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  John Celli
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Publishing Operations

Silvano Payne, Publisher + Writer

Hartley G. Lesser, Editorial Director

Pattie Waldt, Executive Editor

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Simon Payne, Development Director

Donald McGee, Production Manager

Dan Makinster, Technical Advisor

Senior Contributors

Mike Antonovich, ATEME

Tony Bardo, Hughes

Richard Dutchik

Chris Forrester, Broadgate Publications

Karl Fuchs, iDirect Government Services

Bob Gough, 21

Carrick Communications

Jos Heyman, TIROS Space Information

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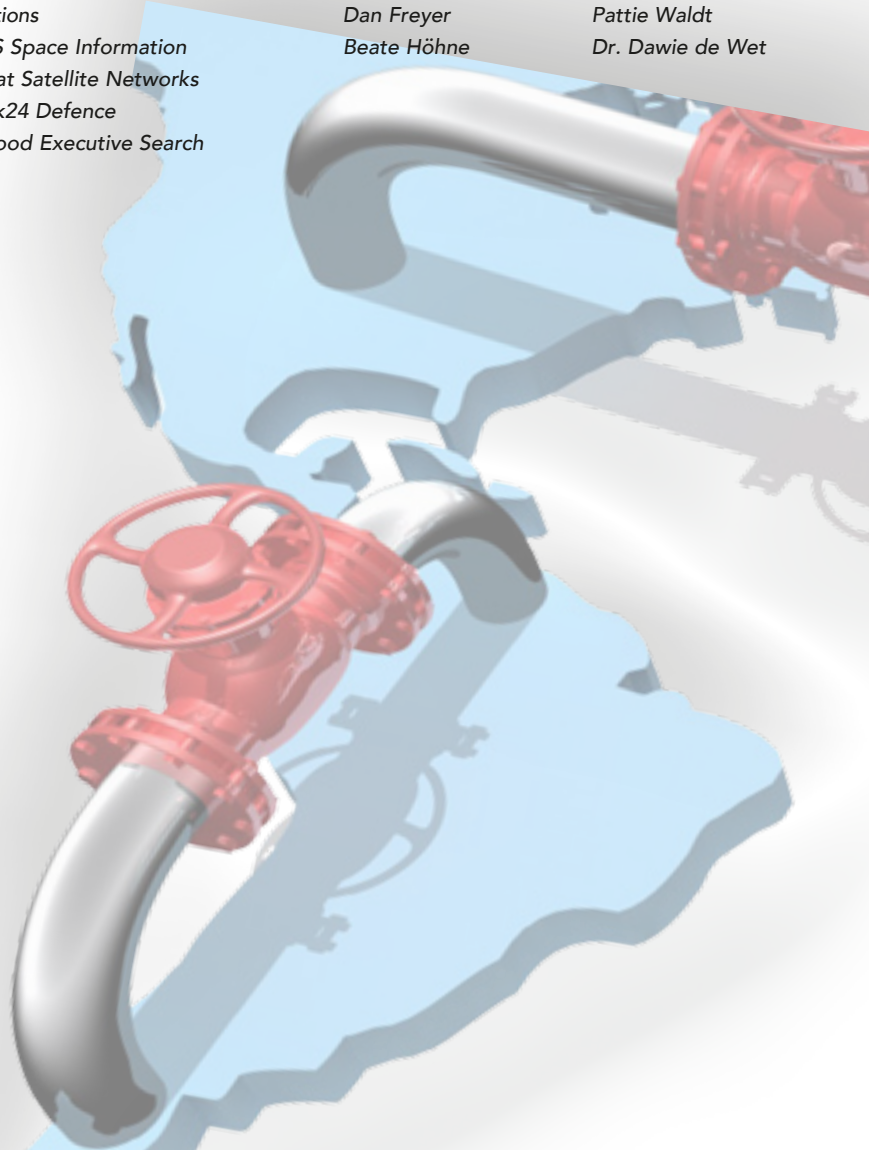Bert Sadtler, Boxwood Executive Search

This Issue's Authors

Gary Bray

Walter Capitani

Blaine Curcio

Louis Dubin

Chris Forrester

Vern Fotheringham

Dan Freyer

Beate Höhne

Dr. Nathan Kundtz

Hartley Lesser

Nick Miller

Tony Radford

Bert Sadtler

Anu Sood

Pattie Waldt

Dr. Dawie de Wet

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InfoBeam

ILS + Sirius–Sounds Sent Into Stratosphere

The successful launch of the Sirius FM-6 satellite aboard an ILS Proton launch vehicle. Photo courtesy of Business Wire.

The launch finally occurred after some delays, and this new satellite will provide commercial free entertainment to more than 25 million subscribers.

International Launch Services (ILS) successfully carried the Sirius FM-6 satellite, built by SSL, into orbit via an ILS Proton for Sirius XM Radio Inc.

The ILS Proton Breeze M vehicle launched from Pad 39 at the Baikonur Cosmodrome at 00:09 local time, at 18:09 GMT and 14:09 EDT, on October 25th.

The first three stages of the Proton used a standard ascent profile to place the orbital unit (Breeze M upper stage and the Sirius FM-6 satellite) into a sub-orbital trajectory.

From this point in the mission, the Breeze M performed planned mission maneuvers to advance the orbital unit first to a circular parking orbit, then to an intermediate orbit, followed by a transfer orbit, and finally to a geostationary transfer orbit. Separation of the Sirius FM-6 satellite occurred approximately 9 hours and 11 minutes after liftoff.

The satellite, weighing over 6 metric tons, was built on the flight-proven SSL 1300 platform. This was the sixth satellite launched by ILS Proton for SiriusXM and the 27th SSL 1300 satellite launched.

Sirius FM-6 has an X-band uplink transponder and an S-band downlink transponder to deliver digital audio radio service. With approximately 20 Kw end-of-life power and an anticipated service life of 15 years, the Sirius FM-6 satellite is one of the most powerful satellites built today. The final orbital location for the satellite will be 116.15 degrees west longitude.

This was the 390th launch for Proton since its maiden flight in 1965 and the 83rd ILS Proton Launch overall. The Proton Breeze M vehicle is developed and built by Khrunichev Research and Production Space Center of Moscow, Russia's premier space industry manufacturer and majority shareholder in ILS.

Phil Slack, president of ILS commented, "For over a decade, SiriusXM has entrusted ILS Proton to deliver their satellites into orbit. It is a tremendous honor for ILS to have been a part of the satellite radio industry since 2000, with the launch of SiriusXM's first generation fleet on ILS Proton within a five month period. Thank you to all of the teams that made this successful launch possible, including SiriusXM, SSL, Khrunichev, and ILS."

ILS has exclusive rights to market the Proton vehicle to commercial satellite operators worldwide and is a U.S. company headquartered in Reston, Virginia, near Washington, D.C

The mission was originally delayed from to allow teams to resolve an issue with a ground station in South Africa. It was determined that more time was needed to resolve the issues and verify that the ground station network was ready to support the mission and initial communications acquisition—the delay was at the request of the customer, Sirius.

Sirius FM-6 is a high-power geostationary satellite for SiriusXM, America's largest radio broadcaster measured by revenue and one of the world's largest pure-play audio entertainment companies.

Sirius FM-6 will help with the delivery of commercial-free music, and premier sports, news, talk, entertainment and Latin programming, traffic and weather to more than 25 million subscribers.

Sirius FM-6 will also help in the delivery of traffic and other data service information to markets across North America for vehicles with navigational systems.

SiriusXM is installed in vehicles of every major automaker and available for sale at retail locations nationwide. Sirius FM-6 will ensure SiriusXM's array of audio and data services are received by vehicles, mobile devices and home receivers and will play an important role in bolstering the continuity of service for years to come.

OmniAccess S.L.–Comms Coming To Cruisers

OmniAccess S.L. has launched a 100Mbps dedicated VSAT service.

The upgraded BroadBEAM Ultra variant is based on iDirect's next-generation X7 modem platform and XipLink's WAN optimization appliance and is the latest addition to its high throughput Broadbeam VSAT service plans.

By leveraging the maximum efficiency of the X7 and Xiplink combo, OmniAccess is able to offer an unparalleled 100Mbps single-link VSAT service to customers across the Caribbean and Mediterranean.

The service has been designed and engineered to meet the high throughput requirements of demanding users who are increasingly using bandwidth-hungry applications and IPTV streaming solutions, such as the upcoming High Definition Plexus TV services.

Earlier this year, OmniAccess was appointed as a launching customer for iDirect's next-generation platform and is now deploying the X7 satellite modems on-board its vessels and upgrading its ground infrastructure to the new Evolution iDX 3.2 software.

With the X7's built-in support for high-speed and high-efficiency applications, customers can upgrade to OmniAccess' latest service offering without the need to change the existing iDirect VSAT platform.

Unlike other TDMA service standards that peak at 15Mbps, the BroadBEAM Ultra 100 is capable of exceeding these limitations while still using the prevailing TDMA iDirect architecture.

This platform consistency allows OmniAccess to provide flexibility, scalability and competitive fees across its entire fleet.

More information is available at the OmniAccess website:
http://www.omniaccess.com/

InfoBeam

Bolivia–Built By China, Upcoming Launch Also By China

Artistic rendition of Bolivia's Tupac Katari satellite.

A Bolivian delegation will travel to China to witness the December 20th launch of the country's China-built "Tupac Katari" telecommunications satellite, Bolivian President Evo Morales announced.

Morales told a press conference in La Paz that he may attend the launch. "The ministers have asked me to head the delegation to China, but it's not definitive yet," he said. "The launch date can vary by two or three days, depending on the weather in that country, so we are still consulting."

Chinese Ambassador to Bolivia, Li Dong, has extended an invitation to the Bolivian delegation, the Ministry of Public Works said.

Morales said he observed the installation of the satellite's antennas in Amachuma, La Paz, and the advanced step showed "our communication satellite is now a reality."

According to the director of the Bolivian Space Agency (BSA), the satellite is 90 percent complete. Morales added that he was "very pleased about it."

Morales called on his ministers of Communication, Health and Education to continue working to make the most of the satellite in their respective fields.

So far, the government has installed 1,000 transmission centers in the country's most remote communities to bring Internet access to residents there.

Once the satellite is in operation, communication costs in Bolivia should drop. The head of state added Bolivia plans to bolster its communication with South American neighbors through sharing the satellite's benefits regionally.

"We hope the experts will continue to provide us with guidance, so this satellite can serve to integrate all of South America," he said.

Morales said he also hopes that an exploratory satellite will be launched one day to provide data on national territory and natural resources.

According to the BSA, the satellite will be launched from northwest China's Jiuquan Space Center.

The $300 million, 5.2 ton Tupac Katari satellite, financed by the China Development Bank and the Bolivian government, is designed to expand television, Internet and mobile telephone services to rural Bolivia from its orbit 36,000km above the Earth, and has a life expectancy of 15 years.

NOAA–Whether The Weather Will Be Extreme

Rendering of GOES-R spacecraft. Credit: Lockheed Martin

NOAA will also introduce new forecast products for severe weather, volcanic ash advisories, fire and smoke monitoring and other hazards.

A key instrument that will fly on the Geostationary Operational Environmental Satellite – R (GOES-R) spacecraft, NOAA's next-generation of geostationary satellites, is cleared for installation on the spacecraft. Lockheed is building the spacecraft for the GOES-R series.

The Advanced Baseline Imager, or ABI, is GOES-R's primary instrument for scanning Earth's weather, oceans, and environment and is a significant improvement over instruments on NOAA's current geostationary satellites. The ABI will offer faster imaging with much higher detail. It will also introduce new forecast products for severe weather, volcanic ash advisories, fire and smoke monitoring and other hazards.

Mary Kicza, assistant administrator for NOAA's Satellite and Information Service, said, "The ABI offers breakthrough technology that will help NOAA develop faster and more accurate forecasts that will save lives and protect communities.

(Credit: Exelis) The first satellite in the GOES-R Series is currently scheduled for launch in early 2016. GOES-R's instruments will also feature improved lightning detection and solar weather monitoring tools, and will provide near real time data to forecasters during severe weather events.

The ABI has two scan modes. It will have the ability to continuously take an image of the entire planet, or a full disk image, every five minutes compared to every 30 minutes with the current GOES imager. It also has an alternative, or flex mode, which will concurrently take a full disk image every 15 minutes, an image of the continental U.S. every five minutes, and smaller, more detailed images of areas where storm activity is present, as often as every 30 seconds. This kind of flexibility and increased frequency of images is a boon for forecasters.

The remaining GOES-R instruments to be delivered are:
—Geostationary Lightning Mapper, which will provide continuous surveillance for the first time of total lightning activity from geostationary orbit over the western hemisphere;

—Space Environment In-Situ Suite, which consists of sensors that will monitor radiation hazards that can affect satellites, radio communications and navigation systems;

—Solar Ultraviolet Imager, a high-powered telescope that observes the Sun, monitoring for solar flares and other solar activity that could impact Earth by disrupting power utilities communication and navigation systems and causing damage to orbiting satellites and the International Space Station; and

—Magnetometer, which will provide measurements of the magnetic field surrounding Earth that protects the planet from charged particles released from the sun. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements will provide alerts and warnings to satellite operators and power utilities.

A sixth instrument, the Extreme X-Ray Irradiance Sensor (EXIS), was completed in May 2013 and was the first of GOES-R's instruments to be ready for integration. EXIS will provide important early warnings of impending solar storms and give scientists a more accurate measure of the power of solar energy radiating toward Earth, which can severely disrupt telecommunications, air travel and the performance of power grids.

NOAA manages the GOES-R Series program through an integrated NOAA-NASA office, staffed with personnel from both agencies and located at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Entel + Gilat–A Bolivian Deal

The Bolivian National Telecommunications Company (Spanish: Empresa Nacional de Telecomunicaciones, Entel) has awarded the implementation of 1,000 satellite telecentres to Gilat Satellite Network for $12 million.

Internet, telephone and television services will be provided via Tupac Katari (TKSAT-1), a telecommunications satellite that is expected to launch this year aboard a Chang Zheng 3B/E (CZ-3B/E) booster from the Xichang Space Center in Sichuan, China.

The satellite will pack 30 transponders and is being built by China Great Wall Industry Corporation with a projected 15 years of service. Entel will also invest another US$ 8 million to deploy base stations for coverage of the local route of the 2014 Dakar Rally race.

Eutelsat + Es'hailSat–Starting

Artistic rendition of EUTELSAT 25B/Es'hail 1, built for Eutelsat and Qatar Satellite Company (QSC) by SSL, will provide Direct-Broadcast Services (DBS) to expanding markets in the Middle East, North Africa, and Central Asia regions. Image courtesy of SSL.

Eutelsat Communications (Euronext Paris: ETL) and Es'hailSat have announced that their jointly owned EUTELSAT 25B/Es'hail 1 satellite, a joint venture satellite, launched on August 29th, went into commercial service at 25.5 degrees East.

Traffic on Eutelsat's EUTELSAT 25C satellite at 25.5 degrees East was transferred onto Ku-band transponders commercialized by Eutelsat on the new satellite during the nights of October 28th to 29th.

This transfer has released EUTELSAT 25C for a new mission for Eutelsat at 33 degrees East, where the satellite will be copositioned next month with EUTELSAT 33A to bring additional capacity to this orbital location.

EUTELSAT 25B/Es'hail 1 brings increased capacity to 25.5 degrees East to serve broadcasters, businesses and public agencies operating in the Middle East, North Africa and Central Asia.

The new satellite operates in both Ku- and Ka-bands.

Télécoms Sans Frontières + Inmarsat–Philippine Aid

A team from aid agency Télécoms Sans Frontières helped set up emergency communications centers to reconnect towns on the island of Bohol in the Philippines.

The telecoms experts were called-in to restore critical communications after the island was devastated by an earthquake which measured 7.2 on the Richter scale. Almost 400,000 were affected by the quake which triggered landslides engulfing homes and destroying infrastructures.

TSF focused its operations on three towns Loon, Maribojoc and Sagbayan, which had all been cut off from the rest of the country. The Inmarsat-sponsored agency collaborated with children's rights organization Plan International, the United Nations Office for the Coordination of Humanitarian Affairs and local telephone operator SMART.

The Inmarsat-sponsored agency also set up humanitarian calling giving people affected by the disaster the opportunity to make a free satellite phone call to let their loved ones know they were safe.

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Thuraya–Adaption Acknowledgement

Thuraya Telecommunications Company has been named winner of the Innovation Award at the Lloyd's List Middle East and Indian Subcontinent 2013 Awards.

Thuraya won the award for the Thuraya SatSleeve, its unique satellite adaptor for the iPhone that enables maritime and offshore users to stay connected from remote locations outside of terrestrial networks with their iPhone.

The award judges recognized the SatSleeve's ability to keep seafarers in touch with their loved ones as well as facilitating vital business communications for officers and crew when operating outside coverage of terrestrial networks.

In selecting Thuraya for the award, the judging panel noted: "The winner of this highly competitive award has created what has been described as the missing link in crew and business communications at sea. As such, this company has improved the quality of life for seafarers immeasurably, helping them keep in contact with their families, friends and colleagues from anywhere on the globe".

Samer Halawi, Chief Executive Officer of Thuraya said, "We are delighted to have won this award, which recognizes Thuraya's commitment to developing products and services that truly meet the needs of mobile users. Combining the innovation of Thuraya's mobile satellite products with the intuitive interface of the iPhone, the SatSleeve provides an elegant and cost effective way to keep in touch while at sea."

Compatible with iPhone 4/4S and 5/5S, the Thuraya SatSleeve supports voice calls, SMS and basic data connectivity in satellite mode.

Users can pre-program an SOS number into the Thuraya SatSleeve to contact a nominated first responder—a feature that works even without the iPhone connected.

The SatSleeve can be used across the Thuraya network either with a Thuraya SIM card in 140 countries or with a standard GSM SIM card available from 356 worldwide GSM operators across more than 160 countries.

Signalhorn–Tying In Offshore Energy Service Vessels

Signalhorn has been selected for the operation and management of a pan-African network for one of the world's leading providers of offshore service vessels to the global energy industry.

Under the terms of the three-year contract extension, Signalhorn will provide a mission-critical, multi-megabit communications network to its customer's key African locations in Angola, Nigeria and Cameroon.

The contract renewal builds upon Signalhorn's four-year relationship delivering satellite and terrestrial links for this customer, and reinforces Signalhorn's commitment to customer care, quality assurance and delivering trusted networks.

"With 40 years of experience providing hybrid communication solutions, we are able to serve this and other customers who are operating in ever more remote, deeper and increasingly hostile environments to meet the world's energy demand," said Gary Bray, Signalhorn Vice President, Oil & Gas sales. "Signalhorn's continually growing global communications footprint enables us to deliver trusted networks for connectivity and performance."

Signalhorn delivers the service to the customer's network across the African continent through regional points of presence and its teleports located at technical centers in Germany and Switzerland.

Signalhorn's service includes communications for the company's core networks, crew welfare, contractors, and regulatory and safety requirements.

Global Data Systems–Striking Oil @ OilComm

The energy marketplace is a global playing field, and energy companies must have the mobility and flexibility to operate anywhere in the world at any time.

OilComm Conference and Exposition (**http://www.oilcomm.com/exposition.html**). strengthens connectivity to your drill sites, your assets and your professional colleagues. OilComm is the only event dedicated to the communications challenges faced in the oil and gas community throughout the lifecycle of the platform and no matter where the drill site is located.

One of the companies in attendance is Global Data Systems, Inc. (GDS) which will be in booth 107 on the show floor November 7—8 at the George R. Brown Convention Center in Houston, Texas. Founded in 1987 and headquartered in Lafayette, Louisiana, Global Data Systems is a full service telecommunications satellite, data center, cloud, network technology and cable/wire services provider to SMB and Enterprise clients in several states. The company has additional offices in Baton Rouge, New Orleans and Houston, Texas.

The energy marketplace is a global playing field, and energy companies must have the mobility and flexibility to operate anywhere in the world at any time. Technology can help keep far-flung energy companies in touch with mission-critical information, however managing such a widespread network offers its own sets of challenges.

Remote access and remote office solutions require a robust network infrastructure along with effective data and application delivery mechanisms. GDS staff have a foundation in core network technology and have proven to be indispensable in helping energy clients deploy and manage wide-area networks for multiple years. Virtualization services enable centralized management of access, applications and data while allowing global access.

Simply register online and use the VIP Code: GLO876 and you'll have access to:

- Exposition Show Floor Thursday, November 7; Friday, November 8; Explore more than 100 leading companies, including Global Data Systems, Inc. in booth 107

- Six Minute Vendor Shoot-Out, Thursday, November 7; It's a fast and furious session to hear vendors hawk their wares! Each vendor gets six minutes to tell you about their next generation solutions for communications

- Networking Receptions Wednesday, November 6 and Thursday, November 7; Join hundreds of colleagues across all disciplines in the oil & gas community for the nightly receptions to connect, collaborate and enjoy drinks and hors d'oeuvres!

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U.C. Berkeley–Fire Finder

Artistic impression of the FUEGO satellite, which would take digital photos of the Western United States every few seconds in search of hot spots that could be newly ignited fires.
(Credit: R. E. Lafever, Lawrence Berkeley National Laboratory)

As firefighters emerge from another record wildfire season in the Western United States, University of California, Berkeley, scientists say it's time to give them a 21st century tool: a fire-spotting satellite.

Such a satellite could view the Western states almost continuously, snapping pictures of the ground every few seconds in search of hot spots that could be newly ignited wildfires. Firefighting resources could then be directed to these spots in hopes of preventing the fires from growing out of control and threatening lives and property.

The UC Berkeley scientists have designed such a satellite using state-of-the-art sensors, written analysis software to minimize false alarms, and even given it a name—the Fire Urgency Estimator in Geosynchronous Orbit (FUEGO). They're hopeful it can be built for several hundred million dollars, either by government or private entities.

"If we had information on the location of fires when they were smaller, then we could take appropriate actions quicker and more easily, including preparing for evacuation," said fire expert Scott Stephens, a UC Berkeley associate professor of environmental science, policy and management. "Wildfires would be smaller in scale if you could detect them before they got too big, like less than an acre."

Stephens, physicist Carl Pennypacker, remote sensing expert Maggi Kelly and their colleagues describe the satellite in an article published online Oct. 17 by the journal Remote Sensing.

"With a satellite like this, we will have a good chance of seeing something from orbit before it becomes an Oakland fire," said Pennypacker, a research associate at UC Berkeley's Space Sciences Laboratory and scientist at Lawrence Berkeley National Laboratory, referring to the devastating 1991 fire that destroyed more than 3,000 homes in Berkeley and Oakland, California. "It could pay for itself in one firefighting season."

With global warming, Stephens said, wildfires are expected to become more frequent and more extensive.

This year alone, California's firefighting arm, CAL FIRE, has responded to over 6,000 wildfires, 1,600 more than average, according to tweets by the department's information officer Daniel Berlant.

Wildfire-prone areas stretching from Spain to Russia could also benefit from their own dedicated satellites.

Fire detection today is much like it was 200 years ago, Stephens said, relying primarily on spotters in fire towers or on the ground and on reports from members of the public.

This information is augmented by aerial reconnaissance and lightning detectors that steer firefighters to ground strikes, which are one of the most common wildfire sparks.

"Even today, most fires are detected, in some way or another, by people," he said. "Even the Rim Fire near Yosemite National Park this past summer was detected by someone who saw a smoke column."

But satellite technology, remote sensing and computing have advanced to the stage where it's now possible to orbit a geostationary satellite that can reliably distinguish small, but spreading, wildfires with few false alarms.

