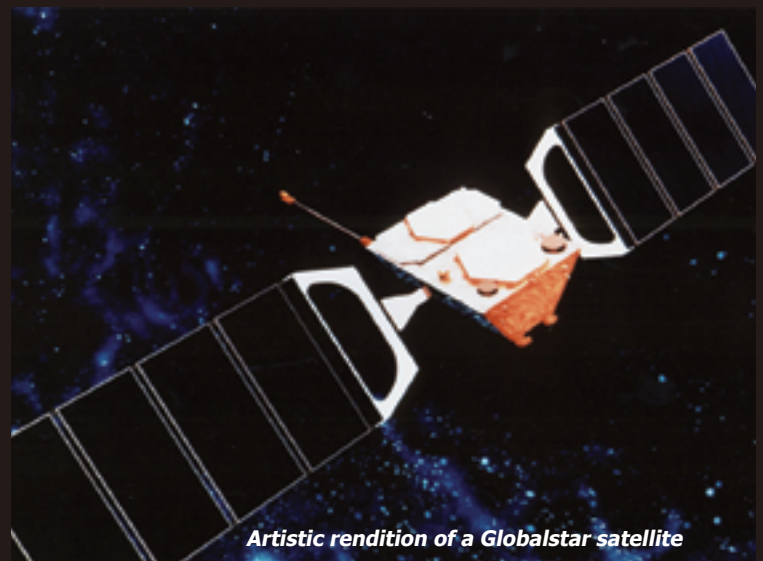
How do you feel the Globalstar LEO satellite network is going to fundamentally change satellite communications?

Jay Monroe

Globalstar was founded on the belief that we can provide affordable, high quality satellite communications on a global scale. Going forward, we will be bringing satellite communications into the modern, data-driven, wireless era. As a result, businesses that rely on data and communications from remote systems and workers can compete more effectively.

SM

How will the recent FCC-proposed ATC (Ancillary Terrestrial Component) rule making, where the Company was denied a postponement for an ATC license by the agency, affect Globalstar?



Jay Monroe

Globalstar enthusiastically supported recommended actions by the U.S. Federal Communications Commission (FCC) regarding the proposed development of terrestrial broadband services utilizing the MSS 2 GHz band. The FCC further stated that it intends to address issues pertaining to the ATC rules for Globalstar's Big LEO band in a separate proceeding at a later date. As Globalstar completes the launch and deployment of its second-generation constellation, we look forward to participating in that future proceeding and anticipate receiving similar flexibility to offer terrestrial services within the Big LEO spectrum band.

SM

What projects is Globalstar currently at work on, and what might we expect from the Company over the next year or two?

Jay Monroe

We're currently exploring some new technologies that could fundamentally change the way businesses and people communicate. Whether it's a seamless integration of terrestrial and satellite phone service, or taking our SPOT satellite GPS messengers to the next level, you can expect some exciting things from Globalstar in the next few years.

SM

Please tell us about your SPOT Satellite GPS Messenger devices and what is your vision for SPOT moving forward?

Jay Monroe

When we launched SPOT four years ago, we created an entirely new consumer category of personal GPS satellite messengers

that has fundamentally changed the way outdoor enthusiasts prepare for their time off the grid, outside of cellular or radio frequency range. We're incredibly proud of the role that SPOT has played in facilitating rescues during emergency situations —as of this writing, we're now up to more than 1,800 rescues initiated around the world via a SPOT device! We're also seeing a convergence of outdoor enthusiasts' desire to stay connected with their social networks while they're off the grid, and then share their adventures with their communities once they've returned. We believe that SPOT devices will become the go-to companion for outdoor enthusiasts around the world —as automatic as a water bottle or bike helmet.

SM

Looking over your career, what projects or products truly bring a smile of satisfaction to you?

Jay Monroe

One of the most satisfying experiences I had in my time with Globalstar was the creation of an entirely new consumer product category of personal satellite messengers. We developed SPOT and put it in-market in less than nine months. But then I learned of some of those very first SPOT-initiated rescues. I began to realize the potential magnitude of this ground-breaking product—not just in terms of the effect it would have on the business, but also recognizing that we were actually helping to save peoples' lives.

It was also a tremendous day when we began launching the second-generation constellation. And the really nice thing about satellite launches is that they are tangible evidence of great collaboration and years of hard work.

Remote Communications In The Mining Industry

By Bernie Branfield, General Manager, Datasat Communications

Creating an effective network infrastructure in the world's remotest locations is increasingly essential for mining companies. Modern communications solutions deliver the same levels of performance and availability as they expect from their corporate networks.

It must be one of the biggest modern business ironies that an industry with the greatest need for data-hungry applications and real-time communications has to operate in the world's most remote and challenging environments. Effective communications are at the heart of any business success.

This is precisely the situation where the mining industry finds itself. Whereas other businesses may be able to operate with unreliable infrastructures and severe bandwidth restrictions, the extreme costs associated with exploration, production and operation means that network downtime can literally destroy profitability. Some industry estimates suggest that, each year, the oil and gas industry alone loses \$15 billion through poor decision making brought on by a lack of access to the relevant information where and when it is needed.

Satellite communications (SATCOM) have played a major role in mine site connectivity for more than three decades. However, it has only been in a limited way. SATCOM has tended to be exploited for low bandwidth Supervisory Control and Data Acquisition (SCADA) and asset tracking applications. In part, this reflected the low bandwidth and low data flow capabilities of early VSAT technologies.

The picture is quite different today. A well designed VSAT network offers a secure, flexible and high performance infrastructure to meet the voice, data and growing multimedia needs of remote mining operations. It can achieve this in a much more cost-effective manner than any other alternative available.

This is not to suggest that satellite is a panacea. Standard fibre-based terrestrial services, and the rapidly maturing approaches to wireless technologies, also have an important role to play. It creates a situation where, for the first time, the mine operator has the ability and flexibility to develop a communications solution that reflects its exact business and budgetary requirements rather than accepting a compromise based around individual technologies.

Satellite hybrid communications delivers best-of-breed network infrastructures with resilience, availability, security and the capability to provide data intensive business applications and Internet services at virtually the same performance levels experienced at the corporate headquarters.

Towards A Reliable Infrastructure

If mining operations in the past could survive with the connectivity for low bandwidth applications like SCADA, this is certainly no longer the case. A simple example is the geological scan. It produces a very large data file that has to be distributed quickly to corporate headquarters or in-country offices for key personnel to make informed decisions on how to proceed. However, there are now a whole range of sophisticated, hugely data demanding applications in daily use by geologists, geophysicists, and drilling engineers, amongst many others. These applications collect massive amounts of data in a variety of different formats which has to be distributed and shared in a timely manner.

Historically, the scan has been placed on a disk and mailed to headquarters for expert analysis—the on-site team then have to wait patiently for the results and instructions on how to proceed.

The key to business effectiveness becomes the remote network's ability to deliver efficient two-way communication when and where it is needed. In the example above, decision making can be reduced from days or weeks to hours or minutes.

For the vast majority of locations where mining is taking place, satellite-based communications is the only reliable and cost-effective means to achieve this level of data throughput and two-way communication. The needs of the operators for advanced voice, video and data applications have outgrown the ability of highly fragmented terrestrial technologies to deliver.

Meeting Today's Implementation Imperative

One of the greatest challenges for mining operators is uncertainty. Sites are continually being explored, constructed, operated and retired. The ability to move quickly from exploration to exploitation is essential—as is the need to be able to establish effective communications between the number of sites that can grow around a single deposit, between sites in different locations and between the site and the corporate network.

In these circumstances, the prohibitive costs of using terrestrial technologies for last mile or first mile connectivity are not even an issue. They simply cannot be installed to meet any sensible timeframes. The maturity of satellite communications and, as importantly, the ruggedisation of its far-end VSAT equipment, means that the network can be modelled and equipment set up and tested at the satellite service provider's facilities.



In this way, the installation of the network at the remote site can be accomplished in as little as a few hours. In fact, the entire process from initial planning and design to full operation is measured in weeks rather than months.

The speed of implementation of a satellite network is matched by its flexibility to enable equipment to be dismantled and reassembled as operational needs dictate. A VSAT installation is highly portable allowing for repositioning that matches the highly fluid nature of the early stages of the mining process.

Measuring Cost-Effectiveness

It is natural to focus on the upfront investment costs of a remote communications project. However, real return on investment (ROI) will be measured in how efficiently a network can use its bandwidth allocation.

The first element is securing availability. The robustness of the on-site infrastructure is essential. It is almost worth considering 'over engineering' the initial installation if the result is a measurable reduction in network downtime, management and maintenance. A satellite service provider should build and test the system off-site so that a robust system can still be installed on-site in minutes or hours.

Secondly, the infrastructure should allow for operationally matched availability. Put simply, the organisation should only pay for the bandwidth it needs. If a site only needs communications capabilities occasionally, there is no reason for the system to be always-on. The more the communications requirements can be planned and scheduled, the more cost-effective the running costs.

Finally, some mine operators have operated at less than a third of the bandwidth that they are paying for. Smart allocation of bandwidth means that specialist business applications, standard offices systems, Internet and voice services can be partitioned and delivered simultaneously. It provides the possibility that a single satellite hybrid network can securely fulfil the communications requirements for all the different entities—mine owner, prime contractor, sub-contractors and staff—at a fraction of the cost of installing a number of separate infrastructures.

The Importance Of Integration

Reliability and speed of implementation are important considerations for all remote communications networks but, for the mining industry, perhaps the most important consideration is the ability to deliver a fully integrated solution for the organization's voice, video and data requirements.

The growth of wireless technologies, especially as they improve in terms of cost, performance and range, has introduced a potential for organizations to develop a series of ad hoc and unintegrated solutions. In some instances, mine sites have seen the creation of individual solutions for individual communications requirements. This development of isolated information silos is not only costly but dramatically reduces business efficiency and acts as a barrier to effective decision making.

The requirement has to be for a single network infrastructure that can accommodate all data and voice requirements. This does not mean that terrestrial, wireless and mobile technologies are not available to mine operators, but that they should be placed within an integrated or hybrid network infrastructure.

Wireless and GSM can have advantages in terms of intra-site and site-to-site communications. The glue, however, to the integrated Wide Area Network (WAN) will continue to be the VSAT satellite infrastructure. It allows for highly available and cost effective bandwidth between sites, in-country offices and the corporate headquarters. It can deliver the performance necessary for sites and offices to shared communications and business applications at DSL-like speeds—with higher security levels.

In addition to operational services, it is difficult to over-estimate the importance of welfare provision. At the simplest form, this may simply be viable voice services and email facilities for on-site employees. A more advanced level could see the provision of a range of well being services, such as web access, broadcast radio, TV and on-demand movies—delivered to the accommodation areas of the site.

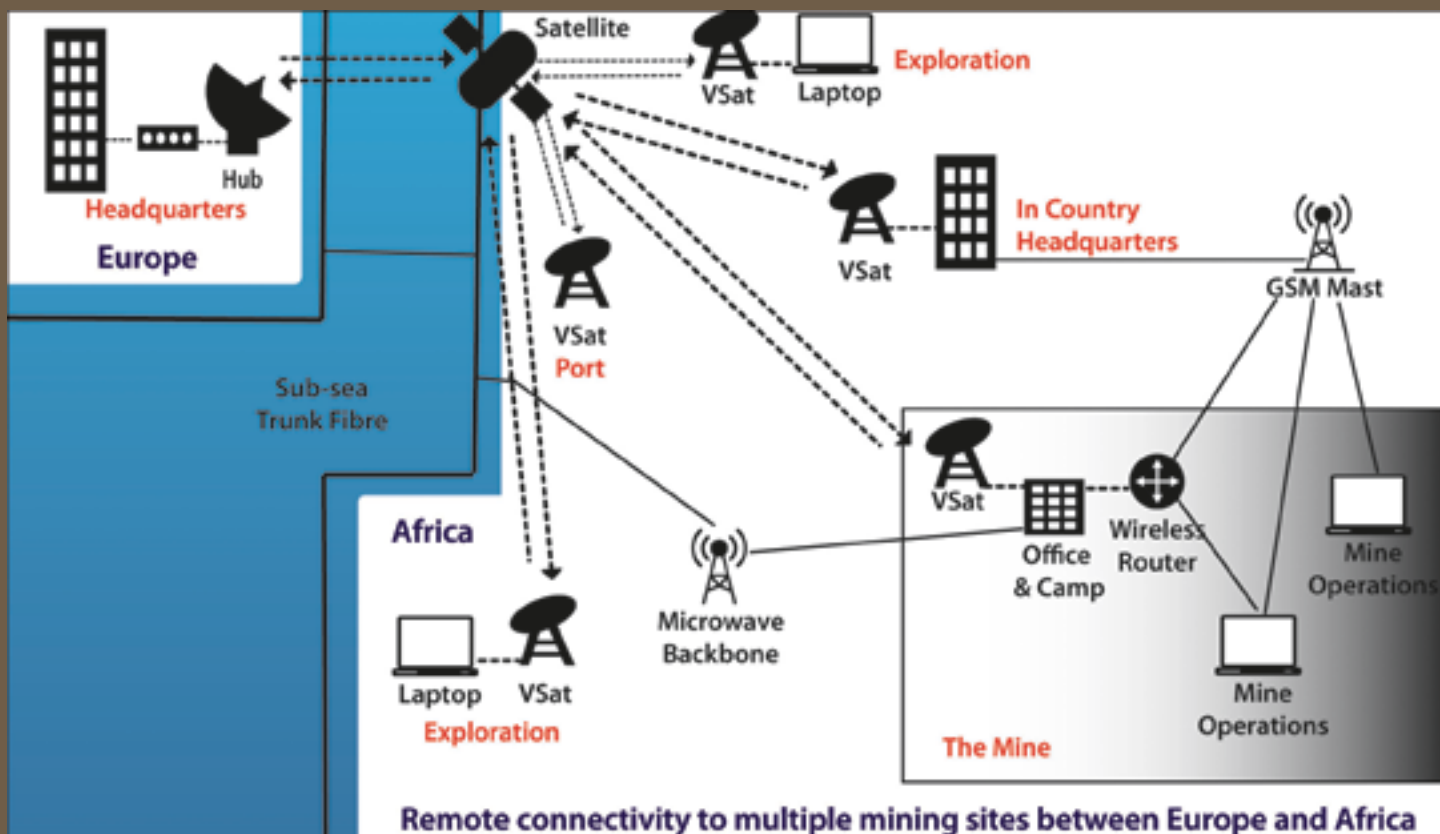
An integrated satellite WAN also provides the potential for a single network to securely meet the communications needs for all the organisations operating at the site. Each operates independently, and it is essential their network functions in isolation to its peers. However, the communications requirements are very broadly similar, and a satellite hybrid network can reliably provide the range of services to each network as a separate entity. Many wireless solutions would allow for separate networks to operate securely on-site from a single wireless hub.

The key is effective bandwidth utilisation; the ability to deliver services to single or multiple sites, for a wide range of purposes in a secure, available, and high-performance infrastructure.

Delivering Mining Communications Requirements

- **Access to corporate business applications:** With so many people involved in the upstream process for mining, the ability to share corporate business applications—such as SAP and Oracle—becomes essential. On-site personnel need to be able to access the applications and perform tasks as they would if they were in the office. Delivering this application performance becomes straightforward with the bandwidth available through satellite communications.
- **Access to real-time communication:** On-site teams cannot wait for days or weeks to receive notification of the next actions to take. To maximise business effectiveness, personnel need to be able to share large data files and communicate in real-time. A satellite, or satellite hybrid solution, is the only possibility for delivering this level of secure, real-time communication anywhere in the world.

- **The importance of well being:** With personnel on-site for weeks or months at a time, well being is a major issue. At a minimum, separate voice and email services are required for personnel to keep in touch with family and friends. However, Internet and entertainment services are also important. These services may often have to be supplied over a completely separate network as web surfing and the use of services such as Skype can transgress governance policies on the corporate network.
- **Dealing with medical emergencies:** Direct lines of communications that can by-pass the local infrastructure are essential in times of medical emergency. With few sites employing full-time medical teams, the ability to share photos and video images with trained medical staff off-site is important for early treatment, and to ensure the proper remedial action is taken. It also allows for early action triggers if the emergency calls for the rapid evacuation of injured personnel.
- **Large File Transfer:** Many of the geological and geophysical applications create extremely large data files. These files have to be distributed in a timely manner in very challenging conditions. Data loss is a major issue for large file transfer and this is exacerbated in remote locations. Satellite systems can deliver virtually error free transfer where data is sent in very small packets and the system can automatically track and re-distribute corrupted data packets so that the receiving end gets the full file as it was sent.
- **Asset tracking and management:** Asset tracking has grown significantly over the previous decade. The systems can now ensure that the organisation is receiving maximum utilisation of assets such as trucks and drilling rigs. Employing a satellite hybrid infrastructure, wireless trackers can be placed on the asset that reports back to the wireless hub on site and onwards via satellite.
- **On site security:** Allied to the security of personnel, security of plant, equipment and product are also essential to safeguard profitability and the long-term viability of remote mining operations. IP-based access control systems and CCTV surveillance cameras can be quickly installed—either hard wired or wirelessly—that can report to the site office or be remotely managed in near real-time via satellite.
- **Corporate Social Responsibility:** With many organisations operating in remote regions, where local villagers can become an important source of labour within the mine, Corporate Social Responsibility has grown in importance. Similar to supplying well-being services to on-site personnel, some mine operators are beginning to use the same systems to deliver welfare services to local villages. This can include distance learning, entertainment services and Internet access.



- **Back up and redundancy:** It is essential that data is backed up to mitigate against disaster, especially where IT equipment is operating in extremes of weather or irregular power provision. This can be achieved during off peak times for the main system or employing the redundant path. The redundant path can be an entirely separate VSAT system or through the main satellite link if bandwidth can be allocated.

Satellite services can now deliver in excess of 45Mbps for backbone connectivity with even larger data rates available for essential business applications such as SAP or video conferencing.

To make these levels of data throughput affordable to most organizations, whether mine operators or not, means matching availability to operational requirements. In effect, only paying for the bandwidth that you use.

If the organization only has occasional needs, then an always-on connection is costly and ineffective. If it knows there are peak communications times, these can be planned for and factored into system requirements.

Real-time Decision Making

The development of mine site technology often seems only bounded by the human imagination—and sometimes not even then. It is a demonstration of the importance of making decisions quickly and getting them right the first time that keyhole cameras are being fitted to drill heads which then feed back live pictures of the seam they are drilling so that professionals—often thousands of miles away—can make a decision on which direction the head should now be taking. This is only one example of the importance of real-time decision making to mining operators.

Early exploration often involves the use of photography and email. The use of video is also becoming more common. Of course, it is nonsensical that all the experts needed to make an informed decision can be at every site. It is far more effective for them to be centrally located and armed with all the information.

Satellite imaging, which has an increasingly important role in determining where exploration should commence, is unlikely to be available to professionals in the field.

Today, only a satellite or satellite hybrid infrastructure can deliver the secure, high performance two-way communication that makes this type of vital real-time decision-making, with parties dispersed across the globe, a reality.

A Highly Flexible + Scalable Network

Whether secure site-to-site or high performance site-to-multi-site, a VSAT infrastructure is highly scalable. It delivers the most cost-effective communications platform, whether the mining operator has only a few sites in a single geography or wishes to connect hundreds of sites globally. However, satellite is more likely to be one component of the complete solution.

There are two important reasons for this. Firstly, the development of terrestrial, wireless and mobile technologies gives a much greater degree of flexibility in network design. It is much easier today for an organisation to develop a communications infrastructure around their specific business requirements.

Service providers can deliver very high levels of customisation around which network topology and technologies meets the requirements of business and budget. Mine operators can benefit from true multi-platform, multi-technology solutions. This is often termed as 'technology agnostic'. The ability to create a network around the business challenge not the underlying technologies. However, a better way to consider this is the ability to deliver a 'best-of-breed' solution. A solution that fulfils current communications requirements, but has the ability and flexibility to adapt to the changes that will occur within the business.

Secondly, the geographical location of the mine site will often dictate the technologies that can be deployed. This is not only true in terms of the physical attributes of the location but also the government regulation and policy of the country it is within. All multinational organisations are well aware of the impediments that can be placed on them by local administrative policy. Within communications, there are many instances where government policy will deter the deployment of certain technologies. This, alone, dictates that a remote network will very often have to utilise a range of satellite, wireless and fixed-line services in order for a mining company to supply effective communications services to all its sites and comply with local regulations.

Creating 'Better Than Terrestrial' availability

From the arid climate of sub-Saharan Africa to the Siberian cold, mining operations are situated in extreme and challenging environments. In addition to the rugged nature of the equipment, the remote communications network has to provide high availability levels in hostile weather conditions.



A Datasat wireless solution in operation

In today's satellite service only the quality end of the market providers are able to deliver upwards of 99.95 percent network uptime with a Quality Service that is backed by guaranteed Service Level Agreements (SLAs). This level of service is significantly higher than that of many terrestrial providers in developed countries with an established infrastructure. It is very often superior to the levels of service possible from the local terrestrial provider—even in their larger cities.

The Preferred Communications Route

Satellite communications developed within mining to overcome the connectivity and cost issues associated with terrestrial services when operating in remote environments around the world. Today, satellite and satellite hybrid solutions are not the only option, but they are the preferred route when organisations need a high availability, high performance network infrastructure, and one that can securely accommodate the data hungry voice, data and video applications on which a modern mining operation relies. By establishing effective two-way communication between sites and head office, the remote communications network can deliver the effective real-time decision making that is necessary to drive profitability in an environment where time really is money.

About Datasat Communications

Datasat Communications has been successfully delivering remote communications solutions for governments, commercial organisations and emergency services for 25 years. Specialists in satellite communications, the company brings experience in terrestrial and wireless technologies to deliver fully integrated satellite hybrid networks around the globe.

The company tailors every network to the specific requirements of the organisation, from small bespoke networks to large global platform based systems. With a reputation for quality and customer service, the company provides high performance, reliable and secure network infrastructure for Internet, broadband and business services to remote locations across the globe.

About the author

Bernie joined Datasat Communications as Technical Manager in 2003 before becoming General Manager in 2006. He has designed and managed the build and operation of both international and domestic VSAT networks. Prior to this, Bernie was General Manager, Network Operations with Kingston Communications, Chief Engineer with TLI Satellite Services and Senior Engineer with BBC Transmission.

Datasat Communications: <http://www.datasat.com>



Ahsun Murad, President + CEO, Optimal Satcom

Ahsun Murad is the President and CEO of Optimal Satcom, which he co-founded as a spin-off from Lockheed Martin Corporation in 2002. Mr. Murad is responsible for driving Optimal Satcom's business and operational growth. His management and leadership skills are focused on advancing the company's role as the world's leading provider of enterprise-level satellite capacity management systems.

Since creating the company, Mr. Murad has focused Optimal Satcom on developing new applications for its fully-integrated, enterprise management system. In addition, he continues to pursue various market opportunities around the world, targeting satellite operators and satellite service providers and their requirements for optimizing their satellite capacity.

Prior to Optimal Satcom, Mr. Murad worked for over 19 years in various positions across the satellite communications industry. Immediately before founding Optimal Satcom, he held senior management positions at Lockheed Martin and COMSAT Laboratories. In these positions, he headed product development for transmission planning and satellite capacity management and led system design for a number of commercial SATCOM and MILSATCOM projects. Mr. Murad honed his satellite engineering expertise while working at the NASA Center for Satellite and Hybrid Communications Networks where he supported research and development for the modeling and simulation of hybrid satellite-terrestrial mobile communications systems.

Mr. Murad graduated from the Indian Institute of Technology, Delhi, India, with a Bachelor of Technology degree in Electrical Engineering. He holds a Master of Science degree in Electrical Engineering from the University of Maryland at College Park.

SatMagazine (SM)

Would you please explain to our readers what your Company's presence is within the Asia-Pacific satellite communications and ancillary market arenas? What sort of experience does your Company possess within the Asia-Pacific satellite markets?

Ahsun Murad

The satellite communications market in the Asia-Pacific is quite challenging, with a relatively large number of satellite operators and service providers. As the world's only provider of enterprise satellite capacity management systems catering to the needs of satellite operators and service providers, **Optimal Satcom's** area of expertise is providing our customers with the technical, operational, and financial management of their satellite business.

One of our first significant projects in Asia supported **ChinaSat's** capacity planning systems in conjunction with its launch of **ChinaSat 6**. (China has since consolidated all its satellite companies into a single entity, **China DBSAT**.) Optimal has also provided systems and actively supports the operations of **GE Satellite** for its **GE-23** Pacific coverage satellite, **Asia Broadcast Satellite (ABS)**, **Singtel**, and **VinaSat**. We also work with a number of global satellite operators including **Harris Caprock**, **Vizada**, **Marlink** as well as the U.S. Government.

SM

Why did your Company enter this market? How long has your Company been involved in this segment?

Ahsun Murad

We have been in the Asia Pacific region for about eight years. Our business in the region has been driven by the growth of our customers, and a number of initiatives for business process modernization by regional companies.

SM

Are you focused on any particular segments, due to their growth potential? (i.e., launch, manufacturing, teleport, security, milsatcom, imagery, satellite broadcast, and others.) What market segments in Asia-Pacific do you believe are the most promising for your Company?

Ahsun Murad

Our business focus is SATCOM and MILSATCOM, supporting satellite companies and government entities with software systems for efficient satellite capacity management. There are a number of innovations in the SATCOM market that are being rapidly adopted across the industry, innovations such as DVB-S2, Double-Talk/CnC, PCMA, Ka-Band Satellite systems, managed services models, airborne systems with phased-array antenna systems, low-rate spread spectrum, etc. We are helping our customers take advantage of the technological and operational strengths these offer, and incorporate them into their business models and product offerings.

SM

The challenges are numerous for entry into, and for business sustainment within, this area of the world. What do you see as among the most formidable challenges to surmount?

Ahsun Murad

The diversity of business cultures and practices create both challenges and opportunities. For Optimal Satcom, it means that our systems need to be flexible and customizable to fit various business process models. We also have to give consideration to issues such as multi-currency operations, multi-lingual end-user reporting, and similar processes. So far, our innovations in this regard have been a discriminator for our products and a business advantage.

A second challenge is the perceived value of software. In many regions around the world, investment in a software infrastructure is still a new concept, especially for operating a company effectively. Organizations often employ highly inefficient and labor-intensive manual processes and need to adapt to software's operational and technological advantages.

The third challenge is having our system management tools fit into the customer's business culture. The high level of integration our systems can provide with free flow of information, and the resulting operational efficiency, often represents a significant shift from a more compartmentalized style of management and operations. We have found that acceptance and support for the project at all levels is important and enables a smooth transition. We work hard to present a value proposition that has significance for executive and mid-level management, as well as the hands-on operational staff.

SM

Given the state of the global economy, how do you rate the Asia-Pacific market as far as its viability for income generation and growth over the next year or two? Where do you believe the opportunities for growth exist?

Ahsun Murad

In today's economic environment, diversity is a key to maintaining business success, predictability and growth. As global satellite operators and service providers pursue the Asia-Pacific market to diversify their operations and sustain their growth, they compete with a host of regional players. Our systems help improve operational efficiency and the easy ability to tie in additional offices and integrate operations worldwide that facilitate such expansions. On the other hand, regional operators seeking to compete and expand to other parts of the world also benefit from our technologies. We have customers that fall into both categories, and we believe both of these trends will foster our continued growth in the Asia-Pacific market.

SM

What applications are driving the demand for satellite-delivered communications in the Asia-Pacific region? What do you see as the major focuses for driving existing and new business in this arena?

Ahsun Murad

Enterprise infrastructure growth, support for off-shore oil and gas operations, airborne and maritime operations are all important verticals that drive growth for our customers, which in turn, drive their need for our products.

SM

What new technologies and/or products can we expect to see or hear about from your Company over the next year?

Ahsun Murad

We continue to create and offer innovative products for the satellite market. Our Enterprise Capacity Manager (ECM) product is going through a series of innovative enhancements in support of new technologies, some of which I mentioned earlier. We will also be deploying new mobile apps and expect to launch new service-based and cloud-based offerings for our satellite operator and satellite service provider customers.

Further information at the Company website:

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



The Need For Speed...

By Tom Luketich, V.P., + Fernando Klurfan, Product Manager, Emerging Markets Communications

In today's global business environment, it's all about speed: a quicker time-to-service or time-to-market, swifter exchanges of information, faster decision making, the "I want it now" mentality.

While the exact definition of speed may differ from person to person or organization to organization, for most of the world's population (who are faced with very slow Internet experiences and who must wait for slow web pages to load or important applications to open) an increase in connectivity speed can change their overall productivity paradigm.

With improved speed, what used to take minutes, or even hours, can happen in the blink of an eye. Workers in the world's most challenged areas for connectivity can browse the Internet at data center speeds from a remote office, access the web and data center applications just as if they were sitting in their corporate headquarters and update programs and applications amongst all global employees with the click of a mouse.

As corporations, non-governmental agencies (NGOs) and governments further expand facilities into remote locations, the need for a breakthrough in the speed of Internet service for all of an organization's employees (where WANs match LAN speeds, without having to buy more Mbps) is growing.

In fact, nearly four billion people in emerging markets have been waiting for a technology to deliver the speed and the overall connectivity experience they need to match their potential and to provide them with a true feeling of being part of an organization's overall team.

Fortunately, there have been a number of technology advances in improving speed for Internet access, including a new virtualization technology that can guarantee cloud speeds of up to 100Mbps up and 100Mbps down via satellite while tightening security and delivering an improved overall connectivity experience for all of an organization's workers, no matter where they are located.

This new infrastructure increases services for, and the productivity of, remotely located users while decreasing the costs associated with servicing and supporting those users.



l: Tom Luketich — r: Fernando Klurfan



The 'Zero Latency' Browser

This new technology advancement is the world's first 'Zero Latency' browser for satellite and terrestrial links. A virtual cloud-based browser built on a redundant global infrastructure, this technology runs on highly powered data centers where state-of-the-art cloud computing infrastructures reside to deliver true broadband experiences to workers based in the most remote locations on the planet.

By guaranteeing upload and download cloud speeds of 100Mbps while centralizing applications, this new browser enables a whole new subset of enterprises and organizations to operate at data center speeds (with LAN-like latencies), vastly improving their time-to-service and time-to-market while allowing even the smallest offices to feel like a true part of the larger organization. This is a paradigm shift, where IT departments try to leverage 1Gbps data center speeds before buying more satellite bandwidth.

In addition to fast Internet connectivity, the new Zero Latency browsers speed end-user access to http- or https-based applications such as customer relationship management (CRM), enterprise resource planning (ERP) and webmail (e.g., OWA). With the new browser, workers over WANs are able to access their corporate applications faster, so they're able to work more rapidly and efficiently.

In one instance, a large NGO reduced its typical ERP transaction times from a full eight minutes down to mere seconds, increasing the number of people they are able to serve each day. How's that for customer satisfaction?

Another benefit of the new Zero Latency technologies is that organizations can roll out new software and applications to all of their employees, worldwide, in seconds, rather than having to use the time- and resource-consuming process of going worker by worker or laptop by laptop.

For that same NGO mentioned above, the use of a Zero Latency browser delivered an incredible savings in time. Before the new browser, it took the organization over a year to move all of its global employees from Lotus Notes to Outlook. After

deploying the browser, they were able to accomplish a similar software update in seconds with the click of a mouse. In addition to saving vast amounts of time and resources, this capability improved productivity by eliminating the challenges that can happen when different facilities are operating on different versions of software, or when operating with decentralized server architectures.

How it Works

In a typical browser, a user clicks on a website and the browser sends out several requests for content to create a page. These requests go back and forth across multiple hops, servers and domains, taking up the user's time, computing power and bandwidth. On the other hand, the new Zero Latency browsers (such as SpeedNet™ from Emerging Markets Communications (EMC)), are thin clients that give the user a visual representation of the actual physical browser running all of the processing in a state-of-the-art data center with multihoming 1Gbps ports to the Internet. There is only one Transmission Control Protocol (TCP) connection to a single server IP. So, the user gets all the benefits of browsing at data center speeds without the need for large amounts of bandwidth or processing power on the remote end—potentially decreasing the overall amount of bandwidth an organization requires and enabling them to dedicate scarce budget resources elsewhere.