Pennypacker estimates that the satellite, which could be built and operated by the federal government, like the Geostationary Operational Environmental Satellite (GOES); as a partnership between government and the private sector, like the Landsat satellite program; or by a private company alone, would cost several hundred million dollars—a fraction of the nation's $2.5 billion yearly firefighting budget.

The idea of a fire detection satellite has been floated before, but until recently, detectors have been prohibitively expensive, and the difficulty of discriminating a small burning area from other bright hotspots, such as sunlight glinting off a mirror or windshield, made the likelihood of false alarms high.

Today, computers are faster, detectors cheaper and more sensitive, and analysis software far more advanced, making false alarms much less likely, according to researchers.

"Simply put, we believe we have shown that this kind of rapid, sensitive fire detection of areas bigger than 10 feet on a side is probably feasible from space, and we have evidence that the false alarm rate will not be crazy," said Pennypacker, who has designed sensitive satellite-borne detectors for 40 years. "Our work requires further testing, which we are eager to do."

The approach is similar to what Pennypacker and colleague Saul Perlmutter used 20 years ago to search for exploding stars to study the expansion of the universe.

In that case, they created an automated system to compare consecutive images of the night sky to look for new points of light that could be supernovas. Perlmutter, UC Berkeley professor of physics, shared the 2010 Nobel Prize in Physics for this work, which proved that the expansion of the universe is accelerating.

"In concept, this is a simple system: a telephoto camera, an infrared filter and a recording device. We are just looking for something bright compared to the surroundings or changing over time," Kelly said. "Then, we do these rapid calculations to determine if one image is different from the next."

Pennypacker and graduate student Marek K. Jakubowski developed a computer analysis technique, or algorithm, to detect these differences in space and time and to distinguish them from bright lights that might look like fires.

This involves several billion calculations per second on images taken every few seconds, covering the entire West every few minutes. The new paper reports on tests of this algorithm using existing imagery from real fires, but the team hopes to get funding to test the system on a fire that is starting, such as a prescribed burn.

"The point is, satellites like Landsat and GOES provide great information after a fire starts; they can focus and monitor a fire by looking at smoke plumes, fire spread, hot spots at the edges, etc.," Kelly said. "FUEGO is designed for early detection of smaller fires. Right now, we lose a lot of time because fires are already big by the time we see them."

Editor's note: This story is based on materials provided by University of California—Berkeley. The original article was written by Robert Sanders.

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South Africa–En Route Is A TV Explosion

Of interest to companies involved in the SatBroadcasting™ arena should be that South Africa is on the brink of a broadcasting explosion, with recent developments showing that the sector is not prepared to wait for the government's shambolic digital terrestrial television (DTT) migration, this according to City Press reports as posted by fin24 Reports (http://www.fin24.com/).

While the DTT process remains stalled by the conditional access debate and the appointment of new Communications Minister Yunus Carrim, e.tv parent company Sabido Investments and the public broadcaster have both made moves to launch new television services on satellite platforms instead.

Kagiso Media, which is also aiming to launch a satellite television service, has raised concerns that the delays in the migration process have allowed MultiChoice a chance to further entrench its position of power in the broadcasting sector.

It is, however, also seemingly leading to a surge in competition in the satellite television market.

"What we are seeing is an explosion of content offerings, which is part of the move to digital television platforms," said one industry insider.

Sabido is launching a new free-to-air satellite platform called Openview HD via subsidiary Platco Digital.

It will be partnering with licensed broadcasters to carry channels on their behalf and Sabido has confirmed that e.tv will launch a number of channels on the platform.

Platco's Maxwell Nonge is promising "significantly cheaper" carriage rates compared with existing players in the sector – which basically comprise DStv and TopTV.

Platco has also confirmed that it is in discussions with the public broadcaster about carrying some of their channels.

The free services will cost consumers only the R1,900 for the decoder, satellite dish and installation. They will get access to between 12 and 20 channels for no additional monthly costs.

"Openview HD will not be engaging in any licensable activities on its own behalf as it merely provides technical platform services to licensed free-to-air broadcasters on the basis of existing licenses," said Nonge.

Nonge says details of the specific channels will be released closer to launch time in October this year.

The plan has generated a lot of curiosity among industry players City Press earlier spoke to on condition of anonymity.

Some argued that the move by Sabido could be interpreted as a vote of no confidence in the migration's process, although Sabido Investments head of corporate affairs Vasili Vass said the company was fully committed to the migration.

"Openview HD should be seen as another platform to strengthen free-to-air broadcasters," said Vass.

Vass pointed out that the United Kingdom, Ghana, New Zealand and Germany all had free-to-air satellite platforms operating alongside DTT platforms.

Meanwhile, the dominant satellite platform, DStv, is also attracting new local channels in lieu of the migration.

The SABC launched its 24-hour news channel this week on MultiChoice's DStv bouquet—a move heavily criticized by the DA, SABC union bosses and the Save Our SABC coalition.

The coalition's coordinator, Carol Mohlala, is reported to have said: "What message are they giving about DTT? Are they trying to tell us DTT won't work? Why couldn't they wait?"

Mohlala said that when migration was up and running, the public broadcaster would have 15 extra channels and it was not clear what they were going to do to fill them with.

Broadcast, Electronic, Media & Allied Workers' Union president Hannes du Buisson said the move was "morally wrong" because the public broadcaster was using public money to broadcast a service to an elite audience.

The Mail & Guardian reported that MultiChoice Africa would pay the public broadcaster a fee of R553m over five years.

The public broadcaster's new 24-hour news channel promises to feature news in all 11 official South African languages, syndicated news programs and repurposed SABC news programs from its existing three channels, including Morning Live.

The channel will also become available on the migration, when the long-delayed switchover to digital broadcasting in South Africa begins.

One industry insider argued that getting the SABC channels on the DStv bouquet was good "political capital" for MultiChoice.

The controversial Gupta family is reportedly also set to launch a 24-hour news channel on the pay channel.

The channel is being launched under the umbrella of Infinity Media, a partnership between the main Gupta family vehicle, Oakbay Investments, with a 35 percent stake, Indian satellite giant Zee-TV (35 percent) and an unknown black-empowerment partner with 30 percent.

The channel known as Africa News Network 7 has started hiring staff, including presenters, anchors, reporters and producers.

The channel has said it will launch late this year.

There were five new applicants to Icasa for a new round of satellite television broadcasting licenses recently.

Kagiso Media, which owns East Coast Radio, Jacaranda Radio, Urban Brew Studios and educational publishers Juta, plans to launch Kagiso TV if granted a license.

Kagiso TV will be a satellite television bouquet that will retail at about R240 per month—with lower-priced options.

The target audience is LSM 5-7—with a potential audience of 3.5 million to 6.5 million households.

Kagiso have set themselves a target of 1?million subscribers by the sixth year of operation—the point at which it will break even.

Set up by the Bakgatla-Ba-Kgafela tribe in North West, Siyaya wants to offer a satellite bouquet for R70 per month.

Soccer will be one of Siyaya's main draw cards, with plans to show club football from South Africa and the continent.

Other content partners include Showtime, National Geographic, Zula, Warner Brothers, Fox and Sony Entertainment.

Their target market is consumers above 30 years old who earn between R4,000 and R10,000 a month— a market that Siyaya estimates has about 1 million potential viewers.

Siyaya plans to break even in their fourth year of operations, but will need 300 000 viewers by then to do so.

Former SABC manager Thandi Ramathesele is the CEO of Siyaya, former Post Office chairperson Vuyo Mahlati is the chair of the board and Bakgatla-Ba-Kgafela's Kgosi Nyalala Pilane is deputy chair.

Cape Town-based Close-T plan to launch a satellite television bouquet for South Africa's gay, lesbian and transgender community.

Besides specific content for this community, they will also offer travel and fashion television shows, and art house and foreign-language films.

Its content partners thus far are Out TV Group, Logo TV and the Out in Africa Film Festival.

Close-T estimates that it has a potential market of 6 million South Africans.

Mindset Media Enterprises is the commercial arm of the Mindset Network, which specializes in education and health content.

They currently produce television shows for MultiChoice's DStv platform, On Digital Media's Top TV platform and Sentech's Vivid platform.

Mindset wants to launch channels full of similar content.

Classic FM founder Hylton Appelbaum is a director of Mindset Media Enterprises.

Mobile TV is owned by publisher and journalist Mothobi Mutloatse and black business support body Nafcoc.

Talking about the technology that will drive his broadcasting business, Mutloatse said: "It will be interactive, touch screen, and have downloads and Internet."

Cambridge Consultants–Saving Species

Product development firm Cambridge Consultants is helping conservationists at the Zoological Society of London (ZSL)—in partnership with the Kenya Wildlife Service (KWS)—protect some of the world's most rare and endangered species.

As part of the Instant Wild project, new satellite-connected and motion-triggered cameras are beaming near-real-time images of animals from the remotest areas of Africa.

A mobile app allows users anywhere in the world to view the photos and immediately identify the animals by cross-checking with the field guide provided in the app.

At the same time, the system provides early warning of illegal poaching activity, as well as evidence for prosecutions.

Patrick Omondi, deputy director of wildlife conservation at KWS, said: "This technology will enable us to make a significant breakthrough in our day-to-day work with endangered species. We manage around eight percent of the total land mass of Kenya—and these cameras will be critical in helping us monitor the wellbeing of rare animals and ensure their habitats remain protected from poachers. Through

our work with ZSL and Cambridge Consultants, we want to help raise awareness of vulnerable species and the risks they face every day."

The system harnesses the capabilities of a range of technologies, including the versatile Raspberry Pi micro-computer. The cameras can run on a single battery, and they use LED flash lighting to work at night as well as during the day. The captured images are sent back over the Iridium satellite communication network – 66 low earth orbit satellites that represent the only commercial satellite system with full coverage of the globe.

"One of our aims is to stop the killing of animals on a daily basis by poachers," said Professor Jonathan Baillie, director of conservation programs at ZSL. "In the last 18 months alone, more than 1,000 rhinos in Africa have been killed as a result of soaring demand for rhino horn products. We need to stop the poachers now before it's too late.

"We are installing cameras in Kenya's Tsavo National Park to create a safety net of eyes and ears to protect threatened wildlife—and contribute to the efforts of cutting poaching there significantly in the next two years."

The satellite connected, motion triggered, camera, part of the Instant Wild project.

Richard Traherne, head of wireless at Cambridge Consultants, said, "The challenge was to create a remote monitoring system that was robust enough to withstand extreme weather conditions and animal attacks, and could be easily hidden in any surroundings—all within the available budget. The vital importance of the conservation project gave us a valuable incentive to come up with an innovative new system that could help ZSL in its mission."

Once the system has been installed in Kenya, there are plans to extend it to cover locations such as Indonesia, Sri Lanka, the Himalayas and the South Pole.

Additional insights...

- One rhino is killed every 11 hours in Africa due to the demand for products made from rhino horns. There are just 539 wild rhinos today, compared with the 20,000 that existed in 1969

- Funding for the Instant Wild program has included donations via the Royal Wedding Charitable Gift Fund of the Duke and Duchess of Cambridge

- The Instant Wild project won a £500,000 Global Impact Award from Google earlier this year

- ZSL runs conservation program in more than 50 countries, as well as London and Whipsnade zoos

MILCOM'13–Upcoming In San Diego

Did you know that if you are a member of the military, a student, or a government employee, conference registration for this event is free?

MILCOM'13 will run from November 18th through the 20th at the San Diego Convention Center, located at 111 West Harbor Dive.

Registration is open for this important conference—start planning your MILCOM experience now! Here are

the top six reasons for attending MILCOM'13.

Hear from the senior military, government and industry leadership and get your questions answered—confirmed speakers include:

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- *Dr. Irwin Jacobs, Founding Chairman and CEO Emeritus, Qualcomm*

- *Larry Payne, Vice President—US Federal, Cisco Systems*

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Dialogue with the experts in panel sessions:

- *Communications Requirements for War-fighters in the 21st Century*
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- *Innovation and Opportunities to Leverage Emerging Technologies*
- *Cyber Security and Survivability*

See and touch the best and newest equipment and technologies industry has to offer as well as engage and network with speakers, panelists, industry representatives, and other attendees.

Registration and additional information at **http://www.milcom.org/**

SITA + Thales–On Demand, In-Flight Entertainment

Thales and SITA have reported on the success of pairing Thales' GateSync™ with SITA's e-Aircraft Services to enable in-flight entertainment on demand to passengers' smartphones, tablets and other devices.

Currently on trial with LAN Airlines, at Santiago Airport, it provides passengers with on-demand rich content straight to their own devices. This includes music, movies, news, TV series, PC games, interactive shopping, destination and flight information, all streamed within the cabin.

SITA provides connectivity for aircraft on the ground via Wi-Max, Wi-Fi, or cellular service and, through its subsidiary OnAir, in-flight connectivity through satellite-based broadband services. By using SITA's network to deliver its in-flight entertainment (IFE), Thales avoids shipping hard drives and the need for manpower to upload content, while allowing frequent updates. SITA's delivery of information is fast, secure and cost-effective, and it can handle other airline data, such as non-safety-critical operational aircraft communications, as well as the IFE content.

Stuart Dunleavy, Vice President of Media & Connectivity of Thales's In Flight Entertainment Systems business, said, "The combination of Thales expertise in the development of in-flight entertainment and passenger connectivity solutions, with SITA's recognized specialization in air transport communications and IT solutions is central to the success of this initiative. Each party is bringing its strengths to this project."

Sebastien Fabre, Vice President, Integrated Networks, SITA, said, "SITA and Thales are unlocking the maximum benefits achievable from e-connected aircraft. This technology is not just for IFE, but can be for all data. In effect, we are making the aircraft an active node in the airline's enterprise network, allowing data control by all stakeholders within the airline. Passengers get on-demand IFE, while time-sensitive data such as passenger manifests, daily news, meal inventories, surveys, crew logs and system performance data can also be securely transmitted to the airline's operational systems.

"SITA is currently experiencing data volume growth on new generation aircraft (A380 and B787) approaching 100% compared to older generation aircraft. This demonstrates that the development of aircraft-centric IP service management is essential to meet the needs of airlines."

This innovative trial from Thales and SITA rapidly accelerates the delivery of high speed Gatesync™ wireless ground connectivity for airlines, putting in place the building blocks for seamless e-enabled aircraft operations.

With the evolution of aeronautical wireless communications and mobile devices, and the growth of new generation aircraft, such as the Airbus A350 and Boeing 787, the Thales/ SITA project demonstrates not only sophisticated on-demand IFE services for passengers, but new ways of operating aircraft.

Airlines can reduce costs and accelerate turnaround time because time-sensitive data can be transmitted wirelessly to, and from, an entire airline fleet.

This automates the labor-intensive and time-consuming processes of retrieving and loading large volumes of aircraft systems' data.

The ground-based infrastructure, which SITA has installed and manages, uses SITA's existing private backbone network for the secure deployment and management of data among airports, airlines and third parties to the e-enabled aircraft ecosystem around the world. It is fully integrated into SITA's Command Centers, which provide round-the-clock monitoring and support services.

Onboard the aircraft, Thales provides GateSync components and integrates the system with onboard servers and avionics equipment.

InfoBeam

Thomas Jefferson H.S., NASA + Orbital–A Spatial Excursion

A satellite developed and built by about 50 students from Thomas Jefferson High School for Science and Technology (Fairfax, Virginia) over the past eight years— the first ever built by high school students— is scheduled to be launched into orbit by NASA November 19, weather permitting.

The satellite, known as TJ3Sat (pronounced TJ-cube-sat), is one of 20 satellites selected by NASA as part of its CubeSat Launch Initiative, which includes cube-shaped research satellites that weigh approximately three pounds, also known as nanosatellites.

TJ3Sat will serve primarily as an educational outreach tool and features a website that hosts live telemetry such as voltages, currents, temperatures, and other system status information available to the general public along with its history and other pertinent documents.

TJ3Sat will also include a voice synthesizer that can be used to take uploaded strings of text and convert them to voice.

TJ alumnus Jason Ethier proposed the project as a result of an internship he served with Orbital Sciences Corporation. Teacher Adam Kemp then developed a course in systems engineering that would focus on the design and construction of the first high school-built satellite.

A $30,000 donation from Orbital Sciences Corporation went toward the purchase of a cubesat kit, which formed the foundation of the satellite. Orbital has also provided the resources needed for the flight hardware, testing facilities for the finished spacecraft, and engineering mentorship by its employees.

Since 2006, teams of TJ students have been working on the design, construction, testing, and integration of TJ3Sat. Stensat LLC donated time, equipment, and expertise toward the development of the satellite.

Students used commercial off-the-shelf hardware for the structure of the satellite, radio, voice synthesizer, and a flight computer designed by Kemp.

The remainder of the hardware was developed as student senior research projects under the advisement of Kemp, Orbital engineers, and other industry volunteers.

The voice synthesizer can be used by students around the world who can send messages to celebrate holidays, cheer on their sports teams, and communicate with friends and family across the globe.

It is estimated that TJ3Sat will be in orbit for at least three months, depending on the deployment and acquisition of orbital parameters.

The team has developed enough hardware to construct three satellites, all currently stored at Orbital's facility in the Dulles area. Plans are to move one of the test satellites, known as engineering units, back to the school for use in troubleshooting the satellite once it is in space. Scale models of TJ3Sat are on display at the school.

Satellite team members have documented all their work and will offer the designs of the original hardware and software they developed on the website so that future K-12 institutions can refer to the information as a resource as they develop their own hardware.

Thomas Jefferson High is a Fairfax County public school. (Article source:FairfaxNews.com)

Advantech Wireless–A Brazilian Bonus

Advantech Wireless Inc. has announced that it's GaN based SapphireBlu™ Series of UltraLinear™ Ku-Band SSPA has received certification from the Brazilian National Telecommunication Agency (Anatel).

"This certification allows us to offer our customers in Brazil the most advanced and powerful solution in the market. More than 100 Klystrons and TWTs have been recently replaced by just 4 units of 3kW Ku-Band UltraLinear GaN SSPAs," said Cristi Damian, VP Business Development at Advantech Wireless. "This disruptive technology allows remarkably high levels of performance and also impressive savings in CAPEX, OPEX, including energy cost."

The New SapphireBlu Series of UltraLinear GaN based amplifiers from Advantech Wireless can cover multiple transponders, full DVB-S2 enabled and can save 8 to 15dB power compared to indoor Klystrons or linearized TWTs.

This new architecture is designed for Multi Carrier operations, with power expandable to 3kW by phase combining and redundant ready and is ideal for DTH Broadcasting, High Data Rate Telecom Services and Deep Space Communication.

Backed by more than 25 years of outdoor SSPA design and manufacturing experience combined with the traditional Advantech Wireless features, this is the only worldwide solution capable of offering the highest efficiency in use of satellite bandwidth and power.

NewSat Limited–Teleport Engrandizement

NewSat Limited has revealed that the City of Salisbury Council granted Development Plan consent for the expansion of NewSat's Adelaide teleport facility in Mawson Lakes, South Australia.

The planned facility expansion highlights the growth of business in SA and more specifically, the City of Salisbury. A larger teleport facility will advance global innovation, assist technology development and increase high tech job availability.

This consent acknowledges NewSat's success to date and the opportunities that NewSat's Jabiru-1 satellite and the teleport infrastructure investment in South Australia will create for local industry.

The teleport expansion is integral to the growth of NewSat and its plans to launch a fleet of satellites. Jabiru-1, Australia's first commercial Ka-band satellite, is expected to generate in excess US$3 billion of revenue over 15 years.

The City of Salisbury's economic and development team, operating from the Polaris Centre in Technology Park, have worked closely with the company to support the application process.

In commenting on the Development Plan consent, Gillian Aldridge, City of Salisbury Mayor said, "NewSat's development application highlights how Salisbury is well placed to provide economic growth and support to industries and businesses, our staff have worked closely with NewSat to provide the company with significant insight and support and we are delighted that they have chosen to expand their operations in Mawson Lakes. This facility expansion is a great example of local business growth and will provide the community with high-tech innovative jobs into the future."

Adrian Ballintine, NewSat Founder and CEO, said, "We are delighted that the City of Salisbury granted Development Plan consent for the Adelaide teleport facility expansion, confirming NewSat's planned infrastructure investment in South Australia and development of our teleport facility here in Mawson Lakes."

XipLink +Hughes–Ensuring Mexican Schools Are Connected

XipLink XHO illustration.

Xiplink has assisted with the successful integration and deployment of several XipLink Hub Optimization (XHO) appliances with a Hughes Network Systems HN VSAT satellite platform to support the Internet connectivity needs of a nationwide public school system in Mexico.

"We performed a rigorous analysis of the XipLink solution," said David Jupin, vice president, International Division at Hughes. "The Hughes team had performance concerns surrounding the number of Internet session counts that are generated by the large number of schools on the network, but the XipLink XHO platform exceeded our expectations."

The XipLink appliance (XA) family of wireless link optimizers, scale from low-cost devices operating at 2Mbps to high-performance, multi-core platforms operating at 155Mbps and supporting more than 30,000 simultaneous TCP connections.

The appliances serve as the vehicles that deliver optimization features such as stream-based compression, byte caching, lossy and lossless compression capabilities, link bonding/balancing, and advanced cellular compression capabilities.

Bruce Bednarski, senior vice president of Business Development at XipLink said, " The XHO solution was specifically designed for large service networks with considerable Internet traffic. The system complements the Hughes TurboPage™ feature, dramatically reducing bandwidth requirements while simultaneously improving the end-user browsing experience. Demonstrable efficiency and a lower overall operating cost structure is a requirement in winning and delivering sizable public networks."

XipLink's flexible architecture allows the solution to scale-up with the demands of the network, protecting the customer's initial investment in two ways. First, the XHO allows for infinite expansion via WCCP protocols and other integrated load balancing solutions, while simultaneously delivering critical fault tolerance.

Also, XipLink two-way optimizer appliances can be provisioned at the larger and more demanding remote locations to further optimize and reduce traffic generated at these sites and across the network.

Photo of the Hughes HN System.

InfoBeam

The SIRIUS Chair Is Launched

From left to right: Marc Pircher, Head of Toulouse Space Center, CNES; Eric de Saintignon, Director of Astrium in Toulouse; Didier Le Boulc'h, Director of R&D and Product Strategy, Thales Alenia Space France; Bruno Sire, President of Toulouse 1 Capitole University; and Jacques Igalens, Director of Toulouse Business School.

From left to right: Jacques Igalens, Director of Toulouse Business School; Eric de Saintignon, Director of Astrium in Toulouse; Bruno Sire, President of Toulouse 1 Capitole University; Jean-Pierre Vialaneix, Director of Thales Alenia Space in Toulouse; and March Pircher, Head of Toulouse Space Center, CNES.

Last month, Marc Pircher, head of Toulouse Space Center (CNES), Eric de Saintignon, and Jean-Pierre Vialaneix, respectively, director of Astrium in Toulouse and director of Thales Alenia Space in Toulouse, formalized their commitment concerning the creation of the Sirius Chair, alongside Bruno Sire, chairman of the Toulouse 1 Capitole University and Jacques Igalens, director of Toulouse Business School.

The Sirius Chair was born in a place that is symbolic on two counts: The Cité de l'Espace, an emblem of Toulouse as the European capital for aerospace, and the Midi-Pyrénées region, which is the first aerospace cluster in Europe and a world leader in Earth observation, operational oceanography, location and navigation.

The three partners associated with the creation of the Sirius Chair, Astrium, CNES, and Thales Alenia Space, have actively participated in the creation of a unique research space.

Their common interest for the creation of a chair dedicated to the legal and managerial challenges of aerospace activities is an echo of the leading role played by these major industrial actors on a European scale.