Intelligent Caching

One of the best advantages of satellites is the ability to push content via broadcast from a data center to a remote site. And it doesn't cost more money to have all the remote sites in the footprint listen to that broadcast. With intelligent caching, a smart local media server stores all of the most popular files, websites and multimedia that were broadcast, so content that is repeatedly accessed (training videos, websites, etc.) resides locally.

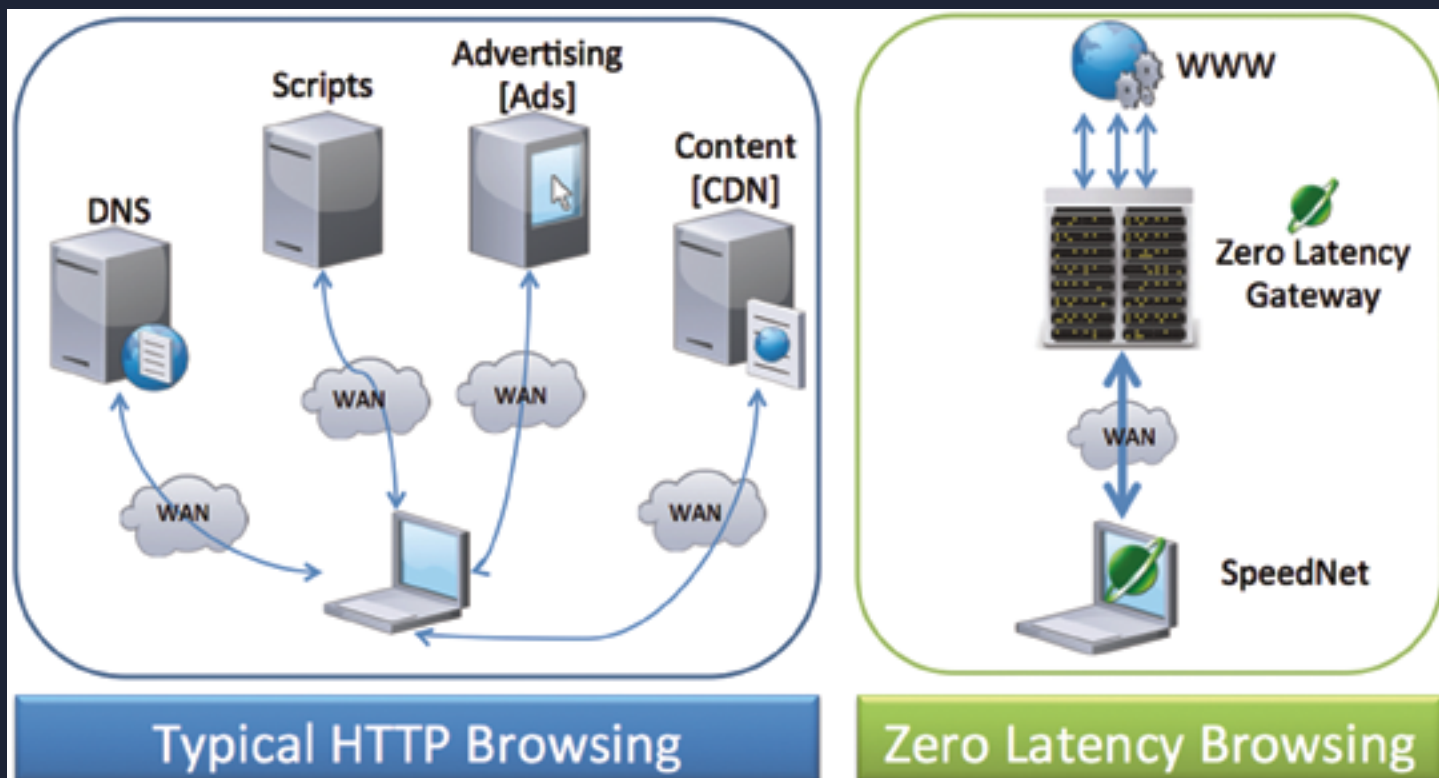


Figure 1: Browsing Architectures

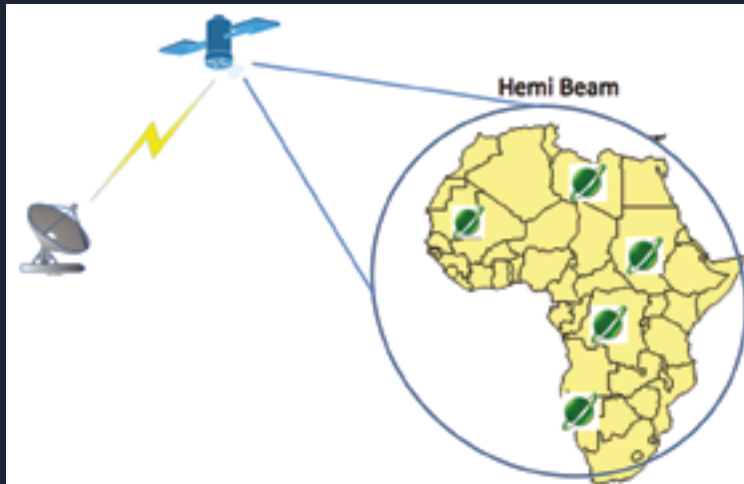


Figure 2. Broadcast/Push of content

The new Zero Latency browsers like SpeedNet now also act as media portals, presenting all the precached content (a sort of iTunes). They are intelligent enough to decide whether to retrieve the content locally on the media server or from the cloud, providing the fastest and most reliable user experience when browsing the Internet. This flexibility is called a split-browser.

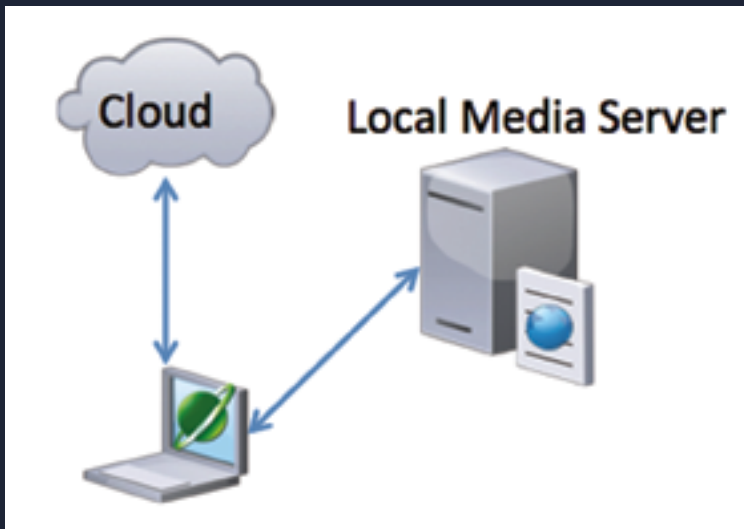


Figure 3. Split Browsing: http+cloud

Private vs. Public Cloud

But what if an organization doesn't want to use someone else's data center to host their applications? The new flexible Zero Latency gateway infrastructures can be hosted anywhere on the planet, allowing IT managers to keep very close control and access over the technology environment.

Because they were targeted at satellite users, the new Zero Latency browsers have been optimized for the worst case in terms of bandwidth availability. But, they are robust enough a platform to be useful in any situation. This is important in many areas around the globe where bandwidth availability varies greatly throughout a single country or continent.

Security

While speed is incredibly important to productivity, innovation and time-to-market, security is just as vital to today's IT directors. Designed to improve the security of corporate applications and information, the new Zero Latency browsers such as EMC's SpeedNet use an enhanced, patent-pending ICA protocol to virtualize applications and centralize information in a secure environment. Port 80 is not exposed anymore on the end-user's browser because SpeedNet uses Secure Sockets Layer (SSL) over port 443, in addition to not having anything running in the end-user's laptop. This approach reduces the risk of threats from malware, viruses and such for remote users by decreasing the need for distributed firewalls and Internet access points down to one.

And, as SpeedNet only serves applications residing under the control of the data center, IT management is simplified, freeing resources for other mission-critical IT tasks and responsibilities.

The Changing Nature Of SLAs

As new Zero Latency browsers such as EMC's SpeedNet are being implemented by organizations across the globe, they are changing the nature of Service Level Agreements (SLAs) being offered by service providers and requested by end-users. Rather than focusing on Mbps, bytes and data points, end-users are focused on the overall quality of their experience—the ease with which all employees can access information and applications, improved security and knowing that even the most remote facilities are part of the team.

In short, new Zero Latency and Split Browser technologies are delivering increased productivity, enhanced security and improved communication between facilities regardless of where they are located. These technologies are providing better overall end-user connectivity experiences and satisfaction, while allowing organizations to reduce costs by enabling a reduction in the amount of bandwidth required at each location.

About the authors

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3DTV... Back On The Menu

By Chris Forrester, Editorial Director, Broadgate Publishing



Despite some previous—and perhaps justifiable—doom and gloom, there was a noticeable spirit of optimism at the Cannes MIPTV programming market in April, and we make no apology for using the 3DTV 'focus' at Cannes as our reason for a major examination of 3D's prospects for satellite operators.



Tom Morrod, a senior principal analyst at *IHS/Screen Digest*, set the scene for the event by stating simply, "broadcasters, and viewers, are desperate for new 3D content." Indeed, that was the overwhelming message during two days of conference activity. Morrod told delegates that the TV market [for 3D] was having a mixed success. While plenty of '3D ready' sets are being sold, far fewer buyers are also investing in 3D glasses. "Manufacturers are failing to include glasses in their new sets, and viewers are simply not making the extra, and expensive, investment in glasses, especially if they are the active-shutter models."

He told delegates that, in his view, so-called glasses-free displays were "still years away." He forecast an increasing take up of 3D displays over the next few years, and touching 80m (internationally) by 2015. This would equate (in markets such as Western Europe, Japan and Australia/New Zealand) to about 35 percent of all TV homes by 2015. The USA market would be reaching 50 percent of all TV homes by 2015.

But the number of channels today is miniscule and few broadcasters have any plans to do much more than add a few 3D channels. By any measure, 3D's televisual future is never going to replicate HDTV's growth. However, **BSkyB** could be the exception, and last week they announced that the company now has more than 250,000 3D viewing homes, and they were

be settled. Glasses need to be more ergonomic. But productions need to be conceived with £D at its heart."

Schmidt is putting his creative money where his mouth is, and is making 10 half-hour special movies in 3D for TV. And *Wim Wenders* is making a new 3D film. "We are still at the very beginning of this development in using 3D as a window

We now save on these productions in order to spend more liberally on a program, or series, which will catch the attention of the public, the press, and dazzle viewers. So, it's remarkable that, as different as 3D appears to senior managers, in reality, the same rules apply to making a great 2D network or channel. Costs are coming down. Producers are getting better at

—There are a total of 31 dedicated 3D channels worldwide, plus 35+ one-off 3D event broadcasts

—Broadcasters see 3D primarily as means of up-selling higher subscription packages

IHS/Screen Digest

widening the possibility of adoption.

Morrod said 3D made sound business sense for pay-TV broadcasters, and even with the low number of channels currently on air they could still generate VOD ARPU uplifts of 17 percent in the U.S., 20 percent in the U.K., and a 40 percent premium in France.

Morrod, along with all of the other speakers, saw the upcoming **Olympic Games** as a terrific opportunity for 3D viewing, with broadcasters anticipating more than 100 hours of live content, and plenty of opportunities for re-run material of the highlights. **BSkyB's** director of 3D, *John Cassy*, said that Sky would be opening up access to its 3D transmissions to more than 4 million homes, and saw tangible revenues flowing post-games. "Our EuroSport 3D channel will broadcast exclusive 3D action every day during the Games. This will be a mix of around eight hours of live coverage alongside four additional hours of the day's main highlights, and will provide the most comprehensive 3D coverage of the Games on British television."

One of the Cannes keynote speakers was *Erwin Schmidt* from **Neue Road Movies** in Germany and the 3D producer for last year's Oscar-nominated dance movie 'Pina' (directed by *Wim Wenders*). He admitted that he is charmed and convinced by 3D. "I am also aware of the fact that 3D faces rather difficult times today, to some of you it might feel the party is over. At least the novelty factor is no longer there. And with this I agree. However, I claim TV is ready for 3D and 3D is ready for TV!"

He argued that TV was wrong to depend solely on Hollywood, and sports, for its 3D content. "We believe that 3D cannot be stopped, so the industry should embrace it. But the never-ending battle over Formats (Active vs Passive) should

into another world."

Another keynote came from *Jim Chabin*, president of the **International TV Society**, a self-confessed evangelist for 3D in all its forms. But his numbers were compelling, talking of record numbers of 3D sets shipping (up 26 percent q-o-q), and likely to be 22 percent of this year's shipped LCD displays. In fact, China has a commitment to launch 10 all-3D channels within the next five years. Prices of sets are falling, and programming is flowing, he stated.

Chabin says he is excited by the growth in high-quality TV programming. "3D documentaries are recreating the genre. Old footage is being found in archives from WWII, the U.S. Civil War, and other unlikely sources. Documentary work is exciting. Sports are dazzling in 3D. **BSkyB** and **ESPN** and others are really accelerating the quality and excitement of sports in 3D. And the live concerts

creating cost efficient production budgets. And we see a day, relatively soon, that the cost of producing 3D will be no more than the cost of producing 2D."

"The TV industry is very adaptive," he added. "What's exciting now is that the flatscreen makers are advancing user friendly technology faster than anyone expected. We anticipate new 3D breakthrough technologies in the market within three to five years, when not long ago, people felt the next generation of 3D platforms was 10 years away. With most major brand flatscreens being '3D ready' consumers are continuing to buy into the technology. Tablets, smartphones and videogames are in this mix, as well."

Chabin's message was echoed by *Spencer Stephens*, CTO at **Sony Pictures**. He argued that the usual grumbles that 3D content is too expensive to shoot, too expensive in post production, and much too expensive in staff and craft skills, was

"Broadcasters are getting savvy about budgets"

Jim Chabin

look beautiful from Japan, the U.S. and Europe. So we see an across-the-board acceleration of production techniques which boost viewer excitement."

Chabin says that broadcasters are also getting savvy about budgets. "They are finding that, by using newer, less expensive technology and software, they can produce quite a bit of content at pretty efficient prices. This allows them to pull additional funds together to make really spectacular, eye-popping, programmes. Again, this reminds us of when television moved to colour, or more recently, to HD.

fast-changing. He especially argued that 3D need not be just for movies, sport and music concerts. Sony has invested its cash into some fascinating 3D experimental shoots, on scripted comedy series and 'Days of Our Lives', a very long-running U.S. soap opera. The end results were superb, taking the viewer 'into' a much more immersive experience. "And they didn't cost a moment's extra filming. There were no delays. "You can shoot 3D on the same schedule as 2D. You can shoot 3D on a similar budget as 2D," he argued. It was all down to planning.

3D budgets are the \$64,000 question. *Stephens* says producers must plan. "Proper planning can really make 3D affordable but the larger issue is how to increase the availability of 3D at home to drive adoption and make it worth producers' investment. Most cable systems could adapt their existing feeds so that 2D feeds go to 2D households and 3D feeds go to 3D households, but to date this hasn't been done because the traditional networks aren't simulcasting in 3D—yet. If there were more shows in 3D, viewers would be interested in watching them, so Sony Pictures Technologies is partnering with the creative community to demonstrate how 3D content can be easy and affordable to produce so they will increasingly see it as a viable option for their shows. As with any new entertainment technology in the home, the availability of people's favourite content is really what drives adoption."

One of the more aggressive content-producers is 3net, a joint-venture between

Sony, Discovery and **IMAX**, and the channel is investing heavily in new 3D content. **3net** reached a major milestone at the end of 2011 by broadcasting its 200th hour of original content, not bad for Year 1.

"It gives 3net the world's largest library of native, original 3D content," said *Mark Ringwald*, head of 3net's acquisition efforts. "Since then we continue to premiere at least one new series a month. In January we launched the original series, 'Tough Love Garage' about the cantankerous but soft hearted owner of an auto body shop, 'Hillbilly Blood: The Hardscrabble Life,' which takes a look at inventive and 'make do' life of the people in the backwoods of the Appalachians, and the acquired series from Discovery Networks International and produced by Renegade Pictures, 'Safari Park Adventures'. On April 8th we will simulcast with Animal Planet an episode of their extremely popular series, 'River

Monsters', in 3D as they air the program in 2D."

For 2012 they have on the slate a new music series, a Mixed Martial Arts fighting series, as well as 13 new episodes of 'Dream Defenders', their kids' animation series. "Later in the summer we are looking to premiere our 'Storm Surfers' where experts hunt down and ride the world's biggest waves, and, before the end of the year, look for 'The Human Body', a look inside ourselves as we truly are, in a way never seen before."

Ringwald says production budgets have remained, for the most part, stable this past year. "Eighteen months ago the camera and editing solutions were (for the most part) either handmade, a work-around, or a patch to an existing system. Since then single body cameras, like the Sony TD300, and editing systems specifically designed for 3D have become available improving both workflow and efficiency. After a year and a half of

On Sony's Culver City, Hollywood lot...

Sony used a variety of cameras on its tests, and trundled them around the studios on normal tracking and mobile rigs, without suffering any damage.



experience we are a lot smarter and so are our production partners, so there are a lot fewer surprises (which always means more money) along the way."

To the doom-sayers who suggest that 3D-TV is just a flash in the pan, *Ringwald* reminds us that 3D adoption rates continue to outpace the adoption rate of HD. "Projections forecast that by 2013, 45 percent of new U.S. TVs sold will be 3D and by 2015 that number reaches 63 percent with 73m total 3D TV sets in U.S. homes. That's an audience!"

The key words that *Jacquie Pepall*, Director of Production at **Dimension Media**, uses in describing her 3D work are "creative", "innovative" and "exciting", and it's fair to say that in the increasingly important world of 3D production for TV (and cinema) Dimension are at the cutting edge. "One of the trends we've witnessed over the past year is that 3D productions are steadily more innovative and adventurous," says *Pepall*. "On the whole, we've seen more creative and experimental techniques such as time-lapse and macro photography used in 3D productions, as well as new systems such as body rigs. As 3D facilities and technology improve, productions are becoming braver and more inventive."

"David Attenborough's 'Kingdom of Plants', a series produced by Atlantic

productions for Sky 3D, is absolutely stunning; the added depth brought the plants to life in ways we couldn't have imagined," she explained. 'Kingdom of Plants', shot largely at the U.K.'s magnificent Royal Botanical Gardens at Kew, West London, is being aired this Spring on Sky 3D. *Pepall* adds: "We have a few other exciting documentary and drama projects that will be broadcast later this year. In terms of viewer feedback, we've found that when the story and the programme concept are good and the 3D is complimentary—it's a win. For example, the viewer response to BBC's *Strictly Come Dancing* [the 'Dancing with the Stars' format] was hugely enthusiastic (it sold out to 21 cinemas)."

Pepall admits that she'd love to see more drama and comedy on air in 3D. "One of the somewhat unexplored avenues of 3D is traditional narrative formats such as dramas and sitcoms. There is a significant opportunity with these formats to use 3D to enhance the narrative and emotional content of the story. For example, the jokes in a comedy might be better articulated using 3D; equally, 3D can bring an added emotional depth to a scene. We would love to see a costume drama in 3D."

3D costs, at least for long-term equipment rental, are coming down, she says. "We've seen movement in both

directions. 3D workflows have improved and crews and production teams have become more efficient and knowledgeable about 3D. So in that sense, 3D budgets and production schedules have decreased. However, we've also seen a wonderful increase in the degree of adventure, difficulty, and ambition associated with 3D projects—and breaking new ground can require higher budgets."

The good news is that she is finding it easier—and necessary—to secure production partners and co-producers. "We've found that the complexities of producing 3D, as well as the costs involved, have made it more compelling for companies to partner on productions. Certainly we've found that there is a lot of interest from other companies in getting involved in 3D projects—partnerships are forming all the time."

One of the key advantages is time. The past year has seen new developments in camera technology, with lightweight side-by-side units, and a growing number of 'prosumer' camera equipment which are extremely suitable on some shoots. There's also a growing number of so-called 5D productions, where the same rigs are used for both 2D and 3D image capture.

Kathleen Schroeter is Executive Manager, **Fraunhofer HHI's 3D Innovation Center** in Berlin. "While for film the higher production cost and the bulky production equipment (e.g. mirror rigs) can be accepted, much higher production costs for TV and still a very small audience is not acceptable. We are facing the same problems as in the beginning of HDTV, only when inexpensive flat screens became available, HDTV became a success. Nevertheless, the sales of 3D-capable TV sets is five times as high as those of HD receivers in the beginning of HDTV."

Schroeter says bluntly that most 3D for TV productions simply cannot fund a doubling-up of camera rentals and so forth. "This is the challenge for the next few years: to develop production equipment, which allows the production of 3D content at comparable prizes as HD content. One of our targets is the development of fully automatic 3D cameras, which do not need



Sony's PMW-F3's on a 3ality TS5 rig, as used on the experimental shoots



a stereographer but which can be used by cameramen as with 2D cameras."

She also sees the initial hype of 3D fading away as viewers—and filmgoers—become more demanding. "The big 3D hype is over, people are becoming more realistic. But this is not only negative, because the 3D projects planned right now are maybe more serious than two years ago."

The conference heard speaker after speaker affirm that 3D for television will grow. New channels will emerge once the content exists to support the channel. And the Palais des Festival at Cannes had 'standing room only' signs for delegates. In other words, the interest from the production community was considerable.

**"3D adoption rates
continue to outpace the
adoption rate of HD"**

Mark Ringwald, 3net



Sky: U.K., Germany + Italy Confirm 3D

More than two intensive days at MIPTV, which focussed entirely on 3D-TV, the senior staff from **BSkyB**, **Sky-Deutschland** and **Sky Italia**, all confirmed their commitment to growing their investment in 3D-TV.

John Cassy, BSkyB's director of 3D said that Sky's 3D numbers now topped 250,000 viewing homes, and he was already budgeting an increased spend in 2013 as part of Sky's five-year plan for 3D-TV. "All our viewer satisfaction rankings go through the roof for 3D," he told delegates at MIPTV's 3DTV Focus event in Cannes.

Much the same story came from *Cosetta Lagani*, Sky Italia's head of 3D-TV, who explained that the Italian channel, despite only launching on September sixth last year, had already achieved considerable success stories, helped by transmitting the final of (the Italian) 'X-Factor' to huge viewer and critical awareness, as well as special live outside broadcasts such as the transmission of Aida (in partnership with Opera Verona). She told delegates that the planned 200 hours of Olympic Games coverage in 3D would only help this story, and that Sky Italia's commitment to soccer, tennis, golf, rugby and other sports, would help continue the drive to greater 3D acceptance.

Stefan Heimbecher, head of innovation and standards at **Sky Deutschland**, also barely 18 months old as far as 3D transmissions were concerned "and counting," said *Heimbecher*, would maintain its 3D commitment, especially now that greater distribution was coming from many of Germany's cable distributors. Sky Germany aired the 2012 Golf Masters event in April in 3D, as well as the upcoming UEFA Champions League Final (from Munich) in May.

Heimbecher said that continued development of less-expensive camera rigs, as well as greater use of so-called 5-D production (using one camera position to generate both 3D and 2D images) was helping to keep production costs in check and to increase efficiencies as well as cut down set-up times. "We must get rid of the 3D production overhead in sport," he said, "and reduce crew costs, production and other costs. It is happening, and we can see further savings being made in these areas. 3D-TV is here today, and to stay."

Fox: Glasses— Free TV Doesn't Work

Twentieth Century Fox believes that glasses-free 3D TV technology and poor real-time 2D to 3D conversion are doing more harm than good when it comes to showing off 3D. *Danny Kaye*, executive vice president, Global Research and Technology Strategy at **Fox** told a conference in London that 3D will thrive as a format, but consumers need to see movies as the director intended them, and not filtered through below par TV technology.

"As long as a film is made in high-quality, you may never tell the difference between a true 3D movie and a post-converted one," *Kaye* told PEVE delegates. "But, what is harming the idea of 3D is real-time conversion...Whether it is 2D to 3D conversion in real-time on a TV set, or versions of no-glasses 3D TVs... we do not need [these technologies] yet as they cannot match the quality of professional conversion services or the filmmaker shooting it in 3D to begin with."

Kaye is optimistic about the future of 3D but said it will take time: "3D is a very complicated technology to get right, it's not so hard to get wrong."

His biggest concern is that techniques such as glasses-free 3D and real-time conversion aren't helping in the perception of 3D to consumers. "We shouldn't stunt the growth of 3D at this early stage by introducing techniques that do not show off 3D in the best light."

Showcasing Australasia's SATCOM Opportunities...

Satellite communications is a growing global market due to an ever increasing demand for bandwidth to support fast, high quality communications across a wide variety of industries and geographical regions. According to recent figures released by the Satellite Industry Association (SIA), world satellite industry revenue was US\$168.1 billion in 2010 and the market has experienced an average annual growth of 11.2 percent over the last five years.

The annual Australasia Satellite Forum occurred in Sydney on the 16th of April 2012 and provided a unique opportunity for open debate and discussion of the satellite industry in the Asia-Pacific region.

The one-day forum hosted a mix of Australian Parliamentary representatives and industry experts from around the world to hear presentations from some of the key players involved, and to participate in panel and roundtable discussions. The event focussed attention on the versatility of satellites in providing fast, efficient, reliable and cost-effective communications to urban, regional and remote areas across the government, enterprise and consumer markets.

Among the political policy makers, industry experts and market leaders in attendance were Shadow Regional Communications Minister, Luke Hartsuyker; NewSat Founder and CEO, Adrian Ballantine; NewSat CTO, David Ball; Arianespace Chairman and CEO, Jean-Yves Le Gall; SES Vice President Asia Pacific Glen Tindall; Intelsat Senior Sales Director Robert Suber and Optus Director Paul Sheridan. Topics covered included regional and remote communications, the Australian National Broadband Network (NBN), satellite demand and supply, launching satellites and first responder communications in disaster zones.



The Westin Hotel in Sydney, Australia

Shadow Regional Communications Minister, Luke Hartsuyker, gave the initial address. He discussed the desperate need for wireless communications and high-speed broadband within regional and remote Australia and provided insights into the applications of satellite communications in isolated locations. Mr. Hartsuyker stressed that "Australia—all of Australia—must have modern high-speed broadband, there is no doubt about that. The question is how best to deliver that?", calling into question the effectiveness and efficiency of the current Federal Government's approach to the NBN.



Luke Hartsuyker

With a portfolio covering not only broadband but also a wide range of communications issues including television and the mobile phone network, Mr. Hartsuyker believes that the satellite sector has a role to play in each of the following areas.

Regarding television, "As Australia turns off its analog television and switches to digital, satellite will be delivering metropolitan quality television to Australians living in the most remote areas. For many people in regional Australia this will be the first time they will have access to direct, free-to-air television services and local news", he explained.

In relation to mobile communications, Mr. Hartsuyker enumerated statistical evidence which reveals 70 percent of Australia's landmass currently has no form of conventional mobile phone coverage at all, putting into focus the fact that the satellite industry has developed innovative solutions to ensure that mobile communications are available across 100 percent of Australia's land mass and out to sea.

He then reiterated that satellite communications will provide an opportunity to improve the quality of life in regional areas, with better healthcare, with better opportunities and with the provision of entertainment in isolated locations.

Mr. Hartsuyker went on to explain how the future of almost every sector of the Australian economy, especially the booming mining and resources sector, will depend on "high-speed, reliable communications providing easy access to new markets, at home and abroad". He emphasised that "such communications will always also provide new opportunities for new industries to move to regional areas: call centres, data processors, designers, software engineers", harnessing the potential for regional Australia to increase its contribution to the economy.



David Ball



Jean-Yves LeGall, Arianespace, speaks at the forum.

In addition to the provision of fast and reliable communications to regional and remote Australia, the role and capabilities of satellite-enabled first responder communications in disaster zones were also discussed during the forum. As part of a panel discussion moderated by NewSat CTO, David Ball, representatives from ASC, Thales Australia, ND SatCom, Comtech EF Data and The Global VSAT Forum spoke of the advantages, versatility and efficiency of using satellites for disaster recovery communications.

Over the last few years, a number of natural disasters around the world have been witnessed wherein many lives were lost and where terrestrial infrastructure has been totally wiped out by floods, tsunamis, bushfires and earthquakes. In his introduction to first responder communications in disaster zones, David Ball stressed that the challenge in many disaster emergency situations is "how to get communications restored and how to rebuild that infrastructure". Mr. Ball believes there is an urgent need at the time of the disaster to get situational awareness built and to get critical command and control established, underlining that "satellite is very well placed to assist with this".

"In the event of a disaster, satellites are able to provide communication solutions for quick and effective recovery" said Ball. NewSat provides satellite communication solutions to overcome challenges that may arise in the event of a disaster, to ensure recovery efforts are not inhibited and help environments to be restored as soon as possible. Its VSAT services can be deployed anywhere and is an ideal standalone disaster recovery tool. During the 2009 Victorian bushfires, NewSat assisted in the bushfire recovery of one of the hardest hit communities—Kingslake, as well as Buxton.

According to Mr. Ball, another challenge when dealing with disaster recovery is that no one thinks about such needs until a disaster has occurred. This proves to be problematic, as obtaining and moving the adequate equipment into the field as well as training people once a disaster has already happened is extremely difficult. "All

these issues in terms of preparedness give us something to talk through," added Mr. Ball.

The forum also provided an opportunity for Jean-Yves Le Gall, Chairman and CEO of Arianespace, to discuss future satellite launches for Australia. According to Mr. Le Gall, space is a real success and is already a reality in Australia. "There are many new operators in Australia and now there are many projects here. This is excellent news because Australia is a kind of space veteran in the Pacific Rim area and what's going on here is very interesting". With many successful satellite launches for Australia already under its belt, the Arianespace chief spoke of three recently-signed new launch contracts, one being the upcoming launch of Jabiru-1 in 2014, NewSat's Ka-band satellite.

Speaking specifically about NewSat, Mr. Le Gall emphasized, "NewSat is a new satellite operator and it is very important when you launch a first satellite that this satellite will be launched successfully, so Arianespace is proud to have been selected to launch Jabiru-1. After Jabiru-1, I'm sure that many others will follow, as well".

The Australasia Satellite Forum also provided opportunities for satellite experts to discuss the media side of the business, the supply and demand of satellite services, as well as the relationship of both cooperation and competition among satellite operators. The forum showcased an excellent line-up of Australian and Asian companies which are bringing solutions, innovation and resources to the global satellite communications industry.



Offshore Connectivity Via Satellite

China National Offshore Oil Company (CNOOC) needed to provide integrated voice, video and data networks to improve communications among its offshore oil and gas drilling rigs, production platforms, offshore facilities, corporate headquarters, Internet and local PSTN networks. A TDMA based network was sought to replace an existing SCPC network. The new network needed to support both star and mesh topologies for a mix of stationary platforms as well as ships. CNOOC chose Gilat's SkyEdge II System to implement the new VSAT network infrastructure. SkyEdge II's high performance and low Total Cost of Ownership now provides a networking solution fulfilling CNOOC's needs.

The Client + The Project

CNOOC provides communications services to the oil and gas industries in China's South Sea. One of its critical needs is to provide communications between offshore drilling platforms, among the platforms and ships, and to have all connected to various onshore management and executive sites. CNOOC's main challenge is to achieve cost effective reliable voice, video and high speed data communications in a simple-to-operate network.



CNOOC was already experienced with satellite technology having operated a *Single Channel Per Carrier (SCPC)* network. However, the company required a better long-term cost effective solution that would provide the advanced network services it needed to meet current and future needs. This solution had to be highly reliable and meet the changing needs of multimedia communications in remote location voice, video and data applications. Likewise, the solution chosen by CNOOC would have to be easy to install and operate, enabling users at sea—on rigs, platforms and ships—to configure a remote terminal with minimal effort. As the business is high revenue and highly competitive, secure and high-speed remote communications was mandatory for supporting its production operations.

The Challenge

Oil is a key element keeping China's economic growth engine moving forward. As petroleum prices increase, offshore oil production platforms are being pushed to keep their production moving smoothly forward. Communications is a vital link in enabling smooth operation of production, handling of proper logistics for supply ships, keeping engineers and management in constant contact with workers, and enhancing and improving production.

However, providing direct business communications isn't the only concern. In addition, employees often work long periods on a platform before rotating back to land. To enhance morale on the platforms, it is important to provide workers a way of calling, not only the office, but also family and enabling access to the Internet.