The Sirius Chair will also strengthen the expertise of Aerospace Valley, a Toulouse-based business cluster of international caliber which leverages a dense network of 150 SMEs, engineering schools, universities, and research laboratories.

Eric of Saintignon, director of Astrium in Toulouse, underscores the benefits of having an international research group pertaining to the legal and economic issues of space activities:

"How will the legal framework evolve for companies of the space sector on a worldwide scale? Why is innovation managed differently in the space sector than in other industrial sectors? It is on this type of issues that the best experts, lawyers and economists, gathered within the SIRIUS Chair, will be working. Astrium wanted to be a part of this, because our position as number two worldwide, and especially as the only company in the world to be present in all space activities, led us to face very different issues in a sector that is perpetually evolving."

Marc Pircher, Head of Toulouse Space Center, agrees with this idea... "We are always on the lookout for new applications, which often raise important questions. The example of observation and location satellites is enlightening: what indeed is our legal responsibility in case of poor integrity of space-based signals or data, or in terms of privacy? What are the legal issues with regards to insurances, individual freedom and image rights? This example is a good illustration of the issues which can come across our research and development."

"The creation of the SIRIUS chair is an excellent initiative which confirms that Space is a sector with a strong potential that has only been very partially tapped until now," Jean-Pierre Vialaneix, director of Thales Alenia Space in Toulouse explains.

"The topics that will be addressed in depth by top-ranking researchers and Ph.D. students will make it possible to compare expectations and constraints from institutions, territorial authorities, citizens and businesses to unearth new political, financial, legal or industrial models paving the way for future developments which will generate employment and economic benefits for France".

Under the scientific leadership of Professor Lucien Rapp, research teams from UT1 Capitole and TBS will initiate studies on behalf of businesses belonging to the French aerospace industry.

They will contribute to their broadcasting through the organization of specialized and dedicated symposiums, seminars and workshops.

"This is why the Sirius Chair is an ambitious project, and a very symbolic one with regards to the partnerships implemented and the services provided, Lucien Rapp, professor at UT1 Capitole, scientific director for the Chair, and one of the best international legal experts in aerospace and telecommunications, said.

Denis Lacoste, scientific co-director of the Sirius Chair, indicated for his part that his research themes, "unexplored to date, will have a very strong added value from an industrial standpoint", and will benefit from the "proximity between research teams and the industrial and institutional environments linked to the aerospace industry."

The two scientific co-directors have both pointed out the significance of aerospace in Europe: "The Treaty of Lisbon has given Space a truly strategic dimension. This momentum continues today within the framework of the Horizon 2020 program, which has replaced the 7th European Research Framework Program, making aerospace one of the 6 priority industrial sectors to support."

A European priority will echo favorably within the Sirius Chair, as evidenced by the ambitious research program announced by the partners. "We will strengthen our understanding of the legal and regulatory phenomena and mechanisms, as well as those pertaining to management or economy, which are directly linked to the specificities of the space sector. I am thinking in particular of market procedures, litigation, intellectual and industrial property, competition law applied to space activities, or even to personal data and privacy protection," Jacques Igalens, Director of TBS, specifies. These themes will build on the strength of a wide network of qualified researchers, in France and abroad.

The Sirius Chair is based upon a skills network composed of doctoral students, post-doctoral students and experts, hailing from various geographic backgrounds.

The Sirius Chair will place this skills network at the service of the European space industry. Astrium, CNES, and Thales Alenia Space will be involved with the organization of international symposia and specialized seminars in Toulouse, on topical subjects relating to the whole space industry.

A chair makes it possible to finance research activities (supervision of Ph.D.s, studies, symposia) over time through the support of private or public actors. Created for a first period of five years, the Sirius Chair is financed by CNES, Astrium and Thales Alenia Space through the Toulouse Business School Foundation.

Spacecom–East African Entry

Artistic rendition of the AMOS-5 satellite.

Spacecom, the operator of the AMOS satellite fleet, has announced that its AMOS-5 at 17 degrees East has won another broadcast deal in East Africa.

Under the new $3.6 million contract, Spacecom will provide analog to digital migration broadcast services to an East African Digital Terrestrial Transmission (DTT) and Direct To Home (DTH) operator.

The operator's DTT distribution and DTH signal to the region, composed of dozens of channels that are focused on local and international content including news, sports, entertainment and family programming, will be transmitted on AMOS-5's Ku-band (Ku-3).

Earlier this month, Spacecom announced it had won an East African digital migration broadcast project worth $5.9 million.

AMOS-5 was designed and built specifically for the African market with a pan-African C-band beam and three Ku-bands that cover the continent and provide connectivity to Europe and the Middle East.

The satellite's position at 17 degrees East enables its signal to reach every region in Sub-Saharan Africa.

iDirect + SkyVision–Ghana Academy Receives Benefits

VT iDirect, Inc. (iDirect), a company of VT Systems, Inc. (VT Systems), has announced that SkyVision, a global IP telecommunications service provider to emerging markets, has donated an iDirect-powered satellite network for the Crossover International Academy, a K-8 school located in the village of Tongor-Attokrokpo, Ghana.

The network was implemented as part of a joint effort between iDirect and SkyVision to help the academy improve its educational offering by providing underprivileged students with online educational resources.

SkyVision's SkyDirect VSAT service, based on the iDirect platform, was chosen to provide the service due to its proven reliable connectivity.

The VSAT service enhances the way students learn and their overall education experience with Internet-based tools such as streaming video, social media, email and educational programs. For example, students can enhance reading levels by using uploaded video tutorials and online programs, such as PRO reading technology and Total Reader™.

Crossover is also leveraging the service to connect with Pegasus, its sister school in the U.S.

The two schools can now communicate with one another via email, implement student debates over Skype and FaceTime, prepare weekly assignments and lesson plans, create online courses for the school's staff, and organize online fundraising activities.

Timely Installation Is The Key To Drilling Rig Support

by Gary Bray, Vice President, Oil & Gas, Signalhorn

For more than 10 years, Signalhorn has been providing satellite communications to rigs operated by KCA Deutag, one of the world's leading well drilling contractors.

The challenge faced by KCA Deutag and other businesses operating in this demanding sector is that drilling rigs are almost always constructed farthest from terrestrial communication networks as they can get.

Operating climates range from the arctic cold of Siberia to the baking deserts of the Middle East and North Africa—with the stormy waters of the North Sea somewhere in between. These harsh, remote conditions place exceptional demands on crews and equipment and also makes reliable communications all the more important for drilling operations, crew morale and safety requirements.

Unlike many of Signalhorn's enterprise customers, installation of a VSAT antenna and other satellite network equipment on an oil rig is always temporary. The rig typically will be constructed at a remote site, operate anywhere from three to 18 months, and then be dismantled and moved to another location to start another drilling operation.

In its years working with KCA Deutag, Signalhorn has focused on developing a range of procedures to assure the customer of two things: That the equipment will work immediately when it is installed on a newly-positioned rig, and that Signalhorn's support staff will be available to deal immediately with any problems that occur during the time the rig is in operation.

This focus on the highest level of reliability and customer service has allowed Signalhorn to grow its business with KCA Deutag over the past decade and to expand to other oil and gas operators.

The company now provides service to 47 of KCA Deutag's land-based drilling rigs in Europe, North and West Africa, the Middle East, Russia and Central Asia.

KCA Deutag also has 39 offshore platform rigs worldwide. Signalhorn recently had several of the employees certified to be able to work on these off-shore locations in anticipation of expanding into that sector, as well.

The solution Signalhorn delivers to the rigs is a combination of Single Channel per Carrier (SCPC) and iDirect networks. The network is supported out of Signalhorn's owned European teleports in Backnang, Germany, and Leuk, Switzerland.

From these points, the customer's data flowing from the rigs is transmitted by terrestrial leased line to KCA Deutag's offices in Bad Bentheim, Germany. Satellite capacity for the network is provided by a number of different operators due to the global nature of KCA Deutag's operations.

These networks allow KCA Deutag to share drilling, engineering and other critical data as well as maintaining voice contact with remote rigs using VoIP.

The company can also use the link for video conferencing and can make it available to a rig's 30+ crew members for voice calls, emails and other electronic communications with family and friends at home.

The use of iDirect and SCPC technology guarantees data rates and fixed monthly costs independent of the amount that the network is used.

When KCA Deutag sets up a rig in a new location, an approved local service partner is dispatched to conduct a primary site survey and to determine exactly what equipment will be required for installation.

Back at the build-and-test facility, located at Backnang, the environment on the drilling rig is simulated by setting up and testing the antenna, RF equipment, modem, switches and any additional telephone or video equipment that will be installed at the rig.

Once the required hardware has been vigorously tested and quality checked, the equipment is shipped to the customer's site. It is essential that all the shipped equipment is pre-built, pre-tested, pre-configured with a final quality check conducted before it leaves Backnang.

At the customer remote site, the installation is performed by either a technician from one of Signalhorn's service partners, or one of Signalhorn's own qualified and certified engineers. This ensures correct installation procedures are followed in cooperation with the Signalhorn Network Operation Center (NOC), with final connection with the customer's network once the antenna is aligned to the appropriate satellite.

Along with the company's own, highly trained field staff, Signalhorn's strong relationships with local service partners in the vicinity of oil and gas exploration has allowed the firm to support KCA Deutag while also providing communications services to other companies in the industry.

Signalhorn has a global network of 60+ service partners in more than 130 countries who understand the culture, business practices, and regulatory framework peculiar to a particular locale. This enables customers to quickly navigate local regulations governing the approval and support of network installations, equipment upgrades, and ongoing operations.

The service partners, collectively, have over 1,000 highly trained employees located in the countries where Signalhorn customers—such as KCA Deutag—operate. This enables Signalhorn to dispatch the technical expertise necessary in-country to ensure a projects is completed to the customer's satisfaction—first time, every time.

Just recently, Signalhorn announced that a major customer, one of the world's largest fully integrated oil and gas companies, has expanded its requirements to extend terrestrial and cellular 3G services from Signalhorn to thousands of locations across Europe to ensure round-the-clock commercial connectivity.

The locations will be connected with Signalhorn's Xtend solution, utilizing fully integrated terrestrial, cellular 3G and satellite technologies to deliver cost-effective and fail-safe communications required for critical point-of-sale and other terminal technologies. The service will conform to the strong security benchmark set by the Payment Card's Industry Data Security Standard (PCI DSS).

Signalhorn dishes at their Leuk, Switzerland, network operations center. Photo courtesy of Signalhorn.

The customer is one of the world's leading oil producers and gasoline retailers. The company requires a robust and global solution that can be rolled out country-by-country with guaranteed connectivity to support its network transactions activities. Signalhorn, with its global reach, deep operational experience, and proven expertise, has successfully rolled out thousands of other customer sites while meeting the high quality-of-service requirements of its customers.

"This project award further validates the strong value proposition provided by Signalhorn's hybrid solution combining terrestrial, cellular 3G and satellite technologies," said Robert Kubbernus, Signalhorn's CEO and President. "The fully managed service allows our clients maximum control of their network services in a way that exceeds their requirements from a technical and commercial perspective."

Commercial connectivity between company locations and headquarters must be up and running at all times so that transactions can be processed," Kubbernus continued. "We optimize our customers' networks based on a combination of the available technologies and we have the talent and global expertise internally to design, build, install, and maintain such large networks."

As part of the services expansion, Signalhorn will start the roll-out of its Xtend network, with an expected completion in 2015. Signalhorn Xtend provides all the essential hardware, software, portal solution, licensing and management services to allow an existing VSAT network to incorporate terrestrial connectivity and cellular 3G for 100 percent availability.

For additional information regarding Signalhorn and the company's services, please access their website: ***http://signalhorn.com.previewdns.com/***

Working oil field, photo courtesy of KCA Deutag, whose headquarters are located in Aberdeen, Scotland.

NSR Analysis—The Shifting Direct-To-Home Demand In Latin America

By Blaine Curcio, Analyst, NSR, South Korea

The Latin American DTH market has, in recent years, seen excellent growth in both household and revenue numbers. With just under 22 million Direct-to-Home (DTH) subscribers as of 2012, Latin America (LATAM) as a whole represents almost 20 percent of global DTH subscribers.
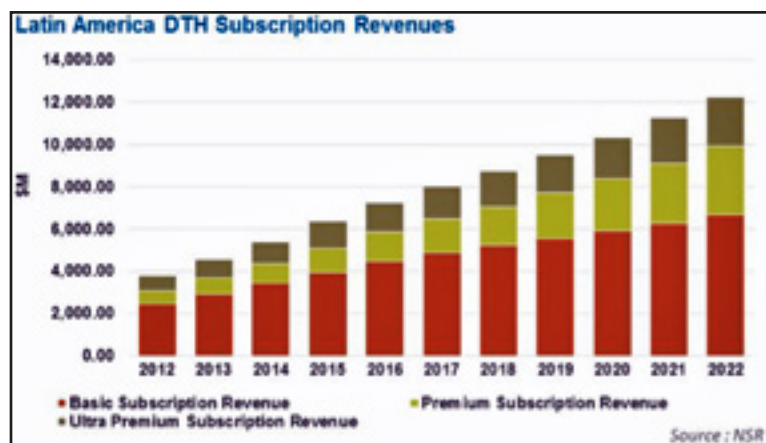
During the next three to five years, LATAM will be the fastest growing region in the world in terms of subscriber and revenue growth, especially among Basic subscribers. Long-term, Premium (HD) subscribers will see growth accelerate, as the middle-class grows throughout the region.

With current Latin American DTH penetration rates at around 14 percent, NSR expects an increase in uptake of DTH services among existing TV households, moving forward. Taking data from NSR's Direct-to-Home (DTH) Markets, 6th Edition, the number of DTH subscribers in Latin America, as a whole, is expected to more than double, from around 22 million in 2012 to 46 million by 2022. More importantly, however, will be the timing of this growth.

Of the total growth occurring from 2012-2022, nearly two-thirds will occur from 2012-2017. DTH subscribers will increase by nearly 16M from 2012-2017, and then will increase by "only" another 9M or so, despite a higher base year total, from 2017-2022.

While overall subscriber growth will be driven by "Basic" subscribers, which will just under double from 18M to 34M, "Premium" subscribers will see a far more impressive CAGR, with the number more than tripling from just over 2M to nearly 8M by 2022.

Premium subscriber growth, however, will, in fact, come in the later years of the forecast. Such reflects the fast growth in the short-term of Basic subscribers, and more long-term Premium subscriber growth. This trend indicates a shift in Latin America to HD programming, and other higher-ARPU services, and the fact that it will be a long-term shift.

Revenues and subscribers in Latin America will continue to show strong growth moving forward. While the bulk of new subscribers will continue to be "Basic," especially in Central America, there is an undeniable shift towards HD programming, "Premium" revenues, and subsequently higher ARPUs from these newly-minted middle-class customers.

Further, growth, particularly among Basic subscribers, will accelerate remarkably quickly in the short-term, with total subscribers increasing by nearly 75 percent from 2012-2017, for a CAGR of more than 11 percent. Long-term growth will be slower overall, but faster among Premium subscribers, reflecting a shift towards a larger middle-class.

With sports programming being a key differentiator, and with regional competition intensifying due to governmental deregulation, specifically in Mexico, these new subscribers will be hotly contested among operators. However, with the overall revenue pie growing by over $8B, there should be more than enough to go around, provided operators are able to cater to the needs of a new class of Latin American customers.

Information for this article was extracted from NSR's report: Global Direct-to-Home Markets, 6th Edition. For further information, please access the report's infopage at:

http://www.nsr.com/research-reports/broadcast-digital-media/ direct-to-home-dth-markets-6th-edition/

The regional shift to HD services is best exemplified by looking at subscription revenue growth. Total regional subscriber revenues are expected to increase by around $8.5B to 2022. While "basic" revenues will continue to reign supreme long past 2022, "Premium" revenues will increase their share of the overall revenue pie from 16 percent in 2012 to 27 percent in 2022, increasing from $626M to $3.25B in the process, indicating a strengthening regional middle-class with an appetite for higher-quality television content.

A recent example of the shift to HD occurred in June 2013, with SES launching their new satellite SES-6. SES-6's anchor customer, Oi!, is a Brazilian DTH provider, which has publically stated that their goal in securing capacity on SES-6 is to increase their HDTV offerings to the Brazilian DTH market.

Further regional trends moving forward will include market deregulation, particularly in countries such as Mexico, which has a history of governmental monopolization. As deregulation brings about increased competition, it should also breed new opportunities for operators to cash in on markets that are being made more efficient, potentially increasing their bottom line in the long run.

The launch of the SES-6 satellite aboard a Proton-M rocket from the Baikonur Cosmodrome in Kazakhstan.

About the author
Mr. Curcio joined NSR in 2012, following a position as a project manager in Shenzhen, China. His prior industry experience includes a role at SES (Den Haag Office) as a strategic marketing intern during the summer of 2010, where he helped develop a strategy to increase their share-of-wallet with key Europe-based customers. His consulting experience also includes having conducted a market-entry strategy project for SGS International, aiding their entry into Mainland China. Blaine speaks English, Italian, Chinese and Spanish. He obtained a Bachelor's Degree in International Business from Illinois State University.

About NSR's
Direct-to-Home (DTH) Markets, 6th Edition
This report provides an industry-leading assessment of key trends, drivers, and restraints facing the Direct-to-Home (DTH) satellite TV market. The study focuses in on the DTH and payTV satellite TV market, emphasizing country-level research being incorporated into regional-level analyses. This study addresses some of the most pressing questions in the DTH industry today, including:

- *How many DTH & Satellite payTV subscribers will there be per region from 2012-2022? How much in subscription revenues will they bring to DTH and satellite payTV providers?*
- *In which regions do Digital Terrestrial Technology (DTT) and Over-the-top (OTT) services present the greatest threat to DTH, and in which regions are they a lesser factor?*
- *Can DTH providers in emerging markets successfully transition from a focus on subscriber acquisition to increasing existing subscriber ARPUs? What factors continue to drive subscriber growth for the leading platforms in key countries?*
- *Which key countries have the greatest opportunities for DTH growth, and which countries are signaling higher barriers to entry?*
- *In the face of economic, political, and terrestrial threats to satellite TV services, which DTH markets still present niche opportunities for market growth?*
- *How big of a role will future technologies like UltraHD play, and in which regions will it be a factor? What is the outlook for SD, HD, or 3D channels?*

Direct-to-Home (DTH) Markets, 6th Edition provides in-depth assessment and forecasting using both primary and secondary research, and includes figures for:

- *TV Households & DTH Subscriber figures from 2012 - 2022*
- *SAC, ARPU, and Subscription Revenues for DTH and satellite payTV Platforms through 2022*
- *SD, HD, 3D, and Ultra HD Channels & Transponder Demand Trends & Forecasts to 2022*

As market conditions continue to change, DTH platforms face challenges from higher programming fees, online providers, and economic stagnation. In many developing regions, political turmoil can also hinder DTH providers' efforts for expansion. However, for regions such as South Asia, driven by the continued growth in India, DTH subscription revenue continues to increase, reaching almost $3.5 Billion by 2022. Furthermore, premium and above package tiers will account for more than half of these subscription revenues.

Despite these challenges, there remain more than 20,000 SD, HD, and 3D channels and over 100 DTH platforms worldwide, and their competitive edge continues to be maintained through new technologies, increased subscriber numbers, and increasing ARPUs in many regions.

Channel growth will continue to be robust, with over 35,000 channels by 2022, including dedicated capacity. While HD channels will roughly double, from just over 5,000 to just over 10,000 by 2022, SD will also post considerable gains, particularly in the developing world, increasing by nearly 10,000 during the period. Even by 2022, SD will still have the lion's share of the channel count.

Considering all these factors, NSR's Direct to Home (DTH) Markets, 6th Edition provides a comprehensive picture of the global DTH market, with detailed analysis on a regional level comprising much of the research.

Global Channel Count, 2022 — SD Channels 72%, HD Channels 27%, 3D Channels 1%, UHD Channels 1%. Source: NSR

Executive Spotlight
John Celli, President, Space Systems Loral

John Celli, President of SSL, is the company's top executive and is responsible for SSL's strategic direction. He has more than 30 years of industry experience and has previously served with the company as Chief Operating Officer, Executive Vice President, and Senior Vice President of Engineering, Manufacturing, & Test Operations.

SatMagazine (SM)

Would you please tell our readers how you came to be interested in the satellite development and manufacturing industry? What, in your background, prepared you for your company responsibilities at SSL?

John Celli

In the summer of 1969, I was a student at the University of Rome, and I needed to decide on my engineering specialty, such as electrical, chemical, or mechanical engineering. In the late hours of July 20, I sat on my balcony overlooking Rome and watched—on a black and white television—Neil Armstrong step onto the moon. At that moment, I heard a roar of cheering coming up from the city below my apartment. It was a powerful moment, an eternal moment, hearing the reactions of hundreds of thousands of people, all responding to this historic space-based event.

Right then, I decided that my engineering specialty would be aerospace. I think many engineers of my generation got into aerospace for the same reason. The satellite industry, then, was a natural fit with my schooling and my interests.

I joined SSL in 1981 and have held a number of different positions, including my role as Director of the Intelsat IX program, for which we built seven satellites for Intelsat, and my role as Executive Vice President, during which time I was responsible for the development, manufacturing, testing, and procurement of all satellite units and subsystems. Each position over the years provided me with experience and a thorough understanding of the satellite manufacturing process, as well as the satellite industry as a whole.

I had good mentorship at SSL, and as I moved into management roles, I found that I liked the management aspect of the job. I'm not sure anything truly prepares you for this type of role, but the combination of my various experiences at SSL and my passion for aerospace led me to my current position.

SM

In November 2012, SSL officially became a part of MacDonald, Dettwiler and Associates Ltd. (MDA). How is the integration between the two companies going?

John Celli

The integration between MDA and SSL has progressed exceptionally well and the synergies continue to strengthen and enhance our business. Our companies are closely aligned, with complementary technology and manufacturing capabilities, along with a similar culture, so we understand each other, which makes the integration easier.

EchoStar XVII. Photo is courtesy of Space Systems Loral.

We are still the same SSL with the same great people, but MDA brings us additional resources and capabilities that are enabling us to enter new markets and bring stronger solutions to our existing customers. We can now provide new services and offerings, including new financing options and opportunities to bundle new capabilities such as satellite servicing, robotics, ground systems, and data services.

The main focus throughout the process has been to leverage both companies' capabilities, creating opportunities for growth, diversification, and innovation, especially in the U.S. government sector.

SM

SSL is growing its Palo Alto, California facilities. Please tell us about the company's current construction project.

John Celli

SSL is currently in the process of constructing a new thermal vacuum chamber (TVC) and a support building to house the chamber. The primary purpose of this project is to allow SSL to perform thermal vacuum testing on two satellites in-house simultaneously.

SSL's new Thermal Vacuum Chamber, under construction. Photo courtesy of SSL.

The new TVC increases our flexibility in managing satellite manufacturing schedules. It will be used in conjunction with the outside test facilities that we currently use, and because we usually will not have to ship satellites off-campus, it will improve efficiency and help minimize manufacturing schedules.

The new TVC will be larger than our current chamber—with an internal diameter of 8.2 meters (27 feet) and measuring 15.2 meters (50 feet) in length—and is loaded horizontally, making the testing process significantly easier than with our current top-loading chamber. It is also large enough to accommodate two satellites in a dual launch configuration to be tested together.

The investment in the new TVC is an example of our new owner, MDA's commitment to making SSL a stronger company better able to meet the future needs of our customers. When completed at the end of 2014 we will have two testing chambers under our complete control, plus access to outside facilities as needed.