On the technical side, CNOOC's mix of sites, stationary platforms and ships require on-the-move broadband connectivity. Thus, the VSAT network needs to be fully integrated with a mix of auto-point and stabilized antennas. Platforms support large and relatively heavier antennas, while ships need smaller auto-stabilized antennas. The different sites also have different application requirements—platforms have larger throughput needs, especially in the Return Channel, while ships are limited to smaller channels as a result of their smaller antennas. Thus, a network needs to be able to be efficient and concurrently support both higher data rates for some sites and smaller channels for others.

Finally, one of the offshore sites' biggest challenges is the need to support both *star* (site-to-center) and *mesh* (direct site-to-site) network topologies. While hub-and-spoke topology works well in connecting Internet and similar server centric applications, voice and video suffer significantly, especially if there is an increase in latency, such as from a "double-hop" when two platforms need to communicate to each other. Therefore, CNOOC very much required a single network that could provide both topologies in a cost effective manner in terms of CAPEX for terminals, and OPEX of satellite capacity.

The Solution

CNOOC selected **Gilat's** advanced **SkyEdge II** MF-TDMA VSAT multi-service high performance platform because it fully met their requirements to support Voice over IP, broadband data and video communications using both Mesh and Star topologies.

SkyEdge II provides high speed connectivity to VSATs with advanced bandwidth on-demand algorithms, enabling improved services using less satellite capacity than CNOOC's legacy SCPC network. Advanced Quality of Service (QoS) provides reserved satellite capacity and guarantees low delay and low jitter transport for voice, video conferencing and other multimedia applications. The QoS mechanism ensures the highest quality even during network congestion maintaining continued superior user experience.

SkyEdge II's full mesh topology with direct communications between VSATs reduces satellite delay, shrinks the bandwidth required for rig-to-rig voice and video calls, and eliminates 'one hop' latency, and wasted satellite capacity. Packet payload compression, IP header compression and voice silence suppression

minimize the bandwidth required per call while still providing high quality service between platform workers, corporate offices and ships. In addition, SkyEdge II's mesh topology also supports data connectivity including TCP acceleration.

By supporting direct site-to-site access of local servers with excellent user experience, SkyEdge II's fully adaptive outbound DVB-S2 ACM and ICM adaptive inbound channels ensure that, even during rain-fade or adverse conditions, CNOOC's communication links remain strong. SkyEdge II's adaptive inbound mechanisms support multiple inbound channel rates, including sharing of channels for both star and mesh traffic.

CNOOC is using three channel rates: 128ksps, 256ksps and 512ksps. For small antennas, VoIP mesh, or in adverse fade conditions, the link automatically transmits from the smaller channels. For high-speed video conferencing requiring higher throughputs, or when transmission is in clear skies, higher speed channels are used. Transmission between channels can change burst-by-burst, thus supporting simultaneous transmission to several sites (which can comprise of several mesh sites and the hub for star) on several channel sizes. In addition, Gilat's high performance broadband network efficiency simultaneously handles various sites with different needs.

Finally, in meeting CNOOC's request for lowering OPEX at installation and afterwards, Gilat's SkyEdge II solution's met expectations. Setup entailed minimal on-site configuration and afterwards, crew training, regular maintenance and hiccups related to lack of proficiency, or complexity of use, that greatly add to extra costs during early system use were dramatically reduced.

"The successful deployment of Gilat's CNOOC VSAT network demonstrates our ability to meet the complex, high-performance standards and high-quality communications needs of one of the region's, and world's leading energy-services companies and once again is a testament to our ability to cater to the maritime market," said Gilat's *Rudy Colson*, Regional Vice President, **Gilat Satellite Networks**.

High Expectations Realized

All together, the solution's simplicity of use coupled with its new powerful technical capabilities not only enables CNOOC to run its maritime oil and gas communications at a low cost of total ownership, but also provides it with extensive new applications not previously possessed.

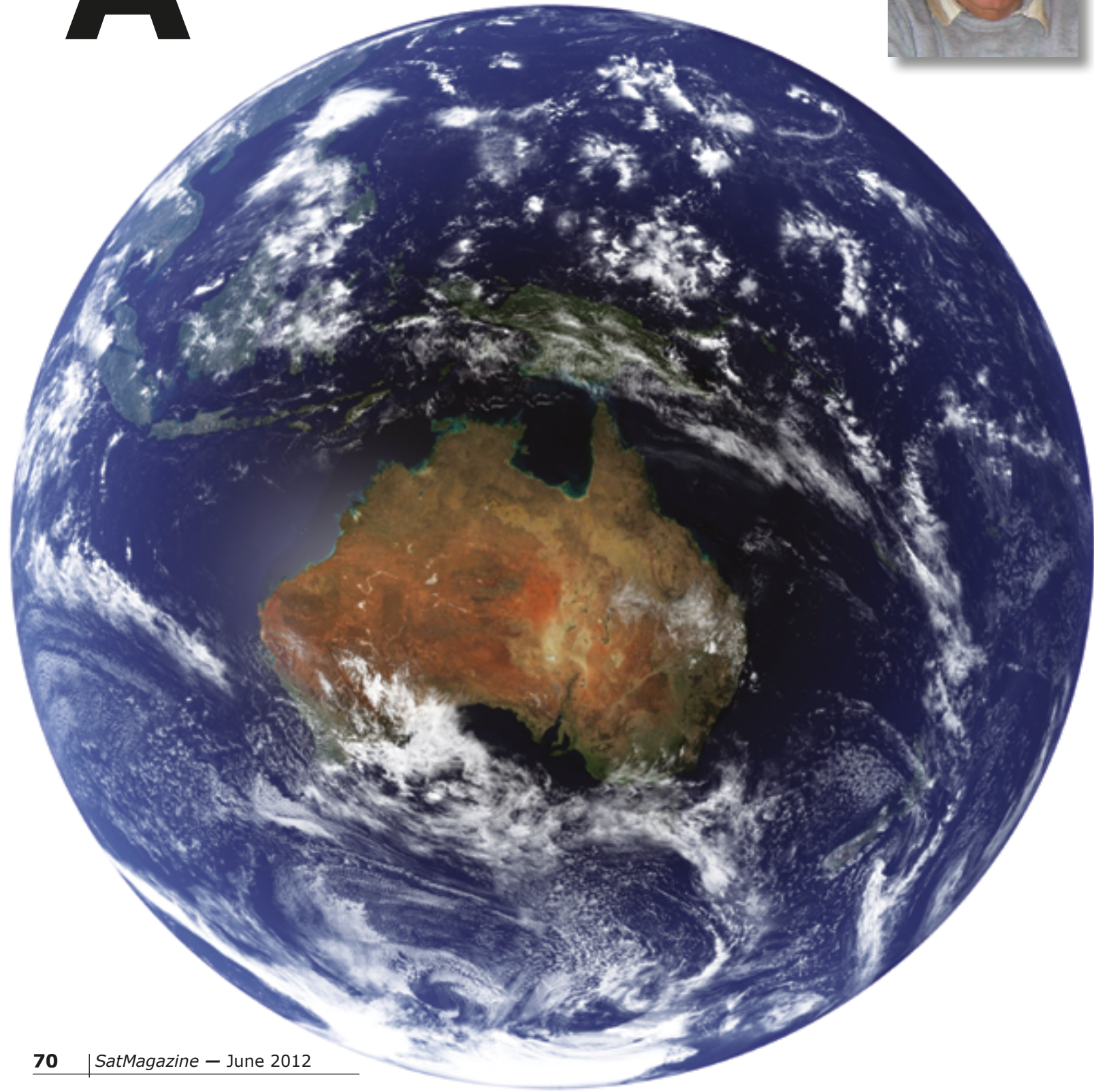
Using SkyEdge II, CNOOC now has fast and reliable communications service linking its entire maritime oil and gas operations together in one network.

Australia's Communication Satellites

By Jos Heyman, TIROS Space Information

A

ustralia received its first taste of space communications on 23 January 1970, when the Oscar-5 Australis radio amateur satellite was placed into orbit aboard a Delta DSV3M launch vehicle.





Oscar-5 satellite

It was the first radio amateur satellite sponsored by the **Amsat Corporation** as well as the first international **Oscar**, being built by radio amateurs at the **University of Melbourne**, Australia. It was also the first Oscar to employ *barmagnet stabilisation* to prevent tumbling, and it carried the first amateur satellite telecommand system. The satellite was mainly used for educational purposes and was designed only to transmit via the 28MHz and 144MHz bands. The 18kg satellite remained operational for 46 days.

Australia is a large and empty country. With an area of 7,686,000 km², it is approximately 82 percent the size of USA. However, the current population is around 22,782,000 in number, which is approximately 7.5 percent that of the USA. Most of the country's interior is sparsely inhabited and the majority of Australians (89 percent) live in selected urban areas close to the coast. This makes Australia one of the world's most urbanised countries. This is a physical condition that has seen some unique communications related projects as part of the Australian history. It is also made Australia a prime candidate for space-based communications in spite of the relatively small market.

In 1977, a formal report to the Government recommended the use of a space-based communications system to provide communication facilities to the entire continent. It was correctly suggested, by experts, that the vastness of the Australian continent, and the lack of an appropriate communications infrastructure, were conditions which could only be solved with satellite technology. This would enable all Australians, irrespective of their place of residence, to have access to telecommunications facilities. There was also an identified need for military communications.

This resulted in the establishment of a task force and, following experiments with the Canadian **CTS** communications satellite in 1978, it led, in 1979, to a government decision in favour of a communications satellite system.

Aussat was established in 1981, owned by the government with Telecom, which itself was another government entity, to operate the system.

Heyman's Focus

In 1992, Telecom merged with the government owned **Overseas Telecommunications Commission**, forming **Telstra** in 1993 as the leading communications organisation in Australia. Simultaneously, and in spite of the fact that the former OTC was a heavy user of satellite technology for overseas communications, Telstra moved away from domestic satellite operations—the Aussat system was sold to **Optus**, the second (and privately owned) communications organisation in Australia. The focus of the system changed to one that provided new customer services, such as mobile communications and pay television (payTV).

In 2001, Singapore's **SingTel** corporation purchased Optus, although the name Optus remains in use on the Australian market.

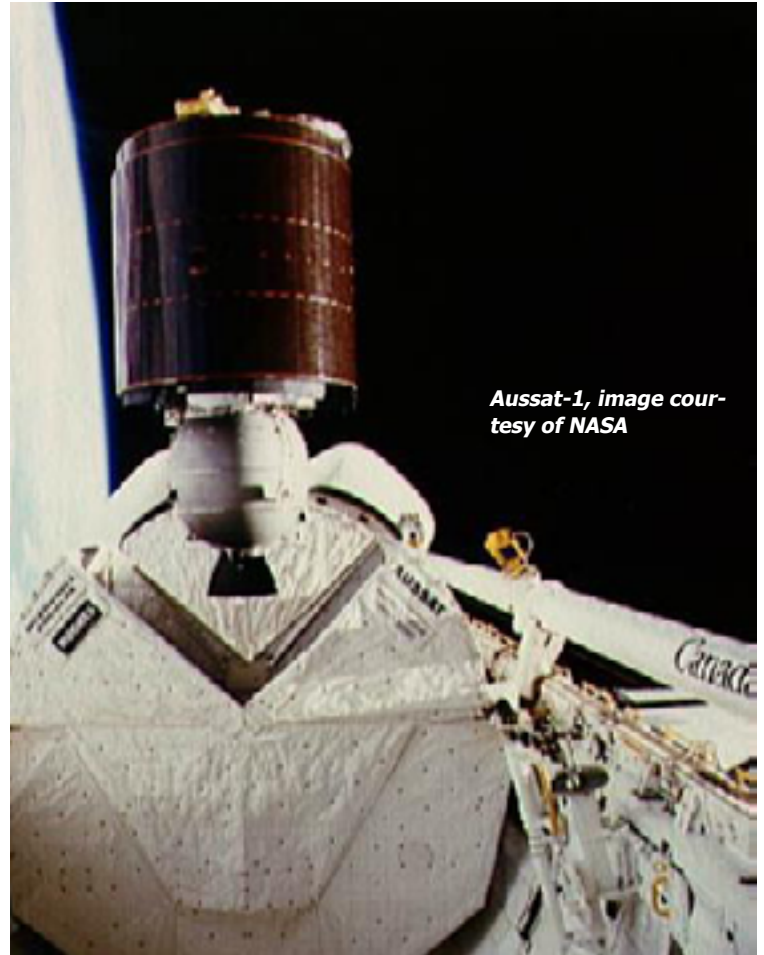
The first generation of Australian communications satellites were based on the **Hughes HS-376** spacebus. These satellites carried 15 transponders that operated in Ku-band. The three satellites were placed in a geostationary orbit at 160 degrees East, 156 degrees East, and 164 degrees East, respectively. Services were initially directed at remote areas of the Australian outback. The Aussat satellites were renamed as Optus in 1992.

Satellite	Launch	Location
First generation		
Aussat-1	27-Aug-1985	160°E
Aussat-2	28-Nov-1985	156°E
Aussat-3	16-Sep-1987	164°E
Second generation		
Optus B-1	13-Aug-1992	160°E
Optus B-2	21-Dec-1992	Failed
Optus B-3	27-Aug-1994	156°E
Third generation		
Optus C-1	11-Jun-2003	156°E
Fourth generation		
Optus D-1	13-Oct-2006	160°E
Optus D-2	5-Oct-2007	152°E
Optus D-3	21-Aug-2009	156°E
Fifth generation		
Optus-10	2013	tbd

Aussat-1 (NASA)

Aussat-1 and **-2** remained operational until 1993. In the same year **Aussat-3**, by now known as **Optus A-3**, was moved to 156 degrees East and was further moved to 152 degrees East in 1995. In 1999, the satellite was moved to 31.5 degrees East to serve with **SES** until it was retired in April 2008.

Plans for the next generation of satellites were made in the late eighties and the second generation of satellites were also ordered from **Hughes**. They were based on the **HS-601** spacebus and carried 15 transponders in the Ku-band, a single transponder in the L-band, as well as an experimental Ka-band transponder. The satellite was equipped with laser reflectors for precise position determination. The first satellite was located at 160 degrees East, while the third one was placed at 156 degrees East. The second satellite failed to reach its geostationary orbit due to a malfunction of the launch vehicle.



Aussat-1, image courtesy of NASA

Optus B-1 was retired in May of 2008, whereas **Optus B-3** remains operational, although it was moved to 164 degrees East in 2003.



Optus-B satellite, image courtesy of Boeing

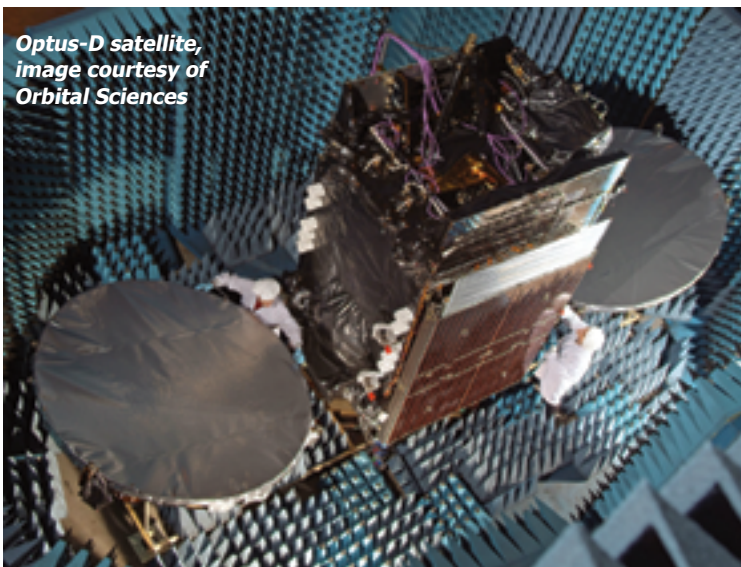
Optus B (Boeing)

Optus C-1 was the only third generation satellite. It was based on a **Space Systems/Loral FS1300** platform assembled by **Mitsubishi Electric**.

It was equipped with 24 transponders in the Ku-band for civilian use along with five Ka-band transponders, six transponders in the UHF band and four transponders in the X-band for use by the **Australian Defence Force (ADF)**. The satellite remains operational to this date.

Optus D (Orbital)

The fourth generation of Optus satellites were built by **Orbital Sciences** using their **Star-2** platform. The satellites carried 24 transponders in the Ku-band, although **Optus D-3** carried 32 Ku-band transponders. Three have been launched and these have been located at 160 degrees East, 152 degrees East, and 156 degrees East.



*Optus-D satellite,
image courtesy of
Orbital Sciences*

Optus has selected a Space Systems/Loral 1300 space platform for its **Optus-10** satellite that is scheduled to be launched in 2013. It will be fitted with 24 Ku-band transponders.

Optus-10 (Optus)

Optus operates a network of four national and two international Earth stations which are located at *Belrose* (Sydney), *Oxford Falls* (Sydney), *Lockridge* (Perth), *Adelaide*, *Auckland* (New Zealand) and *Lae* (Papua New Guinea). These ground stations provide network monitoring, support and troubleshooting whilst



*Optus-10 satellite,
image courtesy of Optus*

Heyman's Focus

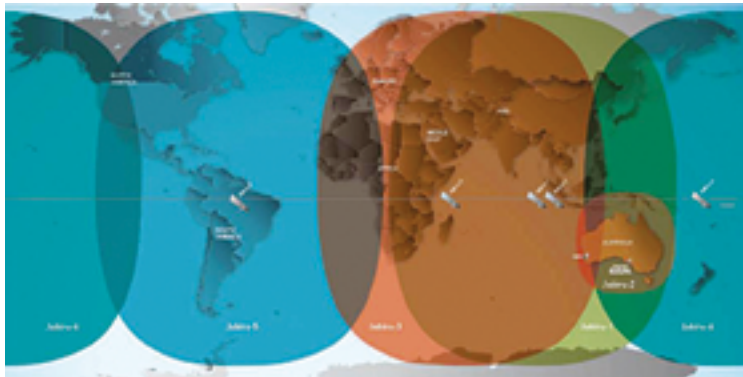


Lockridge ground station,
photo courtesy of Google Earth

the stations also coordinate launch missions. They serve Optus satellites as well as a number of satellites for other operators.

While the Australian Defence Force currently uses **Optus C-1**, which it partially funded, this situation is about to change in 2013 with the launch of the United States' **Wideband Global Satcom (WGS)-6**, a military communications satellite which is being funded by Australia—the Australian Defence Force will have access to the entire WGS system.

The Australian **NewSat** satellite communications provider was founded as a multimedia business in 1987 and gradually evolved into the largest independent satellite communications provider in Australia. It operates two ground stations located in **Bassendean** (Perth) and **Adelaide**. These facilities were acquired in 2005 from **SES Newskies** (now simply known as **SES**) and have permitted NewSat to provide government, corporations, and private enterprise with access to an increasingly broad and diverse range of satellites owned by a variety of operators.



Jabiru satellites coverage map, courtesy of NewSat

Most NewSat customers are located in Australia, the Middle East and Africa.

Jabiru-1 will be the first of five satellites directly owned by NewSat and will offer coverage over the Middle East, Asia and Africa, meeting the large bandwidth demands from military, resources, and carrier-grade telecommunications markets in these high growth regions. The satellite will be built by **Lockheed Martin** and will be based on the **A2100AXS** platform, fitted with 50 Ka-band transponders. To be launched via an **Ariane 5ECA** in late 2014, the satellite will be located at 90 degrees East.

Jabiru-2 will provide Ku-band coverage in and around Australia, Timor Leste, and Papua New Guinea.

Jabiru-3 will provide Ka-band coverage over Africa, the Middle East, Asia and Europe, whereas **Jabiru-4** will deliver Ka- and Ku-band coverage over the Pacific Ocean region.

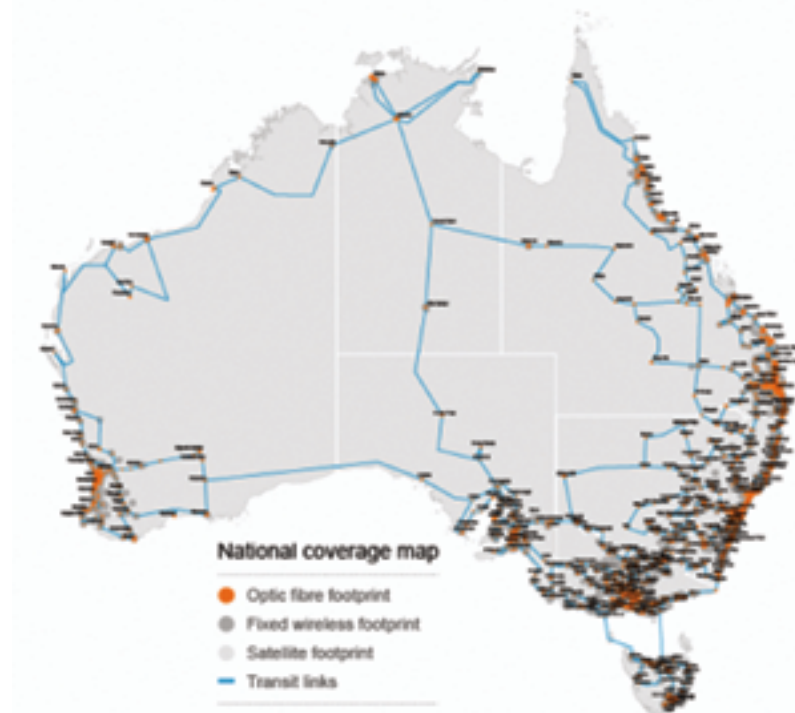
Finally, **Jabiru-5** will deliver high-powered Ka-band coverage over Central, North and South America, as well as Western Africa and the Atlantic Ocean. Jabiru-2, -3, -4 and -5 have not yet

been ordered. NewSat has rights to seven premium orbital slots and its fleet of next generation geostationary satellites will lead Australia's space quest.

The Australia federal government is establishing a national broadband network and, to implement this, the government created the **NBN Co** in 2009, wholly owned by the government for the development and operation of the national broadband network. This network will connect 93 percent of Australian homes, schools and workplaces with optical fibre to provide super-fast broadband services. To cover the remaining 7 percent, NBN Co ordered two high-throughput communications satellites from **Space Systems/Loral (SS/L)** in February of 2012. To be called **NBN Co 1-A** and **1-B**, the two satellites will be based on the SS/L **1300** platform and will be fitted with Ka-band transponders. The launch is scheduled for 2015.

The 7 percent referred to above comprises some of the most remote places in Australia, as well as its coastal islands and external territories that include Norfolk Island, Cocos Island, Christmas Island and Macquarie Island in the Antarctic.

This 7 percent referred to above comprises some of the most remote places in Australia, as well as its coastal islands and external territories including Norfolk Island, Cocos Island, Christmas Island and Macquarie Island in the Antarctic. However, with the demographic distribution in Australia this 7 percent is almost the entire continent, as can be seen on the map, where this 7 percent is shown as light grey.



About the author

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





The Benefits Of DVB-S2 Multistream Technology

By Jörg Rockstroh, Senior R&D Engineer, WORK Microwave GmbH

Twenty years ago, MPEG transport stream was the premier audio and video container format. Content was transmitted over a DVB-S carrier with an inherent static signal of constant modulation, packet size and data rate. Over time, satellite links were used for an increased number of new applications, ranging from direct-to-home (DTH) broadcast channels to satellite newsgathering (SNG) and IP links. Although MPEG's flexible design of the transport stream enabled it to carry all types of data, users were presented with the problem of higher overhead. The wider range of requirements led to the development of the DVB-S2 standard, which introduced the possibility to send more than one transport stream over one carrier. This article will discuss the underlying technologies and the improvements DVB-S2 offers the satellite industry.



Prior to **DVB-S2**, moving multiple transport streams was extremely challenging. The streams had to be transmitted over two separate signals, or they had to be multiplexed into a single stream, and demultiplexed on the receive side. Both methods involved a considerable amount of additional equipment and often resulted in a reduced amount of available bandwidth due to signal spacing or multiplexing overhead.

DVB-S2 resolved these issues by seamlessly transmitting multiple transport and generic data streams over a single carrier. In a multistream application with two transport streams (see Figure 1), the modulator uses the packets of one stream to fill a baseband frame and starts a new baseband frame for the second stream. Next, the frames are aligned chronologically for transmission. Using an 8-bit identifier in the header, the baseband frames are designated to a specific stream, with up to 256 streams.

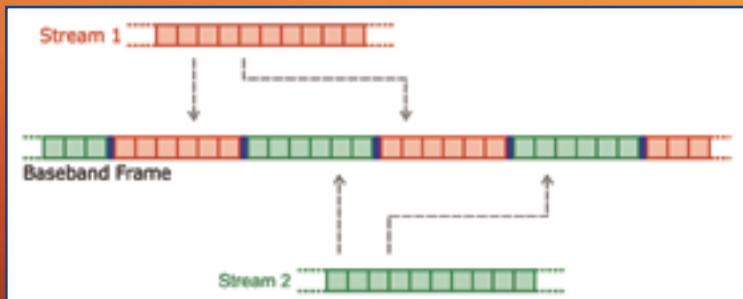


Figure 1: This diagram illustrates the sequence of frames, represented by different colours, containing the two streams.

The demodulator could now be expected to select the baseband frames of one stream, unwrap all of the transport stream packets, and output them over an ASI interface. Unfortunately, the resulting burst-wise output would conflict with the requirements of the *program clock references (PCR)*, which only allow a jitter of 100 ns. As DVB-S2 introduced *Variable Coding and Modulation (VCM)*, which enabled flexible data rates for all contents on the satellite carrier, this problem was exaggerated.

In order to achieve an accurate PCR alignment, DVB-S2 relies on a timestamp called *Input Stream Synchronizer (ISSY)*. Using the timestamp, the demodulator can release the packet towards the ASI interface at an exact point of time and the PCR jitter stays within the specification. The modulator and demodulator are unlikely to have a common reference, so the symbol rate clock acts as the reference for the timestamp. The demodulator recovers this clock from the signal in order to be in sync with modulator, preventing buffer underrun or overflow. A 2- or 3-byte timestamp can be used, depending upon the relationship between the individual stream data rate and the overall symbol rate. This increases the size of a stream packet from 188 bytes to 190 or 191 bytes.

Another useful feature in DVB-S2 is *null packet deletion (NPD)*, which can probably compensate for the synchronization overhead. Null packets are typically used to fill a transport stream to a certain constant data rate, without using any user data. As the demodulator can recover the data rate through the input stream synchronization, most of the null packets can be removed from transmission. Up to 256 packets in a row can be deleted in the modulator, and a 1-byte value attached to each transport stream packet signals how many null packets had been removed before its position. The demodulator then immediately reinserts the packets when unpacking the transport stream from the baseband frames. NPD potentially decreases the amount of occupied bandwidth, and when combined with lower priority data like web traffic, it enables all satellite link users to most effectively use their signals.

While the multistream nature of DVB-S2 is extremely advantageous, its complexity introduces potential for error. For example, if the bit rate of one of the streams in a multistream scenario increases, the overall data rate could exceed the signal capacity, causing the modulator to randomly drop packets out of all of the transport streams when the buffer is full. Incorrectly modifying one stream could affect all of the streams, even though they were meant to be independent. The solution can be found in the IP world as a process called traffic shaping.

WORK Microwave has designed its IP-Modems based on a traffic shaping, cross-layer design that enables symbol-based (signal layer) and rate-based (IP layer) limitations and prioritizations, with both layers being linked to each other. This technology has been adopted for transport stream applications. In an overflow situation streams are stopped independently if they exceed their limit, or alternatively according to priority.

DVB-S2 multistream technology allows satellite operators to combine multiple transport streams or digital data streams into a single satellite carrier and provides many improvements compared with the original DVB-S standard. Features such as input stream synchronization and null packet deletion enable more complex usage cases of satellite links. Through the use of traffic shaping, each stream is independently configurable, enabling total user control. Finally, using a single satellite carrier reduces bandwidth costs and eliminates the need for additional external equipment.

About the author

Jörg Rockstroh is the Senior R&D Engineer for the Company and is the project manager for SATCOM IP products and demodulators. He is also the head of the digital design team as well as the DVB representative.



It's All About Development, Development, Development

Back in the mid nineties, if you had rated on a scale of one to ten the prospects of the Isle of Man developing a successful space and satellite industry, most savvy observers would probably have opted for a figure near to zero.

*Image...
The Isle of Man,
as seen from space.*



Let's fast forward to the present day—this tiny island jurisdiction at the heart of the British Isles is up amongst the front runners in terms of commercial space achievement. The Isle of Man has become one of the sector's unlikeliest success stories and this upward trajectory shows no signs of slowing down.

To put this into context, in terms of the speed of its commercial space industry development, the Isle of Man stands second to the 1960's *Apollo* programme. No mean feat, especially when you consider the island's entire population is little more than 80,000.

Today, four of the world's top 10 satellite companies are represented on the island and, currently, there are 11 satellites in orbit owned by **Manx** based businesses. Furthermore, 14 percent of the UK's *Registry of Space Objects* are either owned, or operated by, Isle of Man companies.

Only two countries, Canada and France, have a larger alumni database graduating from the **International Space University** (ISU) than the Isle of Man's, which is now running at more than 100 in number.

In 2008, island based space and satellite companies had a combined turnover of 62 million pounds. Although far from shabby, the projections for the next three years are set to leave that figure trailing in the distance. For the period 2012 to 2014, official forecasts predict that a staggering 1.6 billion pounds in turnover will be generated by the sector.

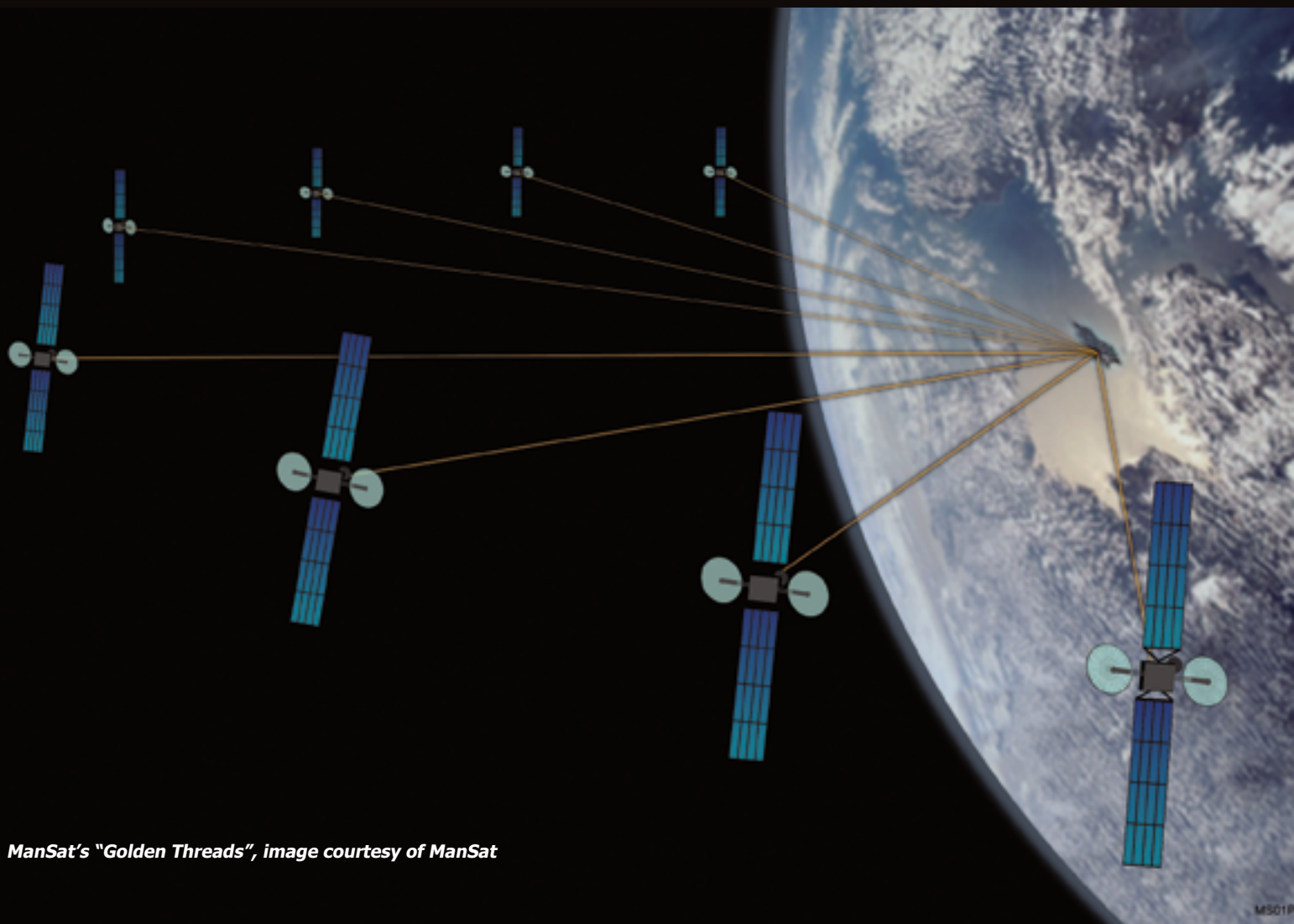
"It's a record of growth and development of which we are extremely proud," said the Isle of Man Government's Director of

Space Commerce *Tim Craine*. "There is no doubt that the space and satellite sector is becoming an increasingly influential part of our economy."