SM

In July, your company announced three new contracts. Can you explain how, over the years, SSL is able to remain competitive and well-positioned in the industry to achieve long-term success?

John Celli

There are two fundamental factors that keep SSL competitive and successful in the industry long term. First and foremost is our performance on our current backlog of satellites. We must perform to the highest level possible and satisfy our customers by meeting our commitment to them. This is essential to our business, as it is to any business. Our long-term customers have come to rely on the value of our work; and new customers know our reputation for performance and quality.

The second fundamental factor to our success is the flexibility of our satellite design, which allows us to accommodate the industry's constantly evolving applications and requirements. Our flexible, scalable platform serves a broad range of missions ranging from UltraHD and the world's highest-capacity broadband to dual launch and all electric solutions.

SSL advances technologies using a gradual and conservative approach, minimizing the risks associated with first-flight hardware, while still expanding our customers' options. With our heritage SSL 1300 platform—the core of our satellite business—we have created a modular configuration that supports high power up to 25 kW and leads the industry in high-capacity broadband capabilities. In addition, our platform can carry the most advanced antenna technologies and upgraded data handling systems. This flexible and adaptable configuration means that our customers can choose a satellite with the options that best meet their business needs, growth strategies, and budgetary constraints.

It is these two key factors—performance and flexibility—that account for our ability to satisfy our customers and remain competitive in an industry that sees significant competition.

SM

You briefly mentioned broadband capabilities. The worldwide demand for broadband is increasing exponentially. What is SSL's role in the growing broadband communications sector?

John Celli

SSL is a leader in putting broadband capacity in space. Our experience goes back to the late 1980s when we built Superbird, the first non-dedicated Ka-band satellite used for broadband communications. Since then, SSL has built more than 40 Ka-band satellites, including the world's two highest-capacity broadband satellites, ViaSat-1 and EchoStar XVII (Jupiter 1), and we continue to develop advanced technology to expand the capability of satellite broadband.

We have seven broadband satellites in backlog right now. Three of these are dedicated broadband satellites, and the others are multi-mission satellites with smaller broadband payloads. The dedicated broadband satellites include two for Australia's national broadband network, which helps ensure that everyone in Australia, even in the most remote locations, will have broadband access.

As demand for digital communications continues to grow around the world, access to high-speed Internet is increasingly essential for health, safety, education, and for economic development. Satellite broadband will help large regions of the world, such as South America and the Middle East, benefit from the opportunities that come with high speed connectivity. SSL is well positioned to provide the satellites to meet this demand with proven, industry-leading technology.

SM

What are your thoughts regarding hosted payloads? Will such be the answer for cost reduction and improved capabilities for MAG satellites? How will, or is, SSL addressing this need?

John Celli

A growing number of satellite operators and owners are discovering the economic benefits of putting multiple payloads on a single spacecraft. SSL has supported hosted payloads for many years. For example, the SSL-built Intelsat 14 satellite hosted a Cisco payload—an Internet Router In Space (IRIS), and Optus C1 hosted a military payload for the Australian government.

The industry, as whole, has provided hosted payloads or multi-mission satellites for commercial customers for many years. However, to host a U.S.-government payload on a commercial satellite mission is more complicated, programmatically; the satellite will be a shared resource, which means the decision-making processes will also be shared between co-passengers.

Artistic rendition of the Optus C-1 satellite. Image courtesy of SSL.

This approach requires a culture change in both the Government and the industry. However, a hosted payload may offer the U.S. Government a more efficient option by sharing, and therefore reducing, costs for both the satellite and the launch. In addition, a commercial schedule is significantly more aggressive than most government schedules, meaning that government payloads can be launched in significantly shorter time frames while maintaining the high reliability established in the commercial satellite industry.

SSL has considerable experience working with hosted payloads, as well as working with both commercial and noncommercial customers and third parties. This experience allows us to support the U.S. Government's hosted payload needs now and well into the future.

SM

Another crucial issue facing our industry is that of satellite interference. Is SSL involved in any projects to help mitigate interference?

John Celli

Communications payloads can be protected from interference in a number of different ways; the solutions are usually implemented as part of the antenna and repeater design. Such designs are driven by customer requirements, which dictate how to implement interference mitigation and to what level. SSL offers a payload in which interference mitigation is inherent in the design, but most often, the solution is a customized approach, working closely with the customer to meet their specific needs.

SM

SSL is clearly thriving. As president, what is your secret to success?

John Celli

I don't know if there's a secret, but the reason behind our success is our culture at SSL, our people, and our focus on quality. We have two key assets: our customers and our employees. We have built a culture that promotes tremendous respect for both. We respect the commitment we make to our customers and we listen to, and work with, them closely in an open environment and work together as a team.

We also respect our employees, their effort, their dedication, and their integrity and we make decisions with a concern for our employees' future. This culture took decades to build and my primary effort is to continue to build on that respect and understanding.

Sometimes, what distinguishes a mature, experienced team from others is not whether a problem occurs but how the team responds to these challenges. I am proud of the team at SSL, the way they have handled challenges without looking to assign blame or find short cuts. Instead they work hard to resolve every issue in a technically sound manner. I believe our customers recognize this intent and trust that the highest quality and their best interest is behind all of our efforts.

Maintaining our culture of respect for our customers and our employees is the key to success at SSL.

SM

Electric propulsion is a hot topic in the industry these days. Does SSL have an electric propulsion solution, and what does it mean to your customers?

John Celli

Yes, we offer an all-electric-propulsion satellite to our customers. We successfully introduced electric propulsion on our commercial satellites in 2004 with the use of Stationary Plasma Thrusters (SPTs) on MBSat. SPTs are used for station keeping with near daily firings. Since then, we have 13 satellites on orbit that use electric propulsion and these have logged more than 25,000 hours of on-orbit SPT operation without a single failure.

In addition to station keeping, electric propulsion can be used for orbit raising and can completely eliminate the need for bi-propellant to be carried on the satellite. For our customers, electric propulsion means a reduction in the mass of the satellite, since the usual bi-propellant fuel is reduced or completely eliminated. This translates into an opportunity to increase payload and generate more revenue, or fly as part of a dual-launch mission and reduce launch costs.

With an all-electric propulsion system, orbit raising takes longer. Depending on the mass of the satellite, it can take three to six months or more to put a satellite in its final orbit using all-electric propulsion. However, in some cases, the delay of putting the satellite into service is more than offset by the reduced launch vehicle cost or increased payload and long term revenue potential.

SM

Having supported various academic developments at the University of Rome while at Alenia S.P.A., you know first-hand how important STEM training is to develop a viable pool of professionals from which competent hires for crucial projects

can be made. How can our industry better support STEM within the middle and high schools as well as at the college level?

John Celli

I believe an introduction to science, technology, engineering, and mathematics (STEM) has to start at the elementary school level, and must focus not just on the education but also on building a passion for science and technology.

As I mentioned, the first lunar landing in 1969 was a great inspiration to me and helped direct me towards aerospace, but today's young generations don't have those historic programs to inspire them. Consequently, the industry needs to provide that inspiration, with people in the industry sharing their experiences and their enthusiasm for what they do.

Once students get interested in STEM, that interest and education can grow and continue throughout school, but we need increased funding to support the schools. SSL actively supports STEM through the American Institute of Aeronautics and Astronautics (AIAA) local outreach events and is a member of Change the Equation (CTEq), a non-profit, non-partisan, CEO-led initiative to move the U.S. to the top of the pack in science and math education over the next decade. I have also had the opportunity to speak at San Jose State University to encourage student interest in aerospace. The biggest key is to create that STEM interest early and not let the spark die.

SM

What crucial courses of training would you recommend for today's students and how can we better interest them in a career in SATCOM?

John Celli

Satellite technology and development involves almost all scientific disciplines, with the exception of biology. This includes physics, chemistry, and various engineering disciplines, such as electrical, mechanical, and materials engineering. Some schools are beginning to offer systems engineering courses, which focus on multiple engineering disciplines. This approach is particularly appropriate for our industry.

Artistic rendition of the Eutelsat 25B satellite. Courtesy of SSL.

As so many disciplines are useful within the field, a student shouldn't feel constrained to follow one specific path. Any student within the sciences should strive to be the best in whatever discipline they follow. Success in their chosen specialty will open doors for them in the satellite field.

Just as the industry must strive to encourage young students in STEM, we must also rely on experts within the field to share their experiences, their successes, and their passion with the younger generations to pass on the excitement for the satellite industry.

SM

Given your highly successful career, when you look back at your past experiences, which projects or missions truly bring a sense of satisfaction to you?

John Celli

The Intelsat IX program, for which I was Executive Director, was a satisfying project. It was challenging, both technically and programmatically. We had active participation, throughout the program, from several strong international partners: Alcatel, Astrium and Alenia. We worked hard to make sure everyone's concerns were heard and understood. In the end, it was incredibly satisfying to lead the SSL team to the successful completion of the program, building and delivering seven advanced communications satellites for Intelsat.

The greatest highlight in my career, though, took shape during difficult times for the company. During our bankruptcy in 2003, SSL created a team charged with identifying and designing the future of the company. We crafted a future for SSL with the premise that we could emerge from bankruptcy as a leader in the industry. We set high goals and charted the path to obtain them. I don't think I've had any greater satisfaction in my career than watching this company arise from those difficult times while meeting all the goals we set for ourselves. In 18 months we went from 1,200 employees to double that size and quickly grew to 3,000 employees, providing the community with jobs, and becoming the leader in commercial satellite manufacturing.

Most importantly, we proved to our customers that their trust in us was not misplaced, that we would offer them the most reliable, affordable spacecraft and space systems in the industry, providing the best workmanship, and the best partnership possible. I am proud to have been a part of the team that shaped SSL's future.

SSL's Most Recent Success

Space Systems/Loral (SSL) designed and built for Eutelsat Communications and Es'hailSat, the EUTELSAT 25B/ Es'hail 1 satellite (a photo of the satellite is located on the previous page.)

The satellite deployed its solar arrays on schedule following its launch, aboard an Ariane 5 launch vehicle provided by Arianespace, from the European Spaceport in Kourou, French Guiana.

"It takes more than a million man hours of dedication and hard work to build a complex satellite such as EUTELSAT 25B/ Es'hail 1," said John Celli, President of SSL. "It is always inspiring to see the product of this effort launched and performing on orbit. I'd like to offer my congratulations to Eutelsat and Es'hailSat on the realization of their vision for a new satellite to serve the Middle East and North Africa."

Based on the SSL 1300 platform, the satellite provides television broadcasting, telecommunications and government services in the Middle East and North Africa via a Ku-band payload. In addition, it has Ka-band capability to open business opportunities for both organizations.

"We are very pleased to see EUTELSAT 25B/Es'hail 1 performing its maneuvers as planned," said Michel de Rosen, CEO of Eutelsat. "The satellite will help us meet the growing demand for capacity in regions experiencing dynamic growth of digital services."

"It has been a very exciting experience to see our first satellite successfully launched," said Ali Ahmed Al-Kuwari, CEO of Es'hailSat. "I would like to thank all of our colleagues who have worked together to make this satellite a success."

The satellite will provide service from 25.5 degrees East longitude and is designed to provide service for 15 years or more.

Metamaterials: Transformative Technology For The Satellite Communications Industry

By Vern Fotheringham, Chariman + CEO, Kymeta Corporation +
Dr. Nathan Kundtz, Executive Vice President + CTO, Kymeta Corporation

I n the early 2000s, in a Duke University laboratory, a team of researchers began to explore ways to commercialize the application of a technology known as metamaterials. Just over a decade later, the satellite communications industry is seeing the benefits of this research.

Satellite antennas built using metamaterials technology are opening doors to new markets for the satellite communications industry and ushering in a new era of mobility. The technology will provide new communications solutions previously impossible with traditional satellite antennas.

The satellite communications industry, which has relied on a parabolic dish antenna infrastructure, is ripe for innovation. A tremendous variety of markets rely on the satellite industry to deliver connectivity around the planet, with users ranging from militaries to humanitarian groups, from maritime shipping lines to airlines and many more.

However, as the demand for broadband connectivity everywhere expands into highly mobile applications and requirements for higher bandwidth, new opportunities for forward-thinking innovators in the market are created.

Delivering Ubiquitous Broadband + Mobile Access

Ubiquity and mobility have been, and will continue to be, drivers of innovation for the satellite communications industry. While access ubiquity has long been the industry's forte, it is increasingly the trend toward mobility that poses a challenge.

Parabolic satellite antennas have provided reliable fixed connectivity for years, but many industries are seeing an increase in demand for mobile connectivity and are, therefore, seeking less expensive, smaller solutions designed for delivering the new generation high-speed connectivity that customers expect. Just as consumers become more and more connected to smartphones, industries—including major airlines, among many others—are becoming more dependent on satellite technology to deliver seamless broadband access anywhere on the planet.

Furthermore, the ever-increasing consumption of online data, driven primarily by over-the-top (OTT) video on services such as Netflix and Hulu, presents an extraordinary opportunity for the satellite communications industry to deliver a solution that goes well beyond the reach of wired infrastructure.

As the world moves into the ever more challenging environment of mobile communications and the need to be connected anywhere, the ability to deliver high-speed, low-cost connectivity to new markets has the potential to be the underpinning of a major transformation of the communications industry.

Metamaterials + Satellite Communications

In the context of these trends, our firm, Kymeta, is developing new metamaterials-based flat panel antennas.

Many people are misled by the term "metamaterials," and often ask to "see the metamaterial" itself. That is a misnomer, as the word refers to a field of study rather than to a singular piece of technology. Scientists have studied the application of metamaterials for more than 60 years, albeit without using the term itself, with research dating back to the 1940s.

Metamaterials use man-made materials to modify the performance of the electromagnetic spectrum to elicit capabilities that were not previously possible in nature. With the backing of Intellectual Ventures in Seattle, Washington, Dr. Nathan Kundtz (who had been a key contributor to the research team at Duke University) began exploring specific uses of metamaterials technology to create antennas that are able to dynamically steer a radio signal without any moving mechanisms. Instead, these metamaterials-based satellite antennas take advantage of a software-controlled panel which is capable of tracking satellites across the sky without any repositioning of the physical antenna.

These antennas are able to deliver the beam-steering performance of a traditional phased array antenna without expensive and power-hungry phase shifting components. The Kymeta antennas consume only a few watts of power—as opposed to phased array antennas of equivalent size that typically consume more than thousand watts.

The reductions in size, cost, power consumption and increased portability made possible by this technology open up a number of markets for the industry where traditional satellite antennas were difficult to integrate or have had particular disadvantages. As metamaterials-based technology continues to mature, interest in its potential is growing rapidly in a number of industries with a stake in improved connectivity.

Kymeta's mTenna^{TM} products simplify satellite connections needed for instant broadband service anywhere in the world, including mobile applications such as planes, trains, boats, and automobiles.

data rates up to 2Mbps and downlink data rates up to 20Mbps, at BGAN size.

Additionally, as the use of Internet-enabled devices, particularly mobile smartphones, becomes more commonplace around the world, there will be increasing demand for connectivity in remote and developing parts of the world. While metamaterials-based satellite receivers may not be suited for integration directly with smartphones, we're encouraged by the work of our partners Inmarsat and O3b Networks to expand broadband connectivity around the globe.

Automotive manufacturers have also taken notice of the potential of metamaterials-based satellite antennas. The automotive market represents an incredible opportunity for the satellite communications industry, as manufacturers look for new, more efficient systems to deliver critical firmware and software updates to cars on the move, as well as to power the infotainment systems becoming commonplace in automobiles. There are also opportunities to integrate metamaterials-based technology into personal communications inside the home, where flat-panel satellite antennas have clear applications for entertainment and broadband access.

The desire for innovative satellite communications solutions is evident in the excitement around the development of these metamaterials-based antennas. Organizations in industries including aeronautics, maritime and land transportation, energy and mining, global aid agencies and more have all expressed interest in the technology. A new era of metamaterials-based satellite antennas means access to new markets that were previously unavailable and a more sustainable future for the satellite communications industry.

For 20-plus years, satellites have beamed critical data to many parts of the world beyond the reach of wired

For example, flat, unobtrusive satellite antennas are a natural fit for the aeronautics industry as commercial airlines seek to provide higher levels of broadband Internet connectivity for passengers. We have an agreement in place with Inmarsat Global Xpress that was signed last March to build Kymeta antenna prototypes for commercial aircrafts. Similarly, the luxury yacht market, long plagued by bulky satellite antenna domes visible on top of the most sleekly designed yachts in the world, can benefit from smaller, low-profile satellite antennas that are essentially invisible on the yachts.

Another compelling use of this technology is in the delivery of broadband access to previously unreachable or underserved parts of the world. Our recently announced agreement with O3b Networks aims to develop beam steering fixed satellite antennas which track O3b's non-geosynchronous satellites as they move across the sky.

What's Next For Metamaterials?

The commercialization of metamaterials technology isn't without challenges. Like any new technology, there are obstacles to its acceptance and integration into established markets. When pioneering a new technology in any industry—from pharmaceuticals to 3D printing—many dynamics are at play.

Incumbent technology-makers often feel challenged, though in the case of metamaterials, applications lie largely in the gaps that incumbent technology cannot fill. However, the evolving needs of the marketplace, evident in trends toward ubiquity and mobility, have created significant demand for new satellite communications solutions from the industry and its customers. This has meant that obstacles to mainstreaming metamaterials-based technology are far outweighed by widespread industry excitement over the technology's potential.

One particularly exciting use of this technology is in the field of personal connectivity. Kymeta is developing a Portable Satellite Terminal roughly the size of a laptop computer that would enable true portability and satellite connectivity where such has not been possible before. We are fond of saying that these portable terminals are capable of delivering VSAT-type performance, with uplink

infrastructure, but oftentimes the cost and power needs of satellite receivers was prohibitive to creating truly ubiquitous connectivity, while the size requirements of most antennas prohibited significant mobility in satellite communications.

With these new solutions based on metamaterials technology beginning to emerge, we envision an industry that will continue to deliver leadership in bringing far-reaching broadband communications to the world over. With new, portable and less expensive antennas, we are poised to see a communications ecosystem where being connected, anywhere, is a reality.

For further information about metamaterials and Kymeta, please access the company website at this direct link: ***http://www.kymetacorp.com/***

About the authors
Vern Fotheringham has been a serial entrepreneur in the broadband wireless and satellite communications industry for over 25 years. He has created and built numerous successful ventures and contributed to large scale projects for major service providers, system vendors and software solution suppliers. He has also been a public policy and regulatory advocate for new telecommunications service rules and standards, and an inventor and creator of now globally adopted standards, innovative new products and services. Previously he was the President and CEO of ADAPTIX, Inc., a world leader in the development of the OFDMA technology that is now the core of the Mobile WiMAX and LTE broadband radio systems.

Dr. Kundtz has an M.S. in electrical engineering and a Ph.D. in physics from Duke University. Dr. Kundtz has authored or co-authored numerous peer-reviewed publications in the field of metamaterials and beam forming antennas. His research has centered on the application of advanced concepts such as transformation optics to real needs and benchmarking the performance of such devices.

Executive Spotlight
Scott Sprague, Chief Commercial Officer, NewSat Limited

Scott Sprague has more than 30 years senior management experience in the satellite and telecommunications sectors. With responsibilities spanning global sales, marketing, operations and customer service, Scott has held senior positions at KPNQwest, Infonet Service Corporation and AT&T, before moving into the satellite sector as Senior Vice President of Global Sales for SES. At SES, Scott was responsible for leading sales teams and growing global revenues across media, enterprise and government verticals around the world.

Scott holds an Executive MBA in International Business from Western International University and a BS degree in Business Administration from Illinois State University. Most recently, Scott was based in Hong Kong as the Chief Operating Officer of Asia Broadcasting Satellite (ABS). Here Scott was responsible for managing the global sales, marketing, technical support and operations of value-added services.

Relocating from Chicago, USA, Scott joined NewSat in Australia in June 2013. With his extensive satellite knowledge, leadership and management experience, Scott will be a key contributor to NewSat's future growth. Scott's proven track record leading global satellite sales, marketing and customer service will drive new business and market share, while greatly assisting NewSat as the company transforms into a global satellite operator.

SatMagazine (SM)

Mr. Sprague, would you tell the readers about your background and what lead you to a career in the satellite industry?

Scott Sprague

I have held senior positions at KPNQwest, Infonet Service Corporation and AT&T, before moving into the satellite sector as Senior Vice President of Global Sales for New Skies/SES. At New Skies/SES, I was responsible for leading sales teams and growing global revenues across media, enterprise and government verticals around the world.

More recently, I was based in Hong Kong as the Chief Operating Officer of Asia Broadcasting Satellite (ABS). I was responsible for managing the global sales, marketing, technical support and operations of value-added services.

SM

You recently joined NewSat—what prompted your decision?

Scott Sprague

I have known the NewSat team for more than 10 years. Initially when New Skies sold NewSat the Adelaide and Perth teleport facilities, and then as a customer for capacity over the Middle East and Asia Pacific.

SM

From the experience derived from your most recent decision making roles, what do you hope to bring to NewSat?

Scott Sprague

With my extensive satellite knowledge and strategic management experience, I hope to greatly assist NewSat's next phase of growth and future business success. With recognized capabilities to lead global satellite sales, marketing and customer service, I intend to drive new business, increase the company's market share, and support NewSat's transformation from a teleport operator into that of a global satellite operator. I am also keenly aware of the need to support our customers. My main goal will be to sustain and enhance the already strong "customer first" approach that NewSat brings to the market.

SM

What are your thoughts regarding the satellite communications industry in Australasia? What new programs can APAC expect from your firm over the next few quarters?

Scott Sprague

I believe the recent CommunicAsia 2013 truly highlighted Asia's focus. The region must drive sustainable growth in an already crowded sky; the need to innovate; increasing customer demand for capacity; and offset the ever diminishing spectrum. The emerging economies with growing middle class incomes are also demanding capacity, due to heavy bandwidth mobile applications and ever-increasing broadband system requirements.

NewSat has a matched focus on mobility, heavy bandwidth application requirements, Ka-band and meeting demand efficiently, as Asia-Pacific becomes more and more competitive with the markets in China, India and Indonesia continuing to grow.

We are definitely excited about the launch of Jabiru-2 in late 2013. This satellite will provide fresh capacity over Australia, Timor Leste, Papua New Guinea and the Solomon Islands. With more capacity, we will be able to provide for greater mobile resource exploration as well as be able to meet larger bandwidth application

requirements. We will also be more effective in supporting the ongoing operations of enterprise and government in the Australasia region.

SM

2013 has been quite an exciting year for NewSat so far—can you tell us a bit about what has been happening?

Scott Sprague

It has, indeed, been an exciting year and a great time to be with NewSat. In example, the US Ex-Im Bank and COFACE finalized US$611 million in funding commitments for Jabiru-1, the launch of Jabiru-2, as well as the continued success of the base teleport business and the plan for future Jabiru satellites.

NewSat is growing at a rapid rate. We are reiterating our customer focus; expanding into new regions where demand is growing; listening and nurturing our loyal customer base; and also looking at ways to help new customers with their communications requirements and, in turn, their business successes.

SM

Australia's first commercial Ka-band satellite, Jabiru-1, is currently under construction. How is this project progressing? What does the launch schedule look like, as of this writing?

Scott Sprague

Jabiru-1 construction continues with satellite manufacturer, Lockheed Martin, after successful completion of their Preliminary Design Review (PDR) last year. The resident Jabiru engineering team in Newtown Pennsylvania, USA, along with NewSat CTO, David Ball and Lockheed Martin, recently completed a series of technical interchange meetings regarding key satellite subsystems. The meetings demonstrated excellent progress. Construction continues on schedule for satellite delivery and launch in 2015. Critical Design Review (CDR) remains on schedule to be concluded before the end of 2013.