What lies behind the island's unparalleled emergence in the space and satellite industry?

"Fundamentally, the Isle of Man has long been recognized as one of the world's best regulated, low tax offshore finance centres and an attractive and competitive jurisdiction in which to do business," said *Tina Rawlinson*, Director of **Cavendish Trust**, one of the island's leading trust and corporate service providers that now provides specialist assistance to companies in the space and satellite sectors. "We have a can-do approach to business here and a very exciting blend of entrepreneurial flair and spirit. Combined with a supportive Government, this has allowed the space industry to flourish here."

If there was a proverbial light bulb moment for the island's space business, then such may well have arrived in September 1995. At that time, Manx born *Chris Stott*, now a leading space entrepreneur, was attending the first Masters programme at the International Space University. "It was an opening lecture being given by Professor Ram Jaku of McGill University," Stott recalled. "He was teaching on the new use of alternate jurisdictions to the United States for orbital filing, such as Hong Kong with AsiaSat, SES and Luxembourg, GE Americom with Gibraltar and others with Tonga. It got me thinking. Why not the Isle of Man? Surely we can do this better?"



ManSat's "Golden Threads", image courtesy of ManSat

The following October and November, after graduating and while waiting for his U.S. Green Card to join the U.S. aerospace company **McDonnell Douglas**, *Stott* arranged meetings with the Isle of Man Government to discuss the practicalities of handling satellite filings from the island. Although the Government was intrigued by the idea, the general consensus was that it was too big a financial risk to take, given the level of expertise required to make the project a success. "There was certainly some feeling of doubt from the then civil service as to the merits of the value of space markets to the island," said *Stott*.

Instead, it was proposed to establish a *Public Private Partnership (PPP)* between the Government and a newly created entity, called **ManSat**, which would shoulder the financial, market and regulatory responsibilities of managing orbital filings, take care of compliance and, where required, raise private capital to develop the market. In turn, they would pay a licence fee, based upon taxation, to the Isle of Man Government.

Around the turn of the millennium, ManSat requested a sole and exclusive arrangement to allow it to compete for business from the 14 major satellite companies who had shown a predilection at that time to leave their home jurisdictions.

In June 2000 following the verbal go ahead from Government and Communications Commission, *Stott* took the decision to work full time for ManSat where he remains the organisation's Chairman and CEO. In 2001, ManSat signed its first client, **Loral Skynet** (now **Telesat**) and the first satellite filings were made that September.

The PPP has demonstrably allowed the Isle of Man Government to translate what has historically been a public sector risk for other nations working in the space industry into a revenue generator for the Treasury. Since 2005, the Government has received 36 million pounds from the sector. "That may not sound [like] a huge amount but the profile we have gained since becoming a space isle has been disproportionate and impossible to place a value on," said *Craine*.

From the Government's perspective, the structuring of the partnership has proved to be an effective catalyst for growth. "Rather than needing to create a new branch of Government, with the all associated costs of hiring highly specialized and skilled staff, as well increasing the size of the Communications Commission the Government instead has been able to outsource this compliance activity to ManSat. This has generated income for the Government, without any additional cost and risk," he added.

In *Stott's* opinion, through the PPP arrangement, the island has been able to harness the power of the market to create a flourishing new space and satellite economic sector for the Manx economy. "It has been the catalyst for gaining a competitive edge and become more attractive to satellite operators wishing to make orbital filings," he said.

In 2004, with increasing interest in the island being shown by space companies such as **Inmarsat** and **SES**, the Manx Government extended its formal agreement with ManSat to file for orbital slots on behalf of all Isle of Man based companies. That same year came a pivotal moment, with the Treasury agreeing to provide assistance for the growing space industry, by announcing that there would be a zero percent corporation tax rate for Isle of Man space activities.

By 2005, the Government's *Office of Space Commerce* was formed, with *Tim Craine* as its Director since its establishment. It was during this period that ManSat created the successful **SpaceIsle.Com** marketing concept.

There are now 35 sector specific companies operating from the Isle of Man, 22 of whom have arrived since 2005. At least 120 people currently work either directly for space and satellite companies, or in specialised supporting roles, providing those operators with vital legal, trust and regulatory services.

"Due to our strong association with the finance sector, it is advantageous that the island has in place a highly professional and established network of service companies, which are able to support the space and satellite industry here," explained *Rawlinson*, who is herself a graduate of the ISU and, along with senior staff at Cavendish, is also a member of the **SSPI**.

Significant private sector growth on the island has also led to wider industry recognition and credibility. In 2006, the International Space University Board came to the Isle of Man and, in 2007, the International Space University announced the creation of the Isle of Man's *International Institute of Space Commerce*. This is the headquarters of the world's first think tank focused on the economics of space.

In 2009 the establishment on the island of the *Space Data Association* took place as a leading international not for profit organisation and, likewise in 2011, by the *Satellite Interference Reduction Group*.

Also in 2011, the *Economic Policy Centre of the London School of Economics (LSE)* cited the island as being the example to follow for a successful space industry. At the same time, the **ASCEND** report said that the Isle of Man was the fifth most likely to return to the moon. This year has also seen the first Isle of Man Chapter of the SSPI.

The calibre of space businesses now settled on the island is impressive. The latest arrival is **NanoRacks**, who have just announced that they are providing researchers with access to the extremes of space via their 'Plug and Play' microgravity 'NanoLabs' external research facilities, that can interface with the International Space Station's power and data capabilities.

Craine, *Stott* and *Rawlinson* are adamant that to protect the quality and reputation of space companies coming to the Isle of Man, it is essential to maintain a strict regulatory process. "The ManSat PPP with the Commission is focused on compliance and adherence to best practice in international regulatory standards and, as a trust company, we wholeheartedly support this stance. I firmly believe that, alongside all the other benefits we have to offer, this is a major plus factor for companies considering having a base on the island," said *Rawlinson*.

<http://www.spaceisle.com/sector.html>

<http://www.bbc.co.uk/news/world-europe-isle-of-man-12355647>

<http://www.spaceisle.com>

<http://www.wheretheyoucan.im>

http://www.cavendishtrust.com/space_and_satellite



Business Productivity Ensured

By Chris Frith, Founder + CEO, SatCHOICE

Thousands of times each day, business owners and IT managers diligently search for communications services that can help meet their demanding networking requirements at a reasonable price.

When these buyers begin examining SATCOM, they often feel overwhelmed by the variety of technologies and associated pricing. Many buyers have begun using various online directories and web portals to identify SATCOM service providers (SPs) that cater to the specific connectivity requirements of top vertical markets. Some of those directories are more comprehensive and helpful than others.



Even with these useful directory services, many buyers still need help understanding the most popular satcom alternatives. To help buyers grasp the basic tenets of satcom, let's first examine the two major areas of variation—contention ratios and frequency bands.

Understanding Contention Ratios

SPs contend, or throttle, their bandwidth so they can offer services at different price points to match customer budgets. This means they allow multiple subscribers to share the same pool of bandwidth. SPs allocate bandwidth on the basis that subscribers will require usage at different times and that no subscriber will need—or is willing to pay—for the cost of exclusive access. When one or more subscribers are unable to access the bandwidth because someone else is using it, that is known as contention.

The industry uses contention ratios to measure the level of performance that can be expected from a link. Not surprisingly, less-expensive services have higher contention ratios (*i.e.*, the SP will allow more subscribers to use the bandwidth pool at the same time). Thus, a service with a contention ratio of 5:1 should provide higher throughput than one contended at 50:1. We say 'should' because it can sometimes be difficult to know whether you are getting what you paid for, which can be a source of satcom buyer frustration.

Some services are offered on what is known as 'best-efforts' basis. This means the SP is using a rule-of-thumb to allocate bandwidth. On this basis, the SP will monitor average performance based on the experienced traffic demand during peak periods (and level of customer complaints). This can lead to lower service levels than would otherwise be expected, based on the contention ratio. If customer complaints increase, the SP must decide how much additional bandwidth it is willing to allocate—and conversely how much profit it is willing to sacrifice.

Other services are offered on a committed, or guaranteed, basis. This establishes a level below which performance should not drop. On this basis, the data rate 1024/256Kbps link with 10:1 contention should not drop below 102/25Kbps. Customers can monitor this performance themselves. However, the better SPs provide online access to performance statistics.

Knowing Your Satellite Bands

Satellite engineers have a range of options from which to choose when designing a satellite link. These include the frequency of the signal path that are grouped into bands (L-, C-, Ku-, Ka-), the size of the antennas, and the coding mechanism that allows your data packets to be carried on the radio wave. These factors are interrelated and must be selected by considering customer conditions. Those conditions include the amount of real estate available (particularly in maritime environments), data rates required, and the size of the region in which the link will operate.

In general, lower frequencies such as L- and C-band provide better performance during rain events. However, they come with their own drawbacks such as high usage cost (L-band) and large antenna size (C-band). The higher-frequency bands tend to have coverage-area constraints (Ku-, and particularly Ka-) and susceptibility to rain-fade.

One of the reasons IT managers may find SATCOM difficult to understand is that the situation is not static. Technology advances have expanded the typical use of each frequency band so there are often multiple options available. Thus, antenna sizes have been reduced and there are now systems that continually adapt their coding and power levels based on the environmental conditions, increasing availability.

These advances are supported by commercial initiatives that enable near-global coverage by integrating multiple satellite-beam footprints.

Selecting The Correct Service For Your Needs

Before delving into satcom directory listings or contacting SPs, every buyer should be prepared to answer three basic questions:

1. **What is your primary business objective?**
2. **Do you require specialized skills or training? If so, you will need to consider SPs that specialize in your industry.**
3. **How important is satcom to your business? Factors to consider may include potential losses of life, equipment and reputation that may be caused by terrestrial network outages.**
4. **Next, make a short list of SPs. Rank them based on their ability to support your business objectives. Key selection criteria should include experience and familiarity with your vertical market.**
5. **Finally, be honest when establishing your budget. Build a business case that goes beyond the cost of the link, taking into account any wider business advantages and savings.**

You are now ready to select your satcom SP. Ideally, you will select one that: is willing to work with you; has a solution based on modern technology; is able to offer additional bandwidth to meet your evolving requirements, and; is willing to fit your budget.

Using the above process maximizes your ability to select the right solution for your business. This may not result in the least-expensive solution, but it is likely to enhance your likelihood of success in the long term.

About the author

Chris Frith is the founder and CEO of SatCHOICE, a new, global online marketplace that matches satellite communications suppliers with purchase-ready buyers. He can be reached at chris.frith@satchoice.com.



New SatCHOICE Marketplace Helps Buyers and Sellers

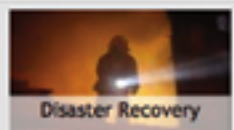
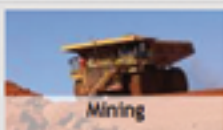
After marketing SATCOM solutions for more than 15 years, industry veteran Chris Frith determined there was a need for a web portal that could quickly match SATCOM buyers with the right suppliers. He founded the SatCHOICE (www.satchoice.com) online marketplace last year and has already secured participation from some of world's most prominent SATCOM suppliers.

For service providers, equipment vendors and other SATCOM suppliers, SatCHOICE helps boost sales by increasing their exposure to highly qualified buyers worldwide, in an efficient online forum. A SatCHOICE online directory subscription enables satcom suppliers to present their capabilities to eager buyers and submit detailed sales proposals. Buyers are free to work directly with suppliers after a match is made.

"SATCOM suppliers view SatCHOICE as a convenient way to expand their sales efforts, to reach buyers who are not aware of their capabilities and not likely to contact them directly," said Frith. "It is the only service of its kind to provide that advantage across a wide range of vertical markets."

Prospective buyers of SATCOM solutions save time and money by using the SatCHOICE portal to view listings of suppliers based on precise service criteria, including fixed and mobile applications in maritime, mining, enterprise, media and oil & gas markets.

Frith concluded, "The SatCHOICE marketplace also offers a valuable service to prospective buyers who have limited experience dealing with satcom solution providers. It helps them understand how their demanding networking requirements can be met by satcom and quickly enables them to compare sellers."



The Evolution Continues... Executive Summary Of The Space Report

By Space Foundation's editors and writers

Each passing year brings advances in space systems and technologies, as well as new applications and services that rely on them. There is a natural evolution of capabilities as governments and companies push the boundaries of what is possible, seeking ways to improve the lives of their citizens or customers. A number of events in 2011 marked a period of transition during this long-term process of capacity-building, as some major programs ended while others started or expanded, often leveraging the knowledge and physical assets left behind by their predecessors.

In the United States, the Space Shuttle Program drew to a close, resulting in the loss of national human space launch capabilities. Parts of the program will live on as some shuttle technology is adapted for NASA's next-generation Space Launch System, as existing infrastructure is modified to support future commercial and government launch vehicles. New ideas continue to flourish, ensuring that the utilization and exploration of space will continue to lead to scientific discoveries and improvements in life on Earth. Rising stars in the field of human spaceflight include nations such as China, which launched its first orbital laboratory module in 2011 and conducted an automated rendezvous with the laboratory using an uncrewed spacecraft.

Government spending, of which human spaceflight budgets constitute a minority, is just one element of space activity. Taking the commercial space industry into account along with government programs, the global space economy increased by more than \$31 billion in 2011. Despite this very healthy growth, governments and companies anticipate pressure on spending in the near term due to conditions in the broader economy. To counteract this effect, spacefaring nations and the private sector increased efforts to cooperate and pool resources. Long a feature of scientific efforts to study and understand the space environment, collaboration among organizations active in space appears to be on the rise in non-scientific space endeavors as well. Although there will always be limits on the extent to which governments can share information and companies can discuss business practices, partnerships in space situational awareness and hosted payloads demonstrate the commitment of many space participants to maximize the returns on their investments by working together.

In several major spacefaring countries, a significant portion of the space workforce is approaching retirement. This has caused concern that valuable skills, acquired over the course of decades of experience, may be lost as older employees leave the workforce. Recruitment and training will be essential to ensuring continuity of skills and operational capabilities. Each year, more than 1.5 million people worldwide receive bachelor's-equivalent degrees in space-relevant disciplines. This base of newly minted science, technology, engineering, and mathematics (STEM) graduates provides the labor pool to support future space activities that will generate benefits we can only imagine at present.

Out of more than 12,000 regions of the sky, this part of the Milky Way was voted the Favorite Nebula for 2011. The nebula, from the constellation of Scutum, was picked by the pool of 35,000 citizen scientist volunteers that study images from the Spitzer Space Telescope. The nebula can only be seen by an infrared telescope like Spitzer because it is hidden behind dust clouds.

Image credit: NASA/JPL-Caltech/University of Wisconsin

1.0 Space Products and Services

We rely on space products and services in countless ways every day. They quite literally help us find our way in the world, connect with each other, and learn about our environment. Space technology also generates spinoff products that have a space heritage but no longer require space systems in order to be useful. Although they may not be the primary motivator for engaging in space activity, these spinoffs have had a profound impact on society. In 2011, NASA reported the results of an effort to quantify some of the benefits of space spinoffs. Approximately 100 companies using spinoff technologies responded to NASA's survey, collectively reporting that more than 12,000 lives have been saved, more than 9,200 jobs have been created, and more than \$6.2 billion in cost savings have been achieved. Taking into account the vast number of spinoffs that have emerged from space programs around the world, the ultimate impact of spinoffs is considerably higher than that reported by survey participants.