SM

You also have the launch of Jabiru-2 quite close at hand; can you tell us more about this satellite? Why is Jabiru-2 so important to your company and to potential users?

Scott Sprague

Jabiru-2 will provide "new" Ku-band capacity across Australia, Timor Leste, Papua New Guinea and the Solomon Islands. Supplying hot zones over the Pilbara, the Kimberley, Western Australia's North West Shelf, Timor Gap, Timor Leste and Papua New Guinea, Jabiru-2 will satisfy the growing demand for high bandwidth connectivity and cost-effective communications for oil, gas, mining, media, carrier-grade telecommunications and government sectors.

Jabiru-2 further strengthens NewSat's position as the leading satellite communications company servicing the mining and exploration sector and we are excited as the satellite will provide fresh capacity over Australia.

Jabiru-2 is scheduled to launch in 2014 and will further enhance the profitability and growth of NewSat's base teleport business. Providing for mobile exploration and larger bandwidth application requirements, Jabiru-2 will help to support the ongoing operational efficiency of the Australian mining and oil and gas sectors.
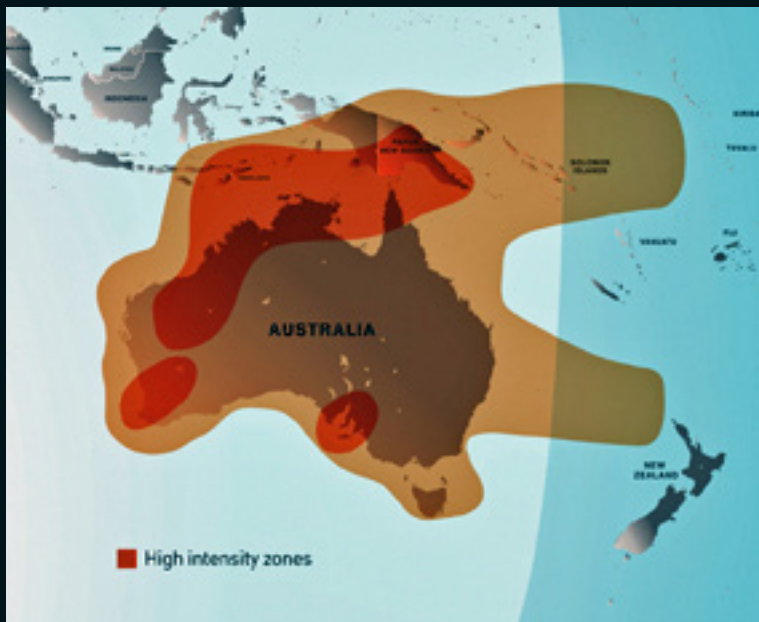
SM

NewSat has a solid teleport business; can you tell us a bit more about this NewSat business?

Scott Sprague

NewSat won a number of significant projects to provide satellite communications to oil, gas, mining, construction, maritime, aeronautical and government markets, across Australia, Asia and the Middle East this year. New contracts represent a growth rate of 28 percent when compared to the same period last year and are incremental to NewSat's existing contract base.

NewSat's Perth teleport. Photo courtesy of NewSat.

Jabiru-2 will deliver 216 MHz of capacity, providing highly focused Ku-band coverage, to satisfy the demanding communication requirements for resource projects in and around Australia.

NewSat continues to achieve excellent customer retention rates due to its high levels of service and support, culminating in over 99.99 percent teleport up-time. The contract with BAE Systems to provide satellite communications for the Wheatstone Project, one of the world's largest LNG projects located in the North Western region of Western Australia, was a major achievement for NewSat.

Our teleports continue to reinforce their global reputation for engineering excellence, with fifth place ranking in the global "Fast Twenty" of 2012 and also featured tenth in the Independent "Top Twenty" of 2012. NewSat was also awarded Top 3 Finalist for "Satellite Provider of the Year" in the ACOMM Awards, a collaboration of Communications Alliance and Communications Day, recognizing excellence in Australian telecommunications.

We have also recently acquired land that is adjacent to our Adelaide teleport. This doubles our size and presence in South Australia. This facility expansion will include a number of large antennas, the Jabiru satellite control facility and Jabiru customer support center, upgraded power systems and generators, as well as other enhancements to security and equipment, which are essential for providing services to defence.

SM

What are your thoughts regarding hosted payloads? Given NewSat's recent appointed of Mr. Don Brown as a Senior V.P. of Strategic Planning, with his previous position being that of V.P. of Hosted Payloads at Intelsat, can we envision a leading role by your company in this area? How will such be implemented?

Scott Sprague

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

SM

Another area of great concern throughout the industry is interference—how does, or will, NewSat work to counter these communication threats?

Scott Sprague

NewSat is committed to working with other satellite operators on this most important issue. As an industry, it is crucial we do everything possible to ensure we can provide the highest quality service possible to our customers—this means we must deter and eliminate interference interruptions to service.

SM

The hiring of properly trained professionals to lead and work on crucial projects is being somewhat hampered due to educational systems not properly preparing students for roles in the satellite and space industries. How can the industry, and NewSat in particular, assist middle and high schools and colleges to bring more STEM coursework into their programs? How can the industry encourage career

paths within our various market segments?

Scott Sprague

NewSat's senior management, including Chief Technology Officer, David Ball and myself, are actively involved as thought leaders in the satellite industry, contributing to other university programs, industry groups and leadership panels. We need to inject the excitement of space back on the agenda for mainstream media, here in Australia.

Being involved in programs such as the Southern Hemisphere Summer Space Program that NewSat participated in earlier this year asserts NewSat's commitment to addressing an area of concern for the satellite industry. In general, there is a world-wide shortage of trained professionals and with the industry growing at an astounding pace, satellite and space companies are finding it more and more difficult to find appropriate candidates to fill critical seats throughout all divisions of work. NewSat is committed to assisting in this regard and believes that programs such as the program run by the University of South Australia and International Space University are excellent platforms for those interested in pursuing careers within the space and telecommunications industries.

NewSat is also actively involved, and presented at, the Australian Space Development Conference, Aerospace Futures and Australian Youth Aerospace Association Careers Evening in Victoria. We need to focus on developing a student's skill and capabilities from the bottom-up to ensure the continued drive for professional technology development in various market segments as well as the motivation to be at the forefront of space innovation.

SM

You have more than 30 years' experience in the satellite and telecommunications industry, including senior management roles at SES and ABS. What have you observed as the biggest challenges and opportunities the satellite industry has faced so far?

Scott Sprague

The biggest challenge is for the satellite industry to stay aligned with customer needs. We need to be flexible and responsive when supporting our clients. This is on the technical and commercial side of the business. Our customers' business models are changing and we need to change with them. The old way of thinking and the old business models no longer work when supporting our clients on a global basis. If we don't continually change, we will be displaced by other communication technologies.

SM

When you look back at your career, what project or projects truly bring a sense of satisfaction to you?

Scott Sprague

There is not a specific project that I would point out. However, rather being part of a team that over a short period of time evolved into one of the most customer focused organizations in the satellite sector. I am confident that the customers of New Skies would echo my feelings. As I move forward with my new role at NewSat, I do so with the conviction that all of the NewSat employees will also place our customers where they deserve to be — first.

About NewSat
*NewSat will be expanding its satellite capabilities with the Jabiru Satellite Program, starting with the launch and operation of Jabiru-1, Australia's first commercial Ka-band satellite. Jabiru-1, a large next generation satellite, will provide superior coverage over South East Asia, the Middle East and North Africa. Jabiru-2, also scheduled, will deliver enhanced coverage over Australia, Timor Leste and Papua New Guinea. NewSat has rights to eight premium orbital slots and its fleet of next generation geostationary satellites will lead Australia's space quest. For more information, please visit **www.newsat.com**.*

Jabiru-1

High-powered Ka-band coverage over the Middle East, Asia and Africa

Meets the growing demand for "new", flexible and secure capacity from government, resources and carrier-grade telecommunications markets, in these high growth regions.

Jabiru-2

Highly targeted Ku-band coverage over Australia, Timor Leste, PNG and Solomon Islands

Satisfies the growing demand from oil, gas, mining, media, carrier-grade telecommunications and government markets for cost-effective communication solutions in and around Australia.

Jabiru-3

High-powered Ka-band coverage over Africa, the Middle East, Asia and Europe

Meets the increasing demand for large bandwidth capacity from resources, government and carrier-grade telecommunications markets, throughout the world's most rapidly growing regions.

Jabiru-4

High-powered Ka-band coverage over the Pacific Ocean region

Addresses the increasing demand for fixed and mobile satellite capacity, from naval, maritime, government and carrier-grade telecommunications markets, to aid the delivery of anywhere-anytime communications.

Jabiru-5

High-powered Ka-band coverage over the Americas and Western Africa

Satisfies the emerging demand from oil, gas, mining, government and carrier-grade telecommunications markets, for high bandwidth satellite capacity, from the next generation of resource rich countries.

Jabiru satellite program global coverage plans

Focus On...
Remote Communications For The Mining Industry

Nearly 2,000 delegates converged on Australia's mining capital Kalgoorlie recently for Diggers and Dealers 2013. The event highlighted a focused optimism for Australia's resources growth and was a perfect opportunity for NewSat to announce that the launch of the satellite Jabiru-2 is not far away. Expected in orbit in late 2013, Jabiru-2 is focused on the communication requirements of the Australian resource industry.

NewSat's Senior Vice President of Global Sales, Andrew Matlock, who was in Kalgoorlie for the three day event, said, "We are very excited by Jabiru-2 as it has fresh capacity over Australia. Providing for mobile exploration and larger bandwidth application requirements, Jabiru-2 will help to support the ongoing operations of the Australian mining sector."

Fresh Capacity

NewSat's new Ku-band satellite Jabiru-2 will deliver further enhanced coverage at 216MHz capacity to satisfy the demanding communication requirements for resource projects in and around Australia. Jabiru-2 is designed specifically for key resource regions in the Pilbara, Kimberley, North West Shelf and Timor Gap.

The availability of high-powered satellite capacity, which will provide more efficient solutions to support large bandwidth applications over these hot zones, is essential for the operational efficiency, employee productivity and future evolution of the resource industry.

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

Auto-tracking For Efficient Exploration

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

Jabiru-2 intensity zones coverage

Jabiru-2

NewSat's self-contained quick deploy communication units can be towed anywhere, establishing instant broadband connectivity within minutes

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

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

Remote Mine Site Evolution

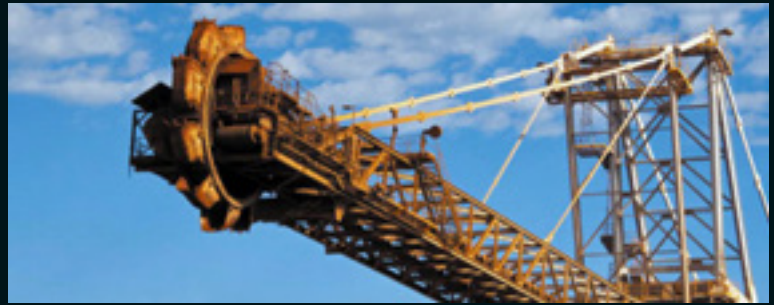Satellite communications has played an increasingly important role in remote site evolution; from initial mobile exploration to complex mine site operations. Satellite communication infrastructure supports mining operations from on-site office requirements and welfare services, to remote asset monitoring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

NewSat has already partnered with one resource company, Atlas Iron, who are an independent Australian iron ore company based in Western Australia. NewSat is providing Atlas Iron exploration teams with satellite communications trailers that deliver instant mobile broadband whenever and wherever their assignments may be.

The satellite trailers give Atlas Iron teams the freedom to tow their communications infrastructure for immediate connectivity at various stages of mine-site exploration and construction. The VSAT dish readily deploys and aligns with the relevant satellite, providing instant connectivity including Internet connectivity, real-time data transfer, video conferencing and information-sharing, thereby maximizing efficiencies in iron-ore discovery.

New Australian Mining Landscape

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

For further information, access NewSat's Mining Industry Flyer infopage at:
http://www.newsat.com/Industries/mining.html

The first trailer deployment at Atlas Iron's Mt Webber site which is now a construction site

Meeting The Challenges Of Satellite Testing

By Beate Höhne, Agilent Technologies

Around the world, the demand for information anywhere and anytime continues to grow in commercial and military applications. While the previous decade focused on mobile communication, the current decade is focusing on mobile broadband. Today's theme is "access to everything, everywhere," and the growth in users and devices is driving tremendous growth in the demand for broadband data.

To support this growth, satellites are a critical part of the infrastructure. One way to ensure an increase in broadband access is to place new satellites in orbit, and industry watchers are forecasting an increase in launches. Putting a new bird in the air presents numerous challenges. In particular, the need to ensure interoperability between new and existing communication links. Such links may be required between terrestrial and space-based communications or between satellites and multiple types of military radios.

As an alternative to placing more satellites in orbit, the capacity of existing satellites can be enhanced. New modulation techniques make it possible to pack more information into the existing transmission bandwidth, and this enables higher data rates and thereby an expansion of overall system capacity. As an example, using 16QAM and 1 GSymbol/s can provide a 4Gb/s data rate.

For new or existing satellites, a link involves the transmission of a signal from an Earth station to a satellite. The satellite receives the signal, amplifies it and sends it back Earthward. Stress testing of these links requires long data transmissions that include changes to various signal parameters.

All of this presents significant challenges in the creation of the test signals that are needed to exercise satellite receivers. Today, few instruments are capable of satisfying the need for high-quality signals, on-the-fly changes and long playback times.

Outlining The Desired Test Setup

On the receiver side, the first item in the test setup is an arbitrary waveform generator (AWG), which can simulate the necessary modulated signals. Next is an upconverter, which translates the modulated signal upward to the required RF frequency.

Measurements on the transmitter side benefit from two devices: A signal or spectrum analyzer and a wideband oscilloscope. Either of these may be enhanced with vector signal analysis (VSA) software that provides the necessary demodulation capabilities and essential measurements such as error vector magnitude (EVM). *Figure 1* shows an example setup that can be used to test satellite receivers and transmitters.

Understanding Typical Signal Types

A new generation of high-speed AWGs provides several advantages in satellite testing. In addition to being highly versatile, current-generation AWGs continue to move upward in bandwidth while also providing good signal quality due to high vertical resolution.

This suggests an initial question: Is an arbitrary waveform generator a good choice for stressing a satellite link to its limits? In the satellite system, the main goal is to squeeze as much data as possible into the spectrum. This calls for high spectral efficiency, which measures the throughput in an assigned bandwidth expressed as bits- per-second per hertz. One technique that provides high spectral efficiency is quadrature amplitude modulation (QAM, because it uses combinations of amplitude and phase, QAM can transmit more bits per symbol.

During satellite testing, the use of QAM requires ongoing changes to amplitude and phase, especially when characterizing sensitivity. To support such tests, the AWG needs to allow a high order of modulation, and QAM1024 is possible with new-generation instruments (*please see Figure 2 on the next page*). A QAM1024 signal can be represented in 10 bits/symbol. The 1024QAM measurement highlights the value of an AWG with high signal quality. For example, precise positioning of different points is critical for high-order modulations. On the receiving side, demodulation becomes difficult in the presence of noise, which is always present in real-world wireless environments.

Another useful modulation technique is orthogonal frequency domain multiplexing (OFDM), which is widely used in communication systems. A transmission channel is split into several subcarriers, and combining subcarriers with standard modulations provides both a high data rate and little or no crosstalk. As subcarrier frequency and spacing are orthogonal to each other, the spectra don't interfere with one another.

By adding subcarriers, the signals become flatter—and a larger number of subcarriers brings the signal closer to being ideal (*please see Figure 3 on the next page*). Because OFDM is sensitive to variations in carrier frequency, it transmits pilot carriers along with the subcarriers for synchronization at the receiver.

Figure 1: This four-instrument test setup enables testing of both receivers and transmitters.

Figure 2. This trace shows a 1024QAM, 3Gbd optical transmission generated by the Agilent M8190A.

Constellation

15 subcarriers

31 subcarriers

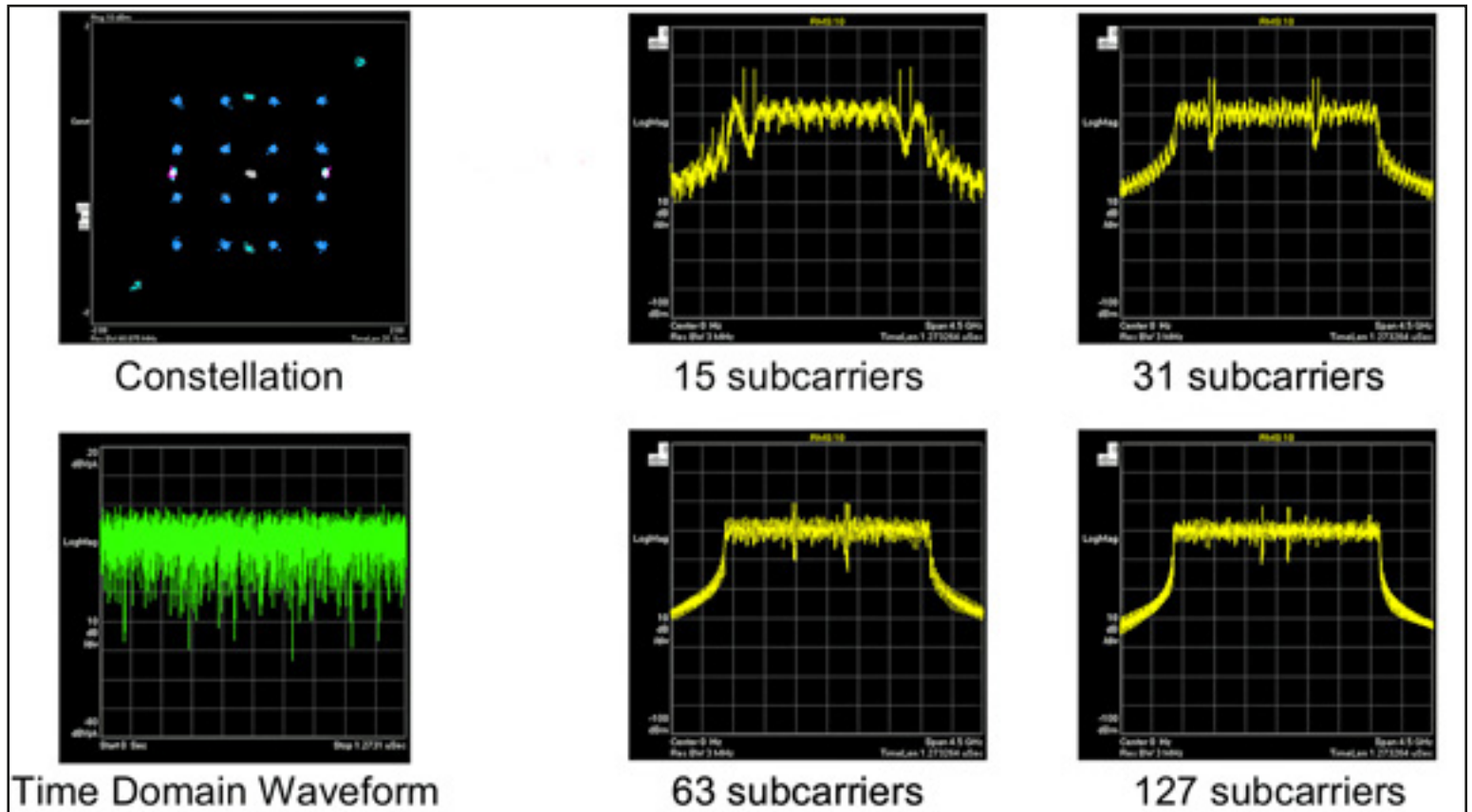Time Domain Waveform

63 subcarriers

127 subcarriers

Figure 3: This OFDM signal, which has QAM16 modulation, a different subcarrier and two pilots, was generated by an Agilent M8190A AWG.

OFDM has a high spectral efficiency due to the close spacing of the individual carriers. The method is robust in the presence of interference and noise because the loss of an individual carrier is not fatal to the entire transmission. Any loss can be recovered through its error-correction algorithm.

When both the transmitter and receiver are moving, high reliability is needed. In such cases, OFDM seems to be a perfect mechanism because it mitigates the problem of multipath propagation.

Last but not least, the complexity of OFDM makes unauthorized demodulation virtually impossible. The reason: OFDM signals can contain different encoding, mapping types, preambles, payloads and numbers of subcarriers.

The use of OFDM does have disadvantages. For example, an OFDM signal has a high peak power ratio, which requires linear amplification and test instruments that have high dynamic range.

Taking A Closer Look At The AWG

To generate the required signals, an arbitrary waveform generator must have sufficient resolution to produce modulated signals with high dynamic range. Playtime is another important consideration. Testing a receiver within one transmission link can be done either within a short test or with a long playtime. In the past, the answer was adding more memory to the instrument. In truth, though, there is never enough memory.

This is one reason why many high-speed AWGs provide a huge amount of memory; however, the actual possible playtime depends on several factors including the nature of the signal itself. For example, assume a 50GSa/s signal and 16GSa of built-in memory: this equates to just 320ms of playtime. Unfortunately, required measurement times are typically minutes in duration. Adding sequencing capabilities can extend the available playtime, and a sequencer that supports repetitive signals can achieve an essentially endless playback time.

What if the test scenario requires unique signals in different scenarios? Standard AWGs certainly have limitations. A generated signal is downloaded into AWG memory and then sent to the DAC output. Whenever the signal must be changed, the measurement must be stopped. This is a crucial point if the test scenario requires a data stream that is both constant and variable. One reason: stopping the measurement also means stopping the transmission link. As a result, it isn't possible to produce the continuous real-life signal scenarios needed to perform long stress tests.

Agilent recently added digital up-conversion to its M8190A, which overcomes the typical AWG limitation. Now a test engineer can make on-the-fly changes to parameters such as amplitude, frequency and phase without restarting the AWG. Thus, permutations of an existing signal are possible without stopping the measurement or the transmission link.

This is possible because signal parameters are stored independently of the waveform itself. As a result, they can be changed by the sequencer during runtime. Specific to satellite testing, this enables accurate testing of channels and transmitters by ensuring that amplitude and phase won't drift or degrade over time.

Playback time is also a very important topic for satellite applications. Test instruments provide a sequencer, which enables long play times for repetitive waveforms. The M8190A supports streaming to enable continuous or ongoing output of changing waveforms. The source can be an uninterrupted data stream from a disk or an algorithm, or it can be data downloaded to memory from an external digitizer or oscilloscope while the AWG outputs the signal.

For some tests, simply outputting an ongoing and changing waveform might be sufficient. However, in other cases it is important to have control over the timing. This can be used to help precisely pinpoint the cause of a problem. In other cases, it may be useful to react dynamically to real-time events and change the waveform as soon as an event occurs. The M8190A provides streaming modes for deterministic timing as well as support for dynamic signal scenarios.

Enhancements Required To Address New Technologies

The goal of packing more data into existing satellite bandwidth can be achieved with complex modulated signals. Addressing these new technologies requires enhancements to satellite hardware and the instruments used to test it. AWGs can keep pace with the new requirements if they continue to advance in signal quality, frequency and memory, and include or support functionality that extends playtime.