Each year, the Space Foundation recognizes the role of space products and services through its Space Technology Hall of Fame and its Space Certification Program. In the case of the Space Technology Hall of Fame, the Space Foundation works with NASA to recognize and honor the organizations and individuals that have developed products based on space technology that improve the quality of life on Earth. With the Space Certification Program, the Space Foundation provides a way for companies that produce and market these products to tie their business to space and to help inform the public of how space activities have benefits on Earth.

The most rapid expansion of space products and services is occurring in the field of location-based services, which rely on positioning, navigation, and timing (PNT) satellites such as the U.S. Global Positioning System (GPS). Parents can use applications on their smartphones to monitor their children's safety, while other applications can help with planning a family trip to a theme park or finding roadside entertainment during a long journey. Businesses are using location information provided by customers to offer timely coupons, special deals, or more convenient methods of payment. Governments rely on PNT systems to aid law enforcement, monitor wildlife, and better understand and improve traffic flow in urban areas. Scientific studies have already resulted in better traffic conditions in parts of Beijing, and researchers are engaged in a variety of programs around the world to learn more about the way people travel from one place to another as they go about their daily lives.

Scientific research often relies on additional space systems besides PNT satellites. In 2011, infrared satellite images were used to find more than 3,000 ancient settlements in Egypt, and they may also be used to help protect archeological sites from looters. Biotechnology company, Amgen, launched 30 mice on NASA's final shuttle mission in July 2011 to test an antibody that could help prevent bone loss, which occurs at an accelerated pace in living creatures in space. Lessons learned from this research could lead to more effective treatments of bone loss among people on Earth. In the field of physics, an orbiting experiment helped to reaffirm Albert Einstein's theory of relativity by measuring the distortion in space caused by the Earth's gravitational field.

Sharing the joy of scientific discovery with the public is a key part of many space endeavors. NASA's Eyes on the Solar System computer program allows users to see space as it is observed by NASA satellites and probes. Some efforts rely on public participation, such as the Planet

Hunters game, which allows anyone on the Internet to help search for planets around other stars by analyzing data collected by the Kepler Space Telescope. In September 2011, NASA announced that gamers had identified two previously undiscovered planets.

From their location high above the Earth's surface, satellites can provide a global perspective on changes in the world around us. In 2011, the Aqua satellite monitored the record-breaking heat wave in the United States, CryoSat created a detailed map of ice near the poles, and the SAC-D/Aquarius satellite provided comprehensive data on the salinity of the world's oceans. When Japan was devastated by an earthquake and tsunami in March 2011, more than 63 satellite observations were made in the first 48 hours following the event, facilitating more timely and effective disaster relief efforts. The value of such capabilities is immense and is one of the major reasons that countries around the world invest in space systems.

2.0 The Space Economy

The space economy increased in size for the sixth year in a row, growing at a faster rate than in previous years, likely due to improving conditions in some sectors of the broader global economy. The space economy grew by 12 percent in 2011, reaching an estimated total of \$289.77 billion. As in past years, the majority of this growth resulted from commercial success rather than increases in government spending.

The space economy's strength was evident as commercial infrastructure and support industries grew at an impressive rate of 22 percent in 2011, reaching a total of \$106.46 billion. The vast majority of the nearly \$19 billion increase is attributable to growth in ground stations and equipment, including personal navigation devices and chipsets, which added more than \$18 billion in value during the year.

Commercial space products and services remain the largest part of the space economy, growing to \$110.53 billion in 2011, 9 percent more than 2010. Most of the nearly \$9 billion increase occurred in the direct-to-home (DTH) broadcasting sector, which added more than \$7 billion in value.

The commercial space transportation services sector, consisting of companies such as Space Adventures and Virgin Galactic, remained relatively static in terms of revenue because no commercial human spaceflights occurred in 2011, although companies continued to collect deposits for future flights. A number of flight tests are scheduled to occur in 2012, indicating the possibility of growth in the near future as new services begin to carry passengers into space.

Globally, government spending on space increased even though its percentage of the overall space economy declined to 25 percent in 2011 from 27 percent in 2010. The aggregate growth rate for government space budgets was 6 percent, bringing spending to \$72.77 billion in 2011. The governments of Brazil, India, and Russia all increased their space budgets by more than 20 percent. Some space agencies experienced more modest growth, as was the case for the European Space Agency (ESA), whose budget increased by 7 percent in spite of the ongoing fiscal problems in some of its member states. Space agencies in other nations, such as the United States and Japan, operated under flat or diminished budgets. Spending in the United States on government space projects was \$47.25 billion in 2011, a decline of less than 1 percent from the amount spent in 2010.

The Space Foundation Indexes, which measure the performance of space-related companies on U.S. stock exchanges, demonstrated investor confidence in the health of the industry. In a year notable for its market swings, the Space Foundation Indexes grew at rates of 4 percent to 7 percent in 2011, outperforming both the NASDAQ and the S&P 500. The number of mergers and acquisitions in the space sector grew by 14 percent in 2011 and the median value of deals increased by 60 percent. Most of these transactions were funded by cash reserves and other assets, as companies and investors decided to use their strong financial position to add to their business portfolios, positioning themselves for future growth.

3.0 Space Infrastructure

Orbital launch activity increased by 14 percent in 2011, rising to 84 launches from a total of 74 in 2010. Russia conducted the most launches, with a total of 31. China followed with a total of 19 launches, outpacing the United States for the first time in history. While the U.S. total of 18 successful launches was not the highest, it contained the greatest launch vehicle diversity, with

eight different types of orbital rockets. One of these vehicles, the Space Shuttle, landed for the final time on July 21, 2011, ending the Space Shuttle Program after three decades of flights. With the shuttle's retirement, astronauts traveling to the space station will rely solely upon the Russian Soyuz until a new launch vehicle becomes available, whether it is NASA's Space Launch System or an alternative provided by a commercial company.

Two major developments were underway in 2011 at the European spaceport in Kourou, French Guiana, in addition to the usual launches of Europe's Ariane 5 rocket. Efforts to enable the launch of Russia's Soyuz rocket from the facility were completed in 2011, with two successful launches taking place during the year. ESA also prepared for the first flight of its new Vega rocket, which took place in February 2012.

Spaceport infrastructure in the United States is in transition as NASA makes changes at the Kennedy Space Center in Florida to accommodate new launch systems in the post-shuttle era. Construction continued on new and upgraded facilities at Vandenberg Air Force Base in California, the Mid-Atlantic Regional Spaceport in Virginia, and Spaceport America in New Mexico. China and Russia also continued development of new spaceports during 2011.

At the end of 2011, there were an estimated 994 active satellites in orbit around the Earth. The broadcasting industry is a huge driver of demand for communications satellites, largely due to global growth in the number of high-definition television channels, which require more bandwidth than their standard-definition counterparts. Consumer broadband Internet service is also seen as an area with potential for growth, particularly in regions where the installation of terrestrial infrastructure is impractical.

Development of observatories and robotic exploration systems continued in 2011, with plans for several observatories with capabilities that will exceed those of existing telescopes. In July 2011, Russia launched a radio telescope called Spektr-R, marking the return of the Russian space program to scientific missions after a hiatus of several years. As with many scientific missions, other countries will participate in the research, in this instance by providing ground-based observations that can be combined with those from Spektr-R to produce images with even greater detail and clarity.

4.0 Workforce and Education

For the fourth straight year, the U.S. civil and commercial space workforce continued to shrink. Nearly 8,000 jobs were lost in 2010, according to the most recent data available from the U.S. Bureau of Labor Statistics, resulting in a workforce of approximately 252,000 people. This was the second-lowest employment level recorded during the previous 10 years. The trend of job losses is likely to continue once data is available for 2011, due to layoffs associated with the end of the Space Shuttle Program. As of July 2011, when the last shuttle flight took place, the number of employees associated with the program had dropped to 6,000 from a high of 32,000 during the 1990s. Even as U.S. space employment decreased, average annual salaries for these workers reached a new high as they earned 15 percent more than the average salary for the 10 STEM careers that employ the largest number of people in the United States. In contrast to the declining employment in civil and private space sectors, the U.S. military space workforce increased by 6 percent over a two-year period, rising from 15,791 in 2009 to 16,739 in 2011.

While the overall number of space employees decreased in the United States, employment increased in other parts of the world, especially Europe. European space employment surged 9 percent in 2010, the last year for which data is available. The European space workforce has expanded by 20 percent over five years, reaching a total of more than 34,000 in 2010. France, Germany, Italy, the United Kingdom, and Spain accounted for 85 percent of these jobs, reflecting their status as the European nations with the largest populations and economies.



Space Shuttle Atlantis, now retired along with the rest of the shuttle fleet, is towed to a temporary storage area in the Vehicle Assembly Building at the Kennedy Space Center in Florida. Once it is prepared for public display, Atlantis will be relocated to the nearby Kennedy Space Center Visitor Complex.
Photo credit: NASA



Using NASA satellite imagery, archaeologists discovered 17 buried pyramids in Egypt, as well as more than 1,000 tombs and 3,000 ancient settlements. Infrared images, taken by satellites orbiting 700 kilometers (430 miles) above the Earth, showed the below-ground structures.
Credit: Sarah Parcak/Univ. of Alabama at Birmingham

As of 2010, the Japanese space industry workforce consisted of nearly 6,900 employees, an 8 percent increase from 2009. The 2010 employment level was the second-highest recorded for Japan during the previous 10 years. The South Korean space workforce consisted of approximately 2,900 people employed by industry, research institutions, and universities in 2009, according to the most recent data gathered by the Korea Aerospace Research Institute (KARI). While this represents a 4 percent drop from 2008, the workforce has experienced a net increase of 22 percent from 2006 to 2009. The vast majority of these new employees were added by the private sector, as the number of South Korean space-related companies tripled from 19 in 2000 to 57 in 2009.

STEM achievement in primary and secondary schools is an indicator of how well the United States is ensuring that students are prepared to pursue STEM degrees, enabling them to enter the space workforce. It is likely that there will be demand for these skills, as the Bureau of Labor Statistics has predicted growth in the number of professionals in several U.S. space-related occupations, including aerospace engineers, astronomers, and atmospheric scientists. The U.S. National Assessment of Educational Progress shows that 34 percent of U.S. fourth-grade students and 30 percent of eighth-grade students performed at or above the proficient level on the science test in 2009. In the field of mathematics, 40 percent of fourth-grade students and 35 percent of eighth-grade students scored at proficient or higher levels, an improvement over past years. The Programme for International Student Assessment evaluation, which tests proficiency among 15-year old students, shows that many nations active in space, including South Korea, Canada, Germany, and the United States, achieved above-average scores in mathematics or science.

As veteran space workers begin to retire around the world, the training of new employees in critical STEM fields has become a focus

for governments and industry leaders. China is the leading producer of STEM bachelor's-equivalent university graduates, doubling the number of graduating students between 2002 and 2006. The number of STEM graduates in other spacefaring nations also grew, but not as quickly. Similar trends are visible in space-related academic publications, which are still dominated by established spacefaring countries but are witnessing rapid growth by emerging nations and regions.

5.0 Outlook

For centuries, humans have looked to space and dreamed of its possibilities. Some of those dreams have become realities, and others provide the motivation for ambitious efforts to push the boundaries of what is achievable. One of those dreams is to expand the human sphere of influence and derive benefits from a greater presence in space. Partner nations in the International Space Station are eager to reap rewards from the station's completion and the corresponding transition from construction to research. Governments in most major spacefaring nations devoted time and energy in 2011 to planning the future of human spaceflight, determining the best way to direct their efforts while recognizing that there are insufficient funds for everything they may wish to undertake. This has led to decisions such as the cancellation of Russia's Rus-M rocket program, which had been intended to carry a next-generation human spaceflight capsule. While development of the capsule will continue, it will likely be launched by an existing rocket.

Budgetary concerns also extend beyond the realm of human spaceflight. In the midst of a sluggish economic climate and uncertain prospects for future growth, some governments are cutting future spending to control their total budgets. These cuts can have serious consequences if they affect critical capabilities such as weather forecasting, as may happen due to programmatic delays and reduced funding for U.S. weather satellite development. Uncertainty regarding the prospects for funding requires a rethinking of processes and programs, often leading to increased multinational collaboration. Outside of government, budget cuts affect industry plans and profits but may also stimulate innovative new approaches in government-industry relations. One outcome is the increasing interest in hosted payload arrangements, in which a sensor, instrument, or other payload owned by one organization is placed aboard a satellite operated by a different entity.

Governments increasingly see a need for formal space policies to provide a framework for coordination and integration of activities. In the absence of clear and effective space policy, government space activities are likely to develop in a manner that may prove challenging to sustain over the long term. Some policy documents, such as one published by the European Commission in April 2011, are intended to define why space activity is worthwhile, what the main space priorities are, and how space activity will benefit the public. Other government planning documents, such as ESA's Cosmic Vision 2015–2025, provide a framework for decisions about future science missions. Among the space agencies planning missions for launch in 2013 or 2014, NASA expects to send probes to orbit the Moon and Mars; ESA anticipates launching a mission to make a three-dimensional map of the galaxy; and the Japan Aerospace Exploration Agency (JAXA) plans to send a probe to study an asteroid. Further missions are planned for launch throughout the coming decade to study the Sun, other planets and their moons, and a host of deep-space and astronomical phenomena. With countless options for exploration and discovery, and with new technology developments that spur growth in the global space economy, the space sector is expected to remain vibrant and productive.

Additional details: <http://www.TheSpaceReport.org>



Connectivity Without Compromise

Mobile operators are navigating the lofty challenges that come with unprecedented demand from increasingly sophisticated subscribers around the world. Upgrading their 2G networks to high performance 3G and 4G platforms is no easy task.

While the deployment of mobile broadband services offers tremendous benefits, there are far more economic hurdles to consider since the bandwidth and transport costs increase exponentially, and the associated revenue stream is proportionally much lower compared to traditional voice. To stay profitable when deploying Mobile Broadband, Operators must deploy cost-effective backhaul alternatives capable of meeting the needs of today's increasingly mobile society.

The cost structure of traditional satellites has stayed more or less the same for the last 10 years, and this has been one of the primary reasons why very little Mobile Broadband traffic is backhauled via GEO satellites around the world today. The cost of existing Geo-Synchronous satellite bandwidth has become so unaffordable to 3G operators that Mobile Broadband is generally only available in areas where terrestrial infrastructure is on hand to backhaul the traffic.

O3b has launched its cellular backhaul product, which uses state-of-the-art satellites to drastically reduce the so called 'cost per bit' to a level that allows data services to run profitably through the network.



Steve Collar,
O3b Networks' CEO

"Mobile operators are discovering that cellular subscribers are much more application aware today than ever before," said **Steve Collar, O3b Networks CEO**. "More competition among operators has led to more consumer choices, and operators must find creative, better quality solutions to differentiate their services," Collar explained, touting the benefits of the newly introduced **O3bCell**.

Collar added, "O3bCell enables reduced bandwidth costs and improved network performance capable of delivering on the rising demand for high-speed 3G and 4G solutions around the world. We are passionate about how services and applications should perform through the network, we don't believe that a customer backhauled via satellite should have a lesser

experience than when backhauled terrestrially. We are defining ourselves by providing connectivity without compromise."

Launched earlier this month, O3bCell is a new concept that enables mobile operators to deliver high-quality 3G and 4G voice and broadband services in markets and areas where existing Geo-Synchronous satellites fall short. O3bCell offers a clear competitive advantage by ensuring higher end-user download

speeds, faster application performance, significantly improved voice quality, future proofed to evolving standards, and most importantly, at an increased profitability for Mobile Operators.

"Mobile backhaul is changing; the conversation around quality of service is no longer limited to throughput and availability alone. Mean Opinion Scores for voice and Quality of Experience metrics for application performance are also critically important factors in determining the relevance of any backhaul solution in an IP world carrying mobile voice and data services. O3bCell answers the call by delivering the world's first mobile backhaul service that is strictly designed to meet the performance of the Radio Access Network," said *John Finney*, Chief Commercial Officer for O3b Networks. "We provide the most profitable means to distribute mobile data and voice services backhauled via O3b Satellites."

O3b Networks will launch its initial fleet of eight MEO satellites in the first half of 2013, creating a global Internet gateway to serve several billion consumers, businesses and organizations in nearly 180 countries.

For more information, visit <http://www.o3bnetworks.com>.