About the author
Beate i is the Product Manager, Pulse Pattern Generators, Digital Test Division within the Electronic Measurements Group. She designs and implements marketing strategies for the most comprehensive pulse and data generator product portfolio for Agilent Technologies' Digital Verification Solutions Division. Beate is responsible for the marketing activities along the entire product life cycle. Beate joined Agilent Technologies (formerly Hewlett-Packard) in 1989 as a consultant in the computer business. During her 16 years with Agilent, she held various positions within marketing including strategic product and business planning within the Network and System Management Division, sales development for a start-up business within Agilent, and is also the Marketing Manager for an OEM Business that is focused on customer relationship management. Beate was born in Paderborn, Germany in 1965 and holds a degree in Business Computer Science.

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SatBroadcasting™
Ultra HDTV Now In Extremely Sharp Focus

By Chris Forrester, Senior Contributor

The recent Amsterdam IBC was dominated—in more ways than one—by 4K/Ultra-HDTV (3840 x 2160 pixels). Booth after booth showed off their latest equipment, and the 4K screen sizes seemed to grow to quite breathtaking proportions—and strong hints that, by the time of CES in January, their prices might even be affordable!

What was also fascinating was how many broadcasters were happy to talk about their own plans for incorporating 4K transmission into their schedules. No firm dates were given, of course, but you could sense from their testing and experimenting that they were not investing this cash on a mere whim.

The fact was that IBC was simply awash with test transmissions. The word from some exhibitors is that Europe will see regular 4K transmissions within 18 months, or perhaps sooner. SES on September 12 announced a pair of Ultra-HD channels using High Efficiency Video Coding (HEVC) for IBC. One of the channels, set up with Fraunhofer HHI, was broadcasting HEVC at much higher frame rates.

Ferdinand Kayser, SES' CCO, in a press briefing at IBC said, "Europe will be an early adopter of Ultra-HDTV and with around 111m displays in use by 2025." He added that SES expected Europeans' preference for ever-larger screens would make Europe "the most attractive market" for early UHD channel launches. Quoting IHS Electronics & Media data, he said UHD display sales were already being made in modest numbers but would ramp up in 2014 and 2015 and would—in Western Europe—achieve 37 percent penetration by 2025.

Eutelsat and Intelsat were also showcasing 4K at IBC. Just about every heavyweight hardware, software and display vendor was also demonstrating a 4K kit. Japan's NHK also showed its Super Hi-Vision 8K transmission system and was happy to talk about the impact this technology would have on the 2020 Tokyo Olympics.

Eutelsat used IBC to announce that one of its key broadcasting clients, NTV Plus, would use the upcoming Russian Sochi Olympic Games to transmit 4K images to cinemas and public viewing areas.

Intelsat also showcased their technology, attracting a huge crowd for a live

transmission (brought to IBC by Globecast) of a rugby match that was also shown in the Ericsson, Sony and Intelsat booths on a variety of UHD displays that included a JVC, seven-foot, 4K UHDTV and a Sony, 6-meter projection setup.

UK broadcaster BT sent the rugby match signals from three Sony F55 4K cameras to a vision mixer, which were then sent to Ericsson AVP2000 encoders and RX8200 advance modular receivers. After encoding, the signal was transmitted as a 100Mbps video from BT's Global Media Network to Intelsat's Point of Presence (PoP) in London, then hopped to the IntelsatOne terrestrial network to Intelsat's teleport in Germany.

From Germany, the signal was uplinked to Intelsat's Thor6 bird and delivered to a 2.4m dish situated on the roof of the RAI Convention Center. The result was a picture of stunning clarity that, quite literally, stopped booth visitors in their tracks.

"This was a live production and we wanted to do it with technology that would show what the capabilities of 4K are," said Matthew Goldman, SVP/Technology for Ericsson. "If you're going to wow people with something new, why go to 4K if you're not going to show the immersive technology. It has four times the spatial resolution, twice the temporal resolution and is 10-bit precision. When we talk about how beautiful HD is when compared to SD, the experience we had on the floor reminded me of what it felt like when I first saw HD in a production. This [UHD demo] made HD look like SD," he added.

Leading the European charge is Sky Deutschland, and its 4K session lined up SES, Pace, Harmonic and Sony TV to show off the technology. Also presenting was US broadcaster 3net, which is already investing in 4K new productions for TV, including its flagship production 'Space' as well as other factual programming in 4K.

Sky Deutschland's CEO Brian Sullivan maintained the same enthusiasm for 4K that he showed at IBC a

4K Live Transmission via ASTRA

year ago. He said, "There has been a huge amount of progress during this last year although mostly driven by the industry rather than broadcasters. We have to deliver these technologies to the consumer and they need to be reliable, and cost-effective. We will be continuing on this path for the next year or three. But this doesn't mean that things will take that long to materialize. You don't always wait until a technology is fully developed [to bring it to market]. We take risks and we have to create the market."

Sky Deutschland's SVP/Technology has described the importance of the new Ultra HD technology to the payTV platform's armory. Gerard Duffy told a Cisco press lunch that the ability of Ultra HD to screen multiple views in high resolution, alongside a main high definition (HD) screen, was as important as the picture resolution itself.

"4K is central—being able to do that offers another potential—it's not just the picture quality but the other things the platform can do," said Duffy. He explained how the launch of an Ultra HD service might be used to renew the set-top box (STB) inventory that, in turn, offered a whole new opportunity that could be used to bring extra value to the customer proposition.

However, he cautioned that there needed to be a strong element of backwards compatibility. "You can't just rip up the platform every three years and start again." Sky Deutschland has used technology, much of it from Cisco and its predecessor, NDS, to make its mark after years of payTV stagnation. Forty percent of new subscribers come from recommendations, with total subscriber numbers now standing at three-and-a-half million.

Indeed, the Sky Deutschland efforts on 4K were highly visible. One session, a popular 'Beyond HD' presentation, showed off Sky-D's impressive test footage, with Stephan Heimbecher, the broadcaster's head of innovations and standards, suggesting that 50/6 fps was a minimum for sports coverage in 4K.

Tom Cosgrove, president/CEO of 3net Studios, showcased 'Space,' a CGI production now being wrapped in 3D, 4K, and eventually set for IMAX release. "We have 20 hours of 4K production underway. We might argue that we are at the beginning of the production chain, but we are also at the end, and what each of us has to remember is to ask whether the viewer is having a good experience in the home. Our goal is to provide that top-notch experience and help drive the sector."

Harmonic's Ian Trow (senior director/emerging technology) said that while there had always been a drive to improve resolution, and that cinema resolution at 24fps had more than satisfied cinematographers and audiences, attempts to push that to 48fps had left some audiences unhappy. "The real litmus test for us all is whether 4K migrates from the very high-end 'man cave,' where the biggest and best might dominate, and into the mass-market living room. That move depends on more than pixels—frame-rate, bit-depth, color imagery—so that we can genuinely manage rapid motion."

Thomas Wrede, VP/reception systems at SES, while recognizing that there was still much to do, also argued passionately for urgent progress to be made on a branding campaign for retailing 4K displays in order not to confuse or disappoint the buying public. "We at SES love innovation and are already showing 4K on satellite. We must all support HEVC, which I believe is the absolute DNA of 4K as this allows high-quality transmission within 20Mb/s of transponder space. We all recognize that satellite is the natural first step for 4K. But as an industry we must ensure that UHD is a true improvement in the TV experience. We must work beyond just the addition of pixels."

Sarah Simon, media analyst at Berenberg Bank, in a note to clients in September, reminded them of Sky-Deutschland's

past work, saying, "SkyD first experimented with Ultra HD with a test broadcast of the FC Bayern Munich vs Borussia Dortmund football match in December 2012 and is gradually approaching full Ultra HD live production capability."

Brian Sullivan, SkyD's CEO pictured below at IBC 2013, expressed his view that Ultra HD is set to be transformational. He said, "This is an exciting time in our industry. There are so many new and innovative ways for customers to access and enjoy content, and Ultra HD—while still at an early stage of development—is one of the most promising." SkyD management has previously said it expects at least half of the current portfolio of 65 HD TV channels to be showing 4K content within five years of launching a dedicated 4K channel.

Simon's bottom-line advice, and the impact 4K might make on satellite operator SES, states: "We believe Ultra HD could launch commercially as early as 2015. In our view, SES will be first to reap the benefits given its exposure to the UK and German markets—the two countries which seem likely to be early adopters, along with the U.S., which market accounted for 23 percent of SES's 2012 revenues."

Also showing confidence in 4K was Cisco Yves Padrines (VP/Service Provider, Video, EMEAR) who had no doubts. "I can tell you that some broadcasters are looking very enthusiastically at 4K, and for it to start as soon as possible, and within the next 18-24 months. 2016 is going to be an important year for 4K."

Caution Urged

That 2016 date cropped up from many participants, and the Rio Olympic Games is bound to motivate 4K display buyers into the stores. But there were some opposing views. 'Viewers can't tell the difference between HD and 4K—they won't pay a premium for it and there are much better uses of spectrum.'

This was a motion introduced into the Great Quality Debate, at IBC, and asked 'Do we really need to go beyond HD?' In a closely fought contest—which was only narrowly won by the opposing motion, the BBC's head of technology for HD and 3D, Andy Quested, presented the case in favor of the technology—arguing that Ultra HD would bring "an emotional quality" to big events such as football.

"Soccer is more than a game of two halves—it's about the emotion and seeing the entire field of play continuously. It's about the position of every player on the pitch and what the linesman is doing. It's about the sweat on goalkeeper's face and the faces in the crowd as a goal goes in… I want to be in the image, be part of the image and have a real sense of presence."

Dr. Giles Wilson also waved the flag for Ultra HD from a business perspective. "In trials capturing sports in ultra HD, we always see the same reaction—the 'wow' factor—people talk about how real it seems, the added depth and how it feels like 3D but it's not. They talk about the color, the sense of presence. Can we afford not to go Ultra HD? Consumers will always go where the compelling experience is to be found."

Sochi Olympics in 4K

Russia's NTV Plus payTV operator will broadcast 4K material from this winter's Sochi Olympic Games (March 7-16, 2014). Oleg Kolesnikov, CTO at NTV+, speaking at a special Eutelsat 4K event at IBC, told delegates that the transmissions would go to public viewing areas and cinemas.

"We have already been testing 4K in July in readiness for the Olympics and we very much want to demonstrate the technology to Russian viewers. Our tests were with the H.264 mosaic cluster of four images using Canon cameras and Ericsson encoders, and Eutelsat satellites. As an intermediate solution this works but we need to move forward so that the complete image is encoded in one go. We have planned for other tests this autumn, but will be using HEVC technology."

Lush tree foliage at the Panasonic 4K booth—in 4K.

However, ad man Rory Sutherland, vice chair of the Ogilvy Group in the UK argued that, like 3D, the human brain can only perceive a marginal difference between HD and 4K. He said, "The additional resolution would not add much at all—and people won't pay a premium for it. It's just like there is something about human psychology that really doesn't enjoy 3D. If you cover up one eye you do not become shocked by how flat the world is," he argued.

For media journalist Ray Snoddy, Ultra HD was a "technological inevitability"—but it was all a matter of timing. As well as "not being the best use of spectrum," he argued that introducing 4K when the majority of consumers were still enjoying their HD sets would be "premature ejaculation that would leave everybody in a sorry mess." He added, "My Sony Bravia is staying firmly screwed into the wall for the next five years."

Pixel Quality

There was also disagreement about bit-depth, considered to be of crucial importance in the battle for 'better pixels', and not just more pixels. The minimum bit depth recommended by Digital Europe (a trade consortium designed to

back the technology) was that 8 bits was enough. Howard Lukk (VP/production technologies at Walt Disney Studies) was just one voice amongst many who said that 8-bit was "a bad start, and a possible false step."

The BBC's head of technology (HD & 3D), Andy Quested, said he was concerned that the public was in danger of suffering "consumer fatigue, unless we can give them something that represents a big, and I stress, a major step change in quality. We have to be offering a package that includes additional frame rates, a dynamic range that will help sports coverage take off, and that can also show movies and other acquired programming in the way it should look. [If we fail] then we might as well all press the 'vivid' button on the sets that will be sold. We must add increased color imagery into the dynamic range."

Sky Deutschland's Stephan Heimbecher (head of innovations/standards) added that broadcasters were under great pressure from the display manufacturing sector to "get the whole thing rolling. But it is quite disappointing for me that we are not taking a sufficient major step forward. What we are seeing is just an 'up-polished' version of HD, and not much more than that. We can live with 50/60p at the moment, but we mustn't stop there. The other parameters must include much better pixels, and not extra pixels. I doubt that [8-bit] gives us enough of a playground."

BSkyB's chief engineer, Chris Johns, argued that if minimum standards were specified and adopted, then "would the public again be confused in two or three years when higher qualities became available? If there was just HDMI as a logo on my screen, who would know whether it was compatible with HD, UltraHD or some future generation of UltraHD? There has to be greater clarification. We have to create a very positive impact. We can deliver the extra resolution, and improved frame rates and bit-depth because the one thing that catches us out is the lack of dynamic range."

Hispasat goes 4K—and for the USA

Spanish satellite operator Hispasat formally launched Hispasat 4K at IBC, a FreeTo-Air TV channel that will be available for all the industry to perform tests and to develop advanced solutions for new video formats. The first transmission will be a 50 minute documentary on the Prado Museum, in Madrid, produced by TVE and co-produced by Hispasat.

The channel will also première at the San Sebastian Film Festival. The new channel will be broadcast in MPEG-4 at a bit-rate of 35Mbps, and—in experimental format—in the new High Efficiency Video Coding (HEVEC) format at a speed of 18Mbps. This will make the satellite transmission system the most efficient anywhere in the world at present. Content, coded in these formats, will be broadcast pursuant to the DVB-S2 standard by the Hispasat 1E satellite, offering coverage across Europe. It is also planned that transmissions will begin in North America and Latin America in the coming months.

Hispasat's Business Director, Ignacio Sanchis said that the satellite represents "an ideal platform for developing UHD services due to its universal footprint, high capacity and large bandwidth; essential for transmitting large amounts of high-definition data," adding that HISPASAT has been a pioneer in UHD satellite transmissions, having broadcast 4K-quality broadcasts in Brazil, Spain and a number of other European countries.

The panel, chaired by the EBU's Dr. Hans Hoffmann, called for much greater clarity on these variables and even a customer education program, and "do a better job than we did on HDTV."

Elsewhere at IBC, Massimo Bertolotti, head of Engineering/Innovation at Sky Italia, stressed that it was looking ahead to 4K, and test transmissions (soccer, Formula 1, motor-bike racing) had already occurred. "We at Sky see 4K as the new viewing experience. Today, the system isn't stable, because all of us are cutting and pasting existing technology and we have yet to see a complete 4K eco-system. We are discussing the FIFA World Cup with Sony for next year, but I am not sure the full chain will be in place for the soccer."

The enthusiasm from the likes of Sony, Samsung, LG and Panasonic is to be expected. The high-end camera makers see IBC as a key showroom for their products. However, Samsung's comments were typical. Vassilis Seferidis, Director, European Business Development of Samsung Electronics, said, "Ultra-HD is the future of television because, not only does it offer a superior user experience, but it also creates exciting new opportunities for the whole TV industry. The Ultra-HD technology is now a commercial viability and we hope that our collaboration with Eutelsat will become the tipping point for a wider cooperation across the industry for the acceleration of the standardization and deployment of Ultra HD TV services."

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

Boiling eggs in 4K, Samsung demo at IBC 2013.

A Case In Point
Real-Time Environmental Condition Monitoring For Remote Mining Projects

By Anu Sood, Global Channel Marketing Manager, SkyWave Mobile Communications

Mining companies often install weather stations to evaluate environmental conditions, especially when the remote work being done is in high mountain elevations. The data is useful for forecasting weather outside of the core mining areas and helps to plan production activities.

For a mining company with production sites near the borders of Bolivia and Peru, the only practical way to share data between meteorologists and remote locations is satellite communication. However, the company was not satisfied with its existing satellite options because it was unstable and the formidable cost of data retrieval allowed only limited transmissions once a day, and those were only in the best of cases.

Working with its IT partner, io-sat (**http://www.io-sat.cl/index_en.html**), the mining company developed a solution that offers 360 degree visibility of weather conditions in South America. To communicate the data, a bi-directional communication solution using SkyWave's IsatData Pro satellite terminal was configured to communicate with a Campbell Scientific datalogger using the PakBus protocol. This afforded the ability to access 100 percent of the functionality of the data logger. This solution required but one satellite terminal, unlike the company's previous provider's solution that required two terminals.

Stations transmit a set of parameters obtained from the sensors with a frequency of 15 minutes. This data is then analyzed by meteorologists to generate forecasts for the zone. Analysts now have real-time and historical data, including temperature and humidity, rain measurement, solar radiation levels, snow height and wind speed. It also meets requirements for stability at a practical cost.

SkyWave's IDP-690 terminal allowed for easy installation and configuration for the following workflow:

- The datalogger captures and records data

- The IDP-690 terminal transmits data from the datalogger to the satellite

- The satellite transmits to the ground station and then transferred to the Internet and can be viewed and downloaded through a browser

- Alarms and events have been set up to generate emails

- When necessary, commands can also be sent to the datalogger through the browser

The solution provides multiple benefits to the mining company including:

- Low-cost communications

- Real time data

- Low power consumption, minimizing the number of solar panels used and, therefore, the cost of the station

- Reduced overall installation costs because of the ease of installation and configuration

- Reliability in the communication given that the satellites are stationary

The customer's level of satisfaction with the SkyWave solution for satellite transmission has triggered the mining company to initiate a plan to replace all of its terminals developed by another provider to SkyWave IDP-690s where there is no GPRS (General Packet Radio Service) signal.

The SkyWave solution also provides other, innovative, satellite applications for mining companies. The same satellite system that is used to evaluate environmental conditions in remote areas can also provide the communication link to sensors and other fixed assets that represent key functions within, and around, a mine.

Satellite messaging terminals connected to sensors can be used to monitor water levels and to remotely turn on and off dewatering equipment that is located in areas where other wireless communications services are not yet available, or are unreliable, or do not have the required reach. In addition to controlling equipment, satellite messaging terminals can also be used to:

Automate the monitoring of health and operation of equipment. Unsupervised pumps can get overloaded and starved, which leads to excessive wear and damage.

Monitor whether equipment is working or not, and track performance indicators like engine performance, engine run hours, utilization reports and engine data.

Receive early warnings of developing problems before a catastrophic failure occurs. The data allows maintenance managers to effectively schedule equipment maintenance and prevent equipment downtime and loss of revenue.

Integrating automatic and real-time notification of dust concentrations into fleet management systems is another application that works well with satellite messaging terminals. Dust concentration data can be used to direct dust suppression vehicles to focus their efforts on high dust areas. Satellite messaging terminals can also be used on dust suppression vehicles to accurately meter the flow of water or dust suppression material for accurate billing and record keeping.

Satellite-based remote monitoring of airborne dust concentrations has many benefits to mine operators, including:

- The ability to gauge dust levels on all roads regardless of location and availability of terrestrial-based communication systems.

- Mine operators can reduce costs associated with vehicle operation, worker health and safety and dust suppression materials because they know which roads are in highest need of dust treatment.

Mining weather station.
Photo courtesy of io-sat.

- Equipment downtime and loss of revenue is decreased because there is less damage caused by dust on heavy equipment and other motorized equipment

Satellite messaging is a wireless technology that is available to mine operators anywhere in the world, and is particularly useful where other wireless services are not available, are unreliable or do not have the reach required to effectively monitor equipment and for operations.

Satellite also comes with the additional benefit of providing a low cost, quick and easy to install communication link without requiring major capital investment as it does not require towers and other land-based infrastructure to be installed and maintained by mine operators.

About the author:
Anu Sood is the Global Channel Marketing Manager for SkyWave Mobile Communications. She may be contacted at **(613) 836-6288 ext. 8320** *or via her* **Skype ID: Anu.Sood.SkyWave**. *Additional information may be obtained at* **http://www.skywave.com**

Careers: Is Compensation About The Money?

By Bert Sadtler, Senior Contributor

Companies today must re-assess their talent needs in order to remain competitive and drive growth. The satellite communications industry continues to face numerous challenges, yet remains ripe with opportunities. As great talent can make a huge impact, employers need to get it right and make a "great hire."

To assist with career and leadership issues, SatMagazine asked Bert Sadtler of Boxwood Executive Search to provide his insight. Boxwood is a management, consulting recruiting firm with offices just outside of Washington DC and in Bradenton, Florida. Boxwood's services involve job growth, maximizing the performance of critical, senior level talent and addressing the shift in the recruitment and compensation paradigm for employers.

And, yes, compensation is about the money. What else provides such an easy and immediate reward to an employee? Employers can offer creative benefits, an energetic workplace environment, flex schedules and extended leave, but all these take second place to "the money." Various forms of stock options and equity can fall into a version of "the money," depending upon the structure of the employer.

Employers have the responsibility to protect their cash while simultaneously incentivizing their employees. This means employers attempt to motivate their employees using alternatives to cash compensation in order to receive the "biggest bang for the buck."

All that being said, CEO's and Senior Leaders tell me that they support a simple business philosophy, yet this philosophy is rarely implemented today. The thought is that Senior Leadership will pay significant compensation to employees who provide extraordinary value to their employer.

Employers agree that today's workplace is quite dynamic and that creative approaches are welcome and frequently implemented. However, many employers continue to use the same compensation model that has been instituted from past years. The model is: If the employer meets certain goals (usually revenue targets), then all employees qualify for a bonus in addition to their base salary.

This approach is designed to serve the employer, not necessarily the individual employee. The approach suggests that all employees deliver a similar value. By working as a team, employee and employer benefit. In theory, this approach sounds great.

Unfortunately, there exists an unintended outcome, one that is totally avoidable.

While the outdated model does universally reward the employees for the employer's success, it does not drive excellence. The model does not speak to each and every employee individually, challenging and encouraging them to their highest levels of achievement. The model does not encourage passion. In fact, the one-for-all and all-for-one model is more socialistic than capitalistic.

Mediocrity and status quo are the biggest enemies of an aggressive, growing, capitalistic organization. The outdated model is unable to promote sustained excellence and, instead, allows "average" to creep into the organization—otherwise known as mediocrity.

On a report card, the letter grade of "C" is considered satisfactory. However, most will agree that a company would bristle if assessed at a grade "C" and labeled merely as a 'satisfactory' entity. Yet, satisfactory and average are translated to mean pretty much the same mediocre level.

The outdated compensation model is saying to the employee: "You are a group and your employer holds you accountable as a group, and rewards you as a group." The employer wants this group to be a TEAM, but has, in fact, modeled them to be a GROUP.

If the old compensation model is more socialistic than capitalistic, allows for mediocrity, and creates groups rather than teams, what model is best?

First, there must be agreement that today's marketplace is faster paced and more demanding of results and stresses that everyone needs to be delivering value. In essence, we are "interviewing for our job" each and every day.

Our output is not equal. Employees are not equal in their talent and their value. Some are smarter, some are creative, some decide to work longer hours. Some have 40 hours committed to their work-life and spend significant additional time on commitments outside of "work." Some employees have a unique drive to over-deliver on their projects.

As private enterprise is not the government wherein all employees are compensated with a specific pay grade level (regardless of their performance), companies must attempt to break the mold and strike out in new ways that acknowledge the individual for their performance.

Employees are different entities—why not weigh compensation more heavily on performance? Don't employers run their business on a pay-for-performance basis? Highly performing companies win business, deliver quality and grow their revenue. Underperforming companies do not.

By the employer directing the company's goals through a performance plan, goals can be individually allocated to each employee in a way that ties back to the employer. If the employee can meet the goals, a smaller bonus is paid. Great results deliver a larger bonus. Extraordinary results deliver an extraordinary bonus, thereby recognizing, encouraging and rewarding excellence and assigning a recognizable value to performance results.

By defining the goals for each employee, the employer can still incentivize employees to collaborate and be "team-like." Individually defined goals drive accountability and excellence, eliminating a socialistic model and eliminating mediocrity.

Smart leaders realize the business value of rewarding extraordinary results with extraordinary compensation.

Traditionally, variable compensation and performance-based compensation has usually been associated with sales producers.

Why limit performance to just revenue producers? Instead of measuring sales revenues, the employer identifies and defines critical key objectives for the employee to meet and complete. While the objectives can be developed as unique to the employee, all of the objectives are in harmony with the company's short- and long-term goals.

Under this performance model, compensation is viewed as "OTE," or, On-Target-Earnings, comprised of base salary, bonus, stock, equity, and so on.

The base salary represents 40-60 percent of the total OTE with attainable goals, and the related bonus components making up the remaining 40-60 percent. There are stretch goals and rewards for extraordinary performance, with no limit or cap to slow down or discourage over achievers.

Finally, while most compensation cycles run for 12 months in parallel with a company's financial year, why not cut such in half and run a six month cycle in order to incorporate adjustments resultant of the dynamic changes in the marketplace? This structured approach only works with a company-wide commitment by all of the managers to spend the necessary time in establishing appropriate individual goals and then providing timely feedback to the employees and, no—this is not an easy path.

To those of you who find this to be a significant change, as well as a significant time investment to implement, ask yourself, what is more costly than NOT realizing the full potential of an organization's talent?

Time and time again, employees tell me their compensation model does nothing to motivate excellence. They feel they are identically for their good work as they would be for their extraordinary work.

Stay the course if your mediocre compensation model is good enough... however, consider a change if "extraordinary" is your company's preferred paradigm for a more beneficial ROI.

Good hunting!

About the author
*Bert Sadtler is an invited speaker who discusses the shift in the recruitment paradigm toward acquiring critical, senior level talent, as well as in analyzing the shift in the employer's performance-based compensation model. Bert can be reached at: **BertSadtler@BoxwoodSearch.com**.*

About Boxwood Search
As a dedicated, consulting resource to the employer, Boxwood designs compensation models to reflect the current trends and launch senior level recruitment campaigns to attract and acquire talent. Position examples include: CFO, COO, Senior Program Manager, Vice President of Sales, Director of Marketing, Vice President of Engineering, Director of Contracts & Compliance and Vice President of Business Development. Examples of industries have included: Government Contracting, The Intelligence Community and the Communications/Technology Sector.

Focus
Network Infrastructure Restoral

By Louis Dubin, Vice Presdient of Product Management, Comtech EF Data

Trunking circuits—the terrestrial fiber or submarine communications cables that transmit data within your core network—comes with the promise of enabling the delivery of voice and broadband...that is, until the link is cut.

The cut (break) can be unintentional, such as the result of a natural disaster or a construction company doing excavation. Or, the cut can be intentional, such as vandalism or corporate malicious conduct. Regardless of the cause, the result is the same...a breach in connectivity, which results in service interruption.

If you currently have, or are considering multi-site infrastructure restoral over satellite, read on for insight that could help you ensure cost-effective service continuity, so you can remain operational and profitable in the event of terrestrial communications failure.

Considerations, Complexities + Costs

Unfortunately, fiber/cable is often the weakest link in mobile networks. First, the sheer volume of traffic that is affected has an impact on a massive subscriber base. Its susceptibility to damage and interruption can negatively impact both service levels and revenue continuity for Mobile Network Operators (MNOs). Given your requirement for highly reliable core infrastructure and transport, MNOs like you are looking to satellite-based solutions for network infrastructure restoral.

Satellite provides the ideal solution given its resilience, flexibility and global, ubiquitous coverage. There are, however, a number of considerations, complexities and costs that must be evaluated when selecting a satellite-based solution that is cost-effective, efficient and able to deliver guaranteed service.

When establishing an infrastructure backup, the consideration should be as to how much satellite space segment is required. Should a network outage be encountered, sufficient bandwidth to restore services must be available. However, it can be cost prohibitive to provision backup satellite capacity for all sites at peak traffic levels.

Satellites are not affected by terrestrial events, and statistically not all sites will be affected by planned or unplanned events simultaneously. Therefore, the most cost-effective solution is an automated one that allows you to transfer traffic when there is an outage from cable to satellite. The ability should be present to consolidate and share services, to use the fewest amount of satellite resources, and to move resources around when and where needed.

There may be sites on multiple continents. Therefore, to properly provision satellite restoral service options, the need to deal with multiple transponders across an array of bandwidth segments and a range of satellite service providers will be evident. A solution is needed that can reduce operating costs throughout the year, but still provide the assurance of service for subscribers.

Another common challenge is not having co-located staff proficient in satellite. In the event of network failure, it may not be feasible or cost-effective to manually reconfigure and re-arrange satellite transponders and links for remote locations. A solution that doesn't require on-site specialized resources should be in place.

There is an array of satellite-based communication options. While this will be your backup infrastructure, a solution that provides the highest performance possible and enables timely packet delivery and service differentiation is needed. As costs are a key consideration, the solution should leverage the latest bandwidth-saving technologies.

Automated, Flexible & Cost-Effective Restoral—A System Level Approach

Dimension Pool Capacity

Whether the satellite bandwidth is already leased, or is in the process of being obtained, how much capacity will be needed to support restoral services must be determined. There are many parameters that need to be considered, including satellite footprints, data rates, power requirements, and so on.

Comtech EF Data offers a mathematical method of determining the required capacity. Once all understand what is needed for 100 percent restoration, the probability of failure for each site is determined. From that point, numerous failure scenario iterations are run that target total network availability that suits a company's needs.

Once the needed data rate network capacity is understood, link budgets and probability analysis are run to define the minimum bandwidth required to meet the target network availability. If an

automated backup system and spectrally-efficient tools are used, significantly less satellite bandwidth will be required.

Proper dimensioning of bandwidth is largely based on pooling the bandwidth resources. When resources are shared in a pool, statistical probability can be used as an "oversubscription" model. In an ideal world, everyone would access the same pool of bandwidth by statistically aggregating the services and using (sharing) the same pool of bandwidth.

When selecting the right resources, satellites with footprints covering all or most of the sites are preferred. For maximum bandwidth pooling resources, as many of the sites must look at the same satellites as possible. Ideally, look for a single footprint with sufficient capacity that all of the sites can see. Focusing on the ever-present need to reduce OPEX, the ground equipment can then be sized to match the satellite footprint.

This may be one of the most important steps in establishing backup restoral services. If there are more than one terrestrial service that is to be aggregated, and the desire is to leverage a platform that can save bandwidth and OPEX, then allocate considerable time to the process of dimensioning pool capacity.

Locate Satellite Capacity

Which satellite operators, and specific facilities, should be contracted? How much bandwidth and power is needed? Identifying the best satellite resources can be a time-consuming and challenging task.

Comtech EF Data has a long-standing relationships with satellite operators globally as the company contacts span the operators' headquarters, in-country facilities and teleports. By leveraging these contacts, the key contacts can be identified and the most suitable satellite capacity located.

Use Spectrally-Efficient Hardware

In order to best use the satellite capacity, infrastructure hardware is needed that provides maximum spectral efficiency. A significant amount of the company's development resources are focused on creating patented and industry-leading technologies that provide unrivaled spectral efficiencies.

Comtech EF Data will work closely with a client to determine which of the tools and technologies are most suited for specific network and applications. The goal is to help identify the optimum products and tools for maximum spectral efficiency. Examples of technologies that are particularly useful for reducing the cost associated with satellite communications for infrastructure restoral are summarized below.

Vipersat Management System (VMS)—The VMS provides scalable, dynamic SCPC (dSCPC) capacity management that facilitates bandwidth sharing, automates space segment allocation and allows for establishment of efficient, low latency, low jitter links. It manages "pools" of available bandwidth and allows carriers to be setup, torn down and resized dynamically within the pools.

VMS dynamically finds and allocates capacity depending on how many circuits are down. There won't be the need to contact satellite operators, manually adjust frequencies, power or symbol rates. After the appropriate amount of satellite capacity has been purchased, VMS will handle the satellite circuit configuration.

When there is a failure, VMS will find the appropriate space on the satellite, find the appropriate transponder, and put up the carrier. It is programmed to know if there is a failure, how much capacity is needed to transmit and receive. The power levels, symbol rates, modulation and coding are pre-programmed. When there is a failure, VMS looks at all of the available resources and determines where to put the circuit. The circuit is dimensioned and sized according to available transponders, essentially doing everything the operator would normally have to do. It actually manages the automation of putting a carrier up and tearing it down when you have an outage situation. The convenient GUI and network control also provides fault monitoring, event recording, and more.

DoubleTalk® Carrier-in-Carrier®—Based on patented "Adaptive Cancellation" technology, allows transmit and receive carriers of a duplex link to share the same transponder space. DoubleTalk Carrier-In-Carrier is complementary to all advances in modem technology, including advanced FEC and modulation techniques. It can enable the achievement of spectral efficiencies that cannot be achieved with traditional links. In simple terms, DoubleTalk Carrier-in-Carrier can be used to save transponder bandwidth and/or transponder power.

DVB-S2-EB1 (Efficiency Boost)—DVB-S2 is widely accepted as the most spectrally efficient standards-based waveforms. With the firm's Efficiency Boost technology, a 10 to 35 percent increase in efficiency over the DVB-S2 standard can be achieved, without an increase in power or occupied bandwidth. This technology virtually doubles the number of available MODCODs compared to DVB-S2, which provides more throughput options to facilitate optimal combinations. DVB-S2-EB1 includes additional roll off figures (15, 10 and 5 percent) which translates into additional, incremental capacity.

Adaptive Coding & Modulation (ACM)—A statistical, non-static advantage that enables dynamic changes in user throughput. ACM doesn't change the power or the bandwidth of the carrier, it just changes the MODCODs so more or less throughput can be obtained. Benefits and value vary over time and are not guaranteed, but are predictable. ACM essentially converts link margin to an increase in the data throughput of satellite links. When using ACM operation in the company's products, link margin can be converted into increased throughput of satellite links.

WAN Optimization—Tools, such as the FX Series, will monitor all of the traffic that comes onto to the network and enables traffic shaping. Traffic shaping can be particularly useful for backup networks. In the event of a catastrophic failure, there may be a willingness to give up some of the services, such as data, to ensure that the essential voice and signaling services are available to users.

WAN optimization constantly monitors the WAN capacity, working in conjunction with satellite modems and VMS. In the case of a catastrophic event, the VMS will tell the circuits to shrink by a pre-determined amount so the failed sites can be fit into the network. The FX Series device understands that the WAN capacity has now shrunk.

Unfortunately, routers and MSC switches don't understand changing capacities. The router or MSC switch feeds more traffic than the circuit can now handle. This is where the FX Series comes into play. It ingests all the traffic, labels it, sorts it, and prioritizes it based on a variety of criteria or rules. Once the traffic has been filtered to put it into different priority classifications, it is drained, based on established rules. The result is a system that grabs less capacity than would normally be needed to backup the site with prioritization to ensure that the most important traffic is transmitted.

Integrated Network Management—the Comtech EF Data NetVue™ Integrated Management System is a powerful and scalable network management platform designed to seamlessly manage satellite networks. It provides a unified management interface to monitor, control, and obtain status for Comtech EF Data and other third-party products. The intuitive, web-based GUI presents the managed network in multiple views, providing real-time data gathering, trend analysis, alarm management and notification. It also offers advanced applications for automation, scheduling, event correlation, reporting, access via mobile devices and spectrum analysis. NetVue servers may be setup as stand-alone, in 1:1 redundant configuration or clustered in a manner that allows multiple locations to be part of a single cluster for redundancy and simplified user management and security.

NetVue's flexibility and scalability make it an ideal management platform for small, medium and large networks. Its simplicity and ease of use enables operators to manage networks efficiently and cost effectively, to manage SLAs and to provide superior customer experiences.

Automate Capacity Usage

Once all of the tools are in place, there are various methods to automate the capacity usage. Here are a couple brief examples.

- *Semi-Automated / Manual Outage Restoral System*—With this approach, the NOC personnel would be notified via call or alarm that one of the terrestrial cables is down and that backup services are required. The operator would use the M&C system (NetVue) to select which site is down and initiate the satellite backup link. This triggers the VMS to examine the available satellite capacity to find the best fit. VMS then puts up the circuit, tears down the old circuits, and so on. This is a simple process that just requires the operator to connect into the network management system for a matter of seconds.

- *Automated Outage Restoral System* —Comtech EF Data's M&C system (NetVue) can take commands and controls from other M&C systems or devices. Should there be a failure on a fiber/cable link, the site's M&C system can see that the link has failed. The site's M&C system sends a Machine-to-Machine message to our M&C system that indicates there is an outage at a specific site, and the backup capacity for that site will be brought up. Without any operator intervention, the satellite link will be established for the capacity needed by the site.

Scalability + Power

The more sites that need satellite restoration, the more aggregation can occur and a probability analysis completed. With multiple sites, the Comtech EF Data solution is scalable and powerful, enabling a small satellite bandwidth contract to be secured, and still have a completely automated backup for all of the terrestrial links at a network availability figure that customers expect.

About the author

Louis Dubin is Vice President of Product Management at Comtech EF Data. In this role, he is responsible for business development and product management of the high speed modems, TDMA modems, and broadcast products. Dubin joined Comtech EF Data in 2008, through the acquisition of Radyne Corporation. During his tenure at Radyne Corporation, he held the positions of President of Radyne's Phoenix, Arizona division and Vice President of Sales. Dubin has over 20 years of experience in the telecommunications and transmission industry. He holds a degree in Electrical Engineering from the Florida Institute of Technology, and completed the Stanford Executive program in Technology Management.

Focus: The Vipersat Management System

The Vipersat Management System builds on years of providing our customers with the most advanced automated bandwidth and capacity management system in the industry. VMS is a feature-rich, comprehensive, intuitive operator's network configuration, management, and control tool. The typical users include offshore Oil & Gas rig owners, satellite service providers, government/militaries/ministries, civil and aviation authorities, satellite newsgathering (SNG) operators, and cruise ship network administrators, to name but a few.

The system is designed to enable network administrators and satellite service providers to easily configure networks and rapidly and effectively respond to network anomalies. More than a network monitor and control platform, VMS automates the carrier switching and spectrum management processes within the satellite network. These capabilities allow SCPC carriers to be switched automatically based on application, load, or schedule, providing on-demand services and unparalleled space segment savings.

Key Benefits

Centralized satellite bandwidth management server / Operates over multiple transponders and satellites / True bandwidth-on-demand technology / Automation of satellite ground terminal transmission plans / Administratively-defined policies for transmission plan changes / Dynamic star and mesh satellite topologies / IP Layer 2, Layer 3, and hybrid networks supported / Total system redundancy / Scalable to address various network sizes

Dynamic Single Channel per Carrier (dSCPC)

Traditional Single Channel per Carrier satellite communication links do not change. As link budgets and network throughput requirements are based on the worst case scenario, these links are often underutilized.

With increasing satellite bandwidth costs combined with increasing throughput requirements, you are looking for the most efficient utilization of your operating budget. Dynamic Single Channel per Carrier provides increased efficiency in bandwidth utilization, carrier management, as well as personnel required to manage the network.

Altering a link typically requires substantial resources on both sides of the link. An analysis must be done to determine what new data rate the modem will require to be optimized for the network traffic load. A new link budget must be performed, including power calculations. A new frequency plan must be created, often requiring changes to multiple sites to accommodate the change. Finally, personnel must be located at both sides of every link involved simultaneously in order to reduce outage time. Leveraging dSCPC enables automation of the above.

When a node in the satellite network detects a change in the amount of throughput required via several automatic detection algorithms, it will automatically request that change from the VMS. The VMS will look at all satellite resource allocations and automatically determine a new frequency plan, power level, data rate, FEC, and modulation schemes for all modulators and demodulators involved in the change. All associated devices will simultaneously be sent these parameters over the air without human intervention. These calculations are done in fractions of a second with the entire process taking less than one second of total data loss in most cases.

dSCPC yields true bandwidth-on-demand, providing low-latency, low-jitter dedicated SCPC connections when needed for real-time applications, such as Voice over IP (VoIP), video conference, broadcasts and large applications (file or image transfers).

At any time, the operator has full manual override ability, and can turn on/off the auto-detection mechanisms.

In brief, there are three levels of service:

- » Minimum Information Rate—A service level always available, ensuring the ability to enter a clear channel SCPC circuit or have a timeslot in STDMA.
- » Committed Information Rate—Bandwidth that is guaranteed to be available instantaneously based on the demand or contention.
- » Peak Information Rate—Bandwidth that can be used by any site on best effort availability, and categorized through multi-level prioritization.

Additional information on Vipersat is available at this direct link.

SatBroadcasting™
Satellite Distribution, A Vital Technology In The Worldwide Adoption Of Digital Cinema

By Walter Capitani, Vice President of Product Management, International Datacasting (IDC)

As a medium for telecommunications and television broadcasting around the globe, satellite technology has proven itself over many decades of reliable service. Within the past several years, satellite has emerged as the "go-to" technology for the worldwide transmission of digital cinema content and live events.

Digital production and projection technology is relatively mature, moving far beyond the historical use of motion picture film. Within the last decade, digital cinema distribution has begun to achieve its promise, evolving from the shipping of large hard drives to the use of satellite links that can transmit a feature presentation in a few hours.

Complicating the implementation of digital cinema is a markedly fragmented global market. By the close of 2013, studies suggest that more than 90 percent of the screens in both the U.S. and U.K. will have converted to digital, where English-language Hollywood films and a small number of major exhibition chains predominate. European and Asian exhibitors are generally at an earlier stage of implementation, with governments encouraging film production in local languages. Latin America and Africa are steadily gaining momentum, as well.

The benefits of digital cinema coupled with satellite transmission are many. For content producers, the cost of digital production is typically lower than that of film. Without the need to make physical copies of the film (or to copy the digital media onto a portable hard drive), distributors can save millions of dollars in print costs, shipping, and lost or damaged media. When coupled with the scalability and high speed delivery of satellite transmission, the logistics of a simultaneous release to 1,000 cities worldwide are as easy as to complete as to a single theater.
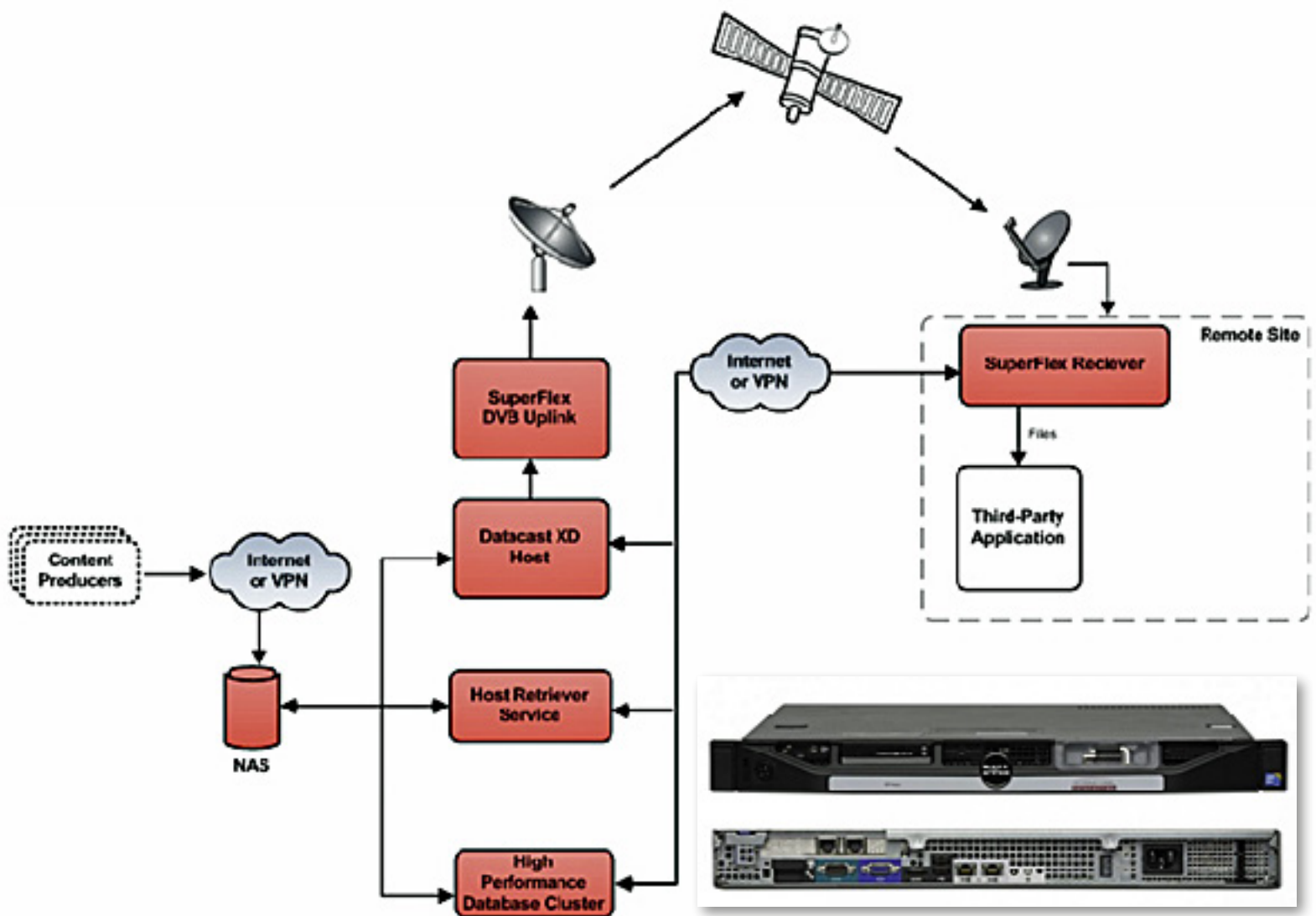
For exhibitors, the industry adoption of digital means a decline of available content on film—overcoming the barrier posed by the high cost of a digital projector becomes a necessity. In return, they gain a higher quality screen image that is free from splices and scratches, with the additional benefits of remote system control and troubleshooting. Exhibitors can fine-tune their schedules, changing content on the fly to put the most popular films on more of their screens. Plus, small theater circuits and film festivals can now gain access to a wider range of content.

Through the use of satellite distribution, audience members can expect a reliably pristine screen image and enjoy greater access to global entertainment. This alternative content (increasingly known as "event cinema") includes an ever-expanding variety of independent films, arts programs, sporting events and educational fare, which would be impossible to present using traditional media delivery methods.

In the last year, for example, IDC's end-to-end digital cinema solutions have brought live broadcasts to cities half a world away from events that are as diverse as a rock concert in Estonia, to a grand opera from Moscow's Bolshoi Theatre. Attendance, and consumers' willingness to pay premium ticket prices, continues to grow rapidly.

Replacing the delivery of physical media or a large hard drive with delivery via satellite speeds the process. The movies are transferred automatically from the

Datacast XD is the solution for delivering
secure/guaranteed file-based content via multicast enabled networks including satellite, WAN/LAN, and cable.

satellite receive equipment into the theatre system—personnel do not need to touch the movie for a successful delivery to occur.

Theaters play the downloaded content from the cinema server in the form of a highly encrypted digital file called a "Digital Cinema Package" (DCP), typically 200-300GB for a feature movie. The necessary decryption keys are delivered separately from the content, usually as an email attachment. The keys are time-limited to the planned exhibition schedule, as well as locked to the specific server and projector. The most advanced security, such as that offered by IDC, can even encrypt the satellite link to protect the confidentiality of the metadata distributed over the system.

The advent of digital cinema represents a new revenue opportunity for satellite companies. When forming partnerships with providers of digital cinema distribution systems, satellite providers will want to carefully examine critical issues such as workflow. IDC's Pro Cinema platform, for instance, was designed to operate within the workflows of both the distributors and the exhibitors. The system exists in the satellite realm but is designed for the studios and exhibitors. This means that the end-to-end hardware and software solution is easy to use and efficient for both the distributor and the exhibitor.

IDC's digital cinema content distribution solution has been delivering movies over satellite for nearly a decade. Streamlined, modular and feature-rich, IDC's proven technology has been deployed by the world's leading cinema service providers, with installations at more than 70 percent of satellite-connected digital cinemas worldwide. Unlike other players in this segment of the digital cinema market, IDC builds its own end-to-end solution with the satellite receiver, processing, storage and delivery integrated into a single device. Sophisticated forward error correction and a terrestrial Internet back channel that tracks delivery and repairs files, contribute to its reputation as the industry's most proven and robust solution.

As the advantages of satellite delivery make it an obvious new standard for digital cinema, new developments continue to advance the technology. With the trend to display images in 4K resolution (3840x2160 pixels) versus the previous 2K standard, audiences will enjoy better images on even the largest screens.

The latest DVB-S2 digital video broadcasting standard allows a higher throughput on the satellite link for faster transmission of these larger, hi-resolution DCP files. Lower cost projectors effectively match the business model for smaller, independent theaters, providing an easier pathway to digital adoption. Plus, new sound standards will mean an upgrade to the complete theater experience. It's a win for the distributor, the exhibitor, the satellite provider, and most importantly, for the viewing audience.

For additional information regarding International Datacasting and Digital Cinema, please access their website at ***http://www.datacast.com/***

About the author
As the Vice President of Product Management with Ottawa's International Datacasting, Walter Capitani leads the development and launch of IDC's next generation content distribution product line, specially designed for digital cinema over satellite.

Executive Spotlight
David A. Anhalt (Col., U.S.A.F. Ret), Vice President and General Manager, Iridium PRIME

Col David Anhalt (U.S. Air Force, retired), joined Iridium as Vice President and General Manager of Iridium PRIME™ in 2013. He is a recognized leader in the hosted payload industry and will spearhead business development for Iridium PRIME, focusing on customer acquisition and technology partnerships.

Prior to his position at Iridium, he was the initial Vice Chairman of the Hosted Payload Alliance and is the organization's current Secretary. He served as Vice President of U.S. Government Solutions at Space Systems/Loral (SSL), where he directed a portfolio of national security space sector initiatives promoting new technology and product offerings.

In addition to his vice presidential duties, Mr. Anhalt served as SSL's capture manager, chief architect, and company spokesman for its pursuit of the United States Air Force Hosted Payload Solutions Contract, which provides fully integrated space and ground communication solutions for government end-users, delivering hosted payload data to them in the process.

Before SSL, he spent seven years at Orbital Sciences Corporation, where he conceived, captured and managed the Commercially Hosted Infrared Payload (CHIRP) flight test demonstration. CHIRP launched in 2011 to evaluate modern wide-field-of-view staring sensors for missile warning. The CHIRP program is the largest unsolicited proposal ever awarded by the Air Force Space and Missile Systems Center on a sole-source basis.

Mr. Anhalt was especially well positioned to work with the Air Force, having served in the military branch for 28 years and graduated from its Test Pilot School. He has played key roles in a broad array of USAF research and development, test operations and program management responsibilities in both the air and space sectors.

Mr. Anhalt earned a Bachelor's of Science degree in electrical engineering from the U.S. Air Force Academy. He holds Master's degrees in Aerospace and Mechanical Sciences (Princeton University), Digital Design and Control Theory (University of Idaho) and International Relations (Queen's University, Ontario, Canada). He is an Associate Fellow in the American Institution of Aeronautics and Astronautics.

SatMagazine (SM)

Would you tell our readers about your current responsibilities as Vice President and General Manager of Iridium PRIME™?
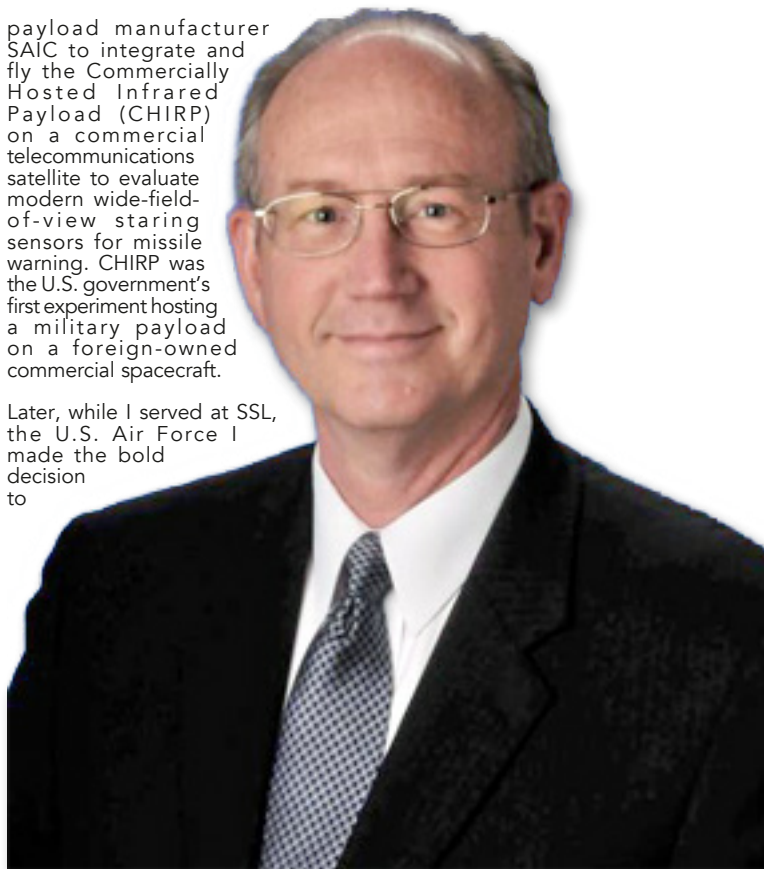
David Anhalt

At Iridium, I direct business development for Iridium PRIME, a first-of-its-kind turnkey space payload solution for accommodating commercial, government, and national security missions in Low Earth Orbit (LEO). My focus is customer acquisition and technology partnerships for Iridium PRIME.

For the past 10 years, following my career in the U.S. Air Force, I've benefited by working at two of the finest satellite manufacturing companies in the world—Orbital Sciences Corporation and Space Systems/Loral—pursuing ways of leveraging commercial space goods and services to meet U.S. government requirements, including hosting government capabilities on commercial spacecraft. While at Orbital, we collaborated with satellite owner/operator SES and sensor

payload manufacturer SAIC to integrate and fly the Commercially Hosted Infrared Payload (CHIRP) on a commercial telecommunications satellite to evaluate modern wide-field-of-view staring sensors for missile warning. CHIRP was the U.S. government's first experiment hosting a military payload on a foreign-owned commercial spacecraft.

Later, while I served at SSL, the U.S. Air Force I made the bold decision to institutionalize their approach for procuring fully functioning commercial on-orbit hosted payload systems, integrated ground systems, and interfaces to deliver payload data to government end-user(s). Applying lessons learned from CHIRP's successful debut and mindful of the U.S. government's urgent need to purchase more affordable and resilient solutions for their space mission, I worked closely with SSL's partners to develop efficient, cost-effective concepts for hosting payloads on commercial spacecraft to meet mission objectives for both U.S. civil government and national security customers.

SM

Iridium recently hosted a press conference to announce your appointment and Iridium PRIME—can you tell us more about Iridium PRIME and why you were attracted to this opportunity?

David Anhalt

Iridium has been a front-runner in the hosted payload space for some time now and was a founding member of the Hosted Payload Alliance in 2011. After exploring more than 30 different payload concepts to host on the Iridium NEXT spacecraft, Iridium chose Aireon™ to be the primary hosted payload, an innovative space-based solution for collecting air traffic surveillance data and providing it in near-real-time to air navigation service providers (ANSPs) for air traffic management. Iridium NEXT is on track for first launch in early 2015, and the Aireon hosted payload mission will be on each of the 66 operational satellites, six in orbit spares and nine ground spares.

Iridium PRIME extends the hosted payload opportunity even further by leveraging Iridium's established space-based global mesh network, ground infrastructure, and flexible spacecraft bus design to provide affordable and responsive turnkey space payload solutions.

What attracted me to this opportunity is that the satellites in the Iridium PRIME series will be built solely to provide for the needs of third-party payloads. Iridium PRIME establishes the means for Iridium to work directly with hosted payload clients to launch and support a satellite (or a constellation of satellites) that's right for the customer and is able to "launch when ready" to fit their timelines, all while substantially cutting costs.

Iridium
PRIME

With the advent of Iridium PRIME, hosted payloads are no longer secondary payloads with "limited rights"; instead, Iridium will assign each payload a "first class" seat and plug them into the Iridium NEXT network. From my perspective in the hosted payload business, we are no longer simply "hosting" on a bus and leasing bandwidth from the primary owner. Instead, we are providing solutions that allow the payload to leverage the advantages of the Iridium® network.

SM

When will Iridium PRIME be launched?

David Anhalt

That will depend on customer needs, but the first launch of Iridium PRIME could be as short as four years away in late 2017, and Iridium PRIME has the potential to generate significant hosting and data services revenue for Iridium over the next 15 to 20 years. An average of two to six satellites launching per year would contribute materially to Iridium's funding profile.

SM

Why did Iridium pursue this new business venture?

David Anhalt

Once we design and build 81 satellites (operational and spares), we expect that the development of additional satellites will have a very low incremental cost. Once Iridium NEXT is complete in 2017, we can launch additional satellites/payloads into our network whenever they're ready. Iridium's ground support systems and unique, cross-linked, global constellation are designed to fly at least 140 satellites at a time. We see a great opportunity in the future of hosted payloads and created Iridium PRIME in response to the high market demand for more affordable access to low Earth orbit. As budgets continue to tighten, it's imperative that the satellite industry approach hosted payloads in a new, innovative way.

SM

Why was Thales Alenia Space selected as the manufacturer of the Iridium PRIME satellites?

David Anhalt

Thales Alenia Space is a world leader in satellite systems and design, and they have been instrumental in working with us and the Iridium NEXT Mission Team of partners to keep the design and construction of our next-generation constellation on schedule and on budget. Their track record of performance with Iridium NEXT and our strong business relationship makes them ideal partners for the manufacturing of the Iridium PRIME satellites.

Specifically, Thales Alenia Space will provide and produce a derivative of the Iridium NEXT satellite bus for Iridium PRIME, maintaining the inter-satellite crosslink functionality and the ability to fly within the Iridium NEXT constellation. We're also working together to develop a Hosted Payload Controller for the Iridium PRIME bus to ensure independence and diversity of missions on Iridium PRIME satellites. Customers with compatible missions will be able to share the platform-minimizing costs and leverage the investment in Iridium NEXT.

SM

How has the financing of this massive project been accomplished, and are all of the necessary agreements now in place? Who are Iridium's partners in this instance?

David Anhalt

The Iridium PRIME buses take advantage of the $3 billion Iridium NEXT investment and limits Iridium's financial exposure because each Iridium PRIME mission will be funded entirely through customer payments for the equipment, accommodation, launch and data management.

SM

How does Iridium's joint venture with NAV CANADA come into play?

David Anhalt

Aireon is a joint venture between Iridium Communications Inc. and NAV CANADA to provide the world's first global aviation monitoring system using a space-based ADS-B hosted payload. The potential benefits the Aireon(sm) system will bring to the commercial airline industry include: improved visibility, optimal use of flight lanes and air space, fuel savings, reduced greenhouse gas emissions and safety enhancements. Aireon is estimated to enable billions of dollars in fuel savings to airlines and represents a potential $500 million business opportunity to Iridium.

Iridium sold all of the capacity for hosting payloads on Iridium NEXT to Aireon and Harris, and frankly, the idea for Iridium PRIME is building off the success of this model. Through that process, Iridium explored more than 30 opportunities with potential customers and quickly recognized the market potential in hosted payloads.

SM

What is Harris Corporation's role with Iridium PRIME?

David Anhalt

Harris Corporation manufactured the payloads for Aireon and worked with customers to leverage the remaining hosted payload space on Iridium NEXT. They've helped us develop and test the infrastructure necessary to implement hosted payloads using the Iridium space and ground networks. We expect to work with Harris on Iridium PRIME to help identify and provide affordable mission solutions for their government and commercial customers.

SM

Who do you expect to purchase payload space on Iridium PRIME and what kind of missions can it host?

David Anhalt

Iridium PRIME has highly flexible accommodations and the ability to host a variety of important missions appealing to government and commercial customers, including: space situational awareness, Earth observation, advanced broadband services, asset tracking, space weather forecasting and scientific and climate monitoring applications.

SM

What kind of impact will this have on the industry at large?

David Anhalt

The Iridium PRIME program revolutionizes the hosted payload business model with an integrated service that reduces the complexity, delays and costs typically associated with building, launching and operating a satellite mission. Iridium PRIME offers customers a variety of options: They can use an entire satellite's payload capacity, or share that capacity with other applications and customers that Iridium brings together. We'll orchestrate payload arrangements from mission design to launch and operations providing in effect a payload "concierge service."

Iridium PRIME overcomes the traditional challenges of hosted payload missions, which include inflexible launch schedules, 'one-off' mission control systems and ground connectivity challenges. Instead, Iridium PRIME will provide customers access to a proven end-to-end satellite network with complete flexibility on the number of payloads they deploy, number of orbit planes they occupy, and independent mission control with a cost savings of fifty percent or more compared to current stand-alone solutions. By hosting their payload on an Iridium PRIME satellite bus and using the Iridium constellation infrastructure, customers will have instantaneous, real-time connectivity and complete user control 24/7.

Iridium PRIME will offer 'launch when ready' mission planning. For the first time, the benefits of Iridium's LEO inter-satellite linked architecture will be combined with the flexibility of more frequent and varied hosted payload launches.

SM

What does the launch schedule via the SpaceX Falcon 9 look like, as of this writing?

David Anhalt

Iridium NEXT is on schedule to begin launching in early 2015, with the first launch of a pair of Iridium NEXT satellites on a Dnepr rocket. From the middle of 2015 through the middle of 2017, the Space X Falcon 9 is scheduled to launch 70 Iridium NEXT spacecraft in a series of seven launches. Iridium PRIME can begin to launch after the Iridium NEXT constellation is fully launched. Our first Iridium PRIME mission could occur by late 2017 or early 2018.

Focus: The Power Of Q

By Tony Radford, Vice President, Teledyne Paradise Datacom

There's no doubt that the telecommunications industry is evolving at a blistering pace, thanks to our insatiable thirst for connectivity no matter where we are located.
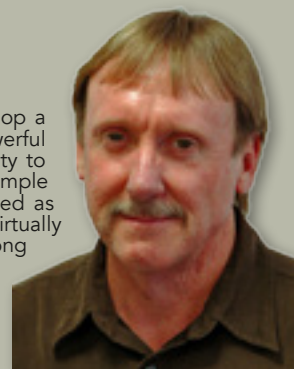
It would seem that the portion of our planet not illuminated by some form of broadband service is shrinking faster than the polar ice caps. The introduction of new services being delivered via MEO and HTS satellites alone brings the promise of access from virtually any point on land, at sea or in the air. In much the same way that Twinkies and Bon Bons begat Spandex, the fierce demand for high-bandwidth, global connectivity is driving the need for new products and features that operators can use to provide these services in the most cost-efficient way.

However, even as the latest products are released, innovators are hard at work developing the next set of features that promise to push the envelope even further in terms of throughput and efficiency, often rendering the previous models obsolete before the ink is dry on the purchase order. The result is the loss of

Wouldn't it be great if someone were to develop a software-defined modem platform that was powerful enough and that had sufficient onboard capacity to accommodate tomorrow's features by way of a simple USB-upload? A modem that could be purchased as a low-cost, modestly-featured product with a virtually unlimited growth potential—that could evolve along with the network by accepting new, high-end features along the way—without the need for the replacement of hardware?

Introducing Q-FLEX

The modem-design team at Teledyne Paradise Datacom has maintained a focus on operational-flexibility since the release of the Evolution modem in 2005.

an opportunity to wring another pint of profit from their network by employing the latest technology breakthroughs—at least until their next capx budget is approved (which, for some, is synchronized with the passing of Halley's Comet).

When it comes to communications via satellite, this aphorism is particularly applicable to a satellite modem—the device that largely determines the maximum data transmission-rate, as well as the amount of satellite bandwidth required to carry it. Over the years, the introduction and refinement of modem features that include high-order modulation schemes, sharp roll-off filtering, low-latency codes, IP compression and sophisticated carrier-cancellation techniques, has presented service-providers with the ability to pack more bits-per-hertz than anyone could have imagined just a few years back. But that provides little solace for those who built their networks around products that were fixed on the evolution timeline—products that aren't sufficiently flexible to accept significant technology upgrades as they become available.

"By addressing virtually all satellite modem applications with a single hardware platform, our modems have provided great value to our customers around the world by minimizing the degree to which market and technology changes have impacted their operations," said Colin Mackay, Vice President of Engineering. "Our new Q-Flex satellite modem is our first truly software-defined modem running on a new universal hardware platform. Our design goal was to make it capable of doing whatever you want it to do—now and in the future. It combines great performance, flexibility, simplicity and value."

John Restivo, General Manager of Teledyne Paradise Datacom, said, "Q-Flex is much more than a mere refresh of our legacy platform. Q-Flex is a ground-up design that incorporates not only our current features, but many new ones as well. For example, we've developed an optimized spectral roll-off feature that can provide up to 20 percent bandwidth savings. When combined with other bandwidth-saving features such as Paired Carrier and FastLink-LDPC, Q-Flex provides an excellent value proposition for customers who want to squeeze everything they can from the transponder. In addition, we've figured out how

The front and back panels of the Q-Flex Modem.

to implement them in a cost-effective way that should give us a considerable advantage over our competition."

The Q-Flex datasheet contains a most impressive list of specifications. However, you have to look under the hood to obtain the full benefit of what Q-Flex offers beyond convention. By using the latest chips available, Paradise has been able to reduce the total FPGA count from the previous platform by half, while increasing the number of functions that can be performed directly on the motherboard. The lower parts-count means less current draw and consequently—less heat.

The new, main-processor is 10 times more powerful, so it can easily power the new Internet Protocol (IP) engine without need of a separate daughter-card and dedicated processor. The upgrade was necessary to accommodate all of the enhanced IP features available on the Q-Flex platform, such as fully-provisioned IP Quality of Service (QoS) and the ability to process 150,000 IP packets per second.

In addition to all of this, Q-Flex contains a complete set of embedded network diagnostics tools that includes a wide-band spectrum monitor with peak-hold, a Bit Error-Rate Tester with Fireberd-emulation, constellation oscilloscope to 32APSK, IP Packet-throughput monitor and an interfering-signal detector—any of which can be employed while carrying live traffic. The reduced need for external test instruments will go a long way towards capital savings.

The number of terrestrial interfaces that the modem can accommodate simultaneously has been doubled and USB ports have been added to the front and rear panels to make software upgrades and configuration transfers ultra-convenient.

The real beauty of Q-Flex is that, regarding price, Q-Flex can go head-to-head with low-end, less-featured modems that have little room for upgrade. A base-configured Q-Flex can be field-upgraded all the way up to its high-end configuration, so the unit can grow with the network and eliminate the need for modem change-outs in the future. And since both IF and L-band interfaces are available in a single unit, sparing is greatly simplified.

As the world is moving more and more towards IP as the transmission protocol of choice, it is only fitting that Q-Flex is equipped with the most powerful suite of IP features available today.

Mr. Mackay said, "The challenge for IP-over-satellite is that the IP world is changing rapidly, with a relatively small number of traditional core IP protocols now being supplanted by a much larger number of application-specific protocols such as those used in 4G communications.

"These new protocols don't always perform well over satellite without careful handling. IP bandwidth optimization features such as compression and Adaptive Coding and Modulation (ACM) are very important. However, great features in themselves don't guarantee a great quality of service. For that reason we have focused strongly on tightly integrating all of our IP features with powerful traffic management tools that help users deliver, and prove they deliver, the quality of service specified in their Service Level Agreements (SLAs)."

In fact, Paradise has taken things a step further with the introduction of XStream IP™, a new approach to handling IP that was developed specifically for inclusion in both Q-Flex and its half-size cousin—Q-Lite. XStream IP™ is a collection of satellite-friendly, highly-efficient, IP bandwidth-optimization and traffic-management tools.

"It represents a break from the past. IP has moved on and so have we. Paradise has evolved a different approach because IP-over-satellite was getting way too difficult and wasn't delivering the quality of services users expect," added Mr. Mackay.

For some customers, simple 'point-to-point' links are not enough to provide sufficient connectivity. For users that require a higher level of management, the product development teams at Paradise and CodeMettle have joined forces to develop a state-of-the-art network management platform—Q-NET™.

Q-NET™ is an innovative and scalable Multiple-Channel-Per-Carrier (MCPC) Demand-Assigned-Multiple-Access (DAMA) satellite network management system whereby satellite resources are allocated 'on-demand' from a centrally-managed pool that is shared amongst all users in the network. MCPC architecture ensures that bandwidth-contention is managed with minimal overhead, resulting in high bandwidth efficiency. All network topologies including point-to-point, point-to-multipoint, STAR, mesh and hybrid variants are supported.

Dynamic bandwidth management is provided via flexible, automated carrier switching that supports a wide variety of bandwidth sharing policies. Thanks to the set of powerful diagnostics tools embedded in the Q-FLEX modem, system monitoring and link diagnostics at the network-level are second to none, including the collection of performance data for both real-time and historical analysis.

A reversionary control system for the Q-NET™ Central Server, along with customizable levels of support, helps ensure the highest level of system availability. Advanced internal IP features including encryption, acceleration, compression, ACM and traffic shaping allow efficient utilization of bandwidth while simultaneously providing the highest QoS for each traffic stream on an individual packet-basis.

If there ever was a "one size fits all" modem, Q-Flex is it. Depending on how it's purchased, what it can't do out of the box—it can do with a simple flash-upgrade of additional features, including higher data-rates, carrier-cancellation, higher modulation and FEC schemes and anything else Q-Flex can accomplish in its "flagship" configuration.

This future-proofed design ensures that your capital investment is fully protected by allowing enough headroom for functionality upgrades throughout a projected lifetime of 10+ years.

For additional information regarding Teledyne Paradise Datacom, and the Q-Flex Modem, please access the company's infopage at:

http://www.paradisedata.com/ index.php/introducing-q-flex/

About the author
Tony Radford currently holds the position of Vice President of Sales and Marketing for Teledyne Microwave Solutions, which is comprised of seven Teledyne Technologies business units. Mr. Radford's tenure in the Satellite Communications Industry spans more than 30 years and his book—Satcom Guide for the Technically Challenged—is used by companies around the world as a primer for new entrants into the world of SATCOM.

Teledyne Paradise Datacom's Q-Flex satellite modem's dashboard.

A Case In Point
Gas Production Supports Employee Welfare Comms

By Nick Miller, Sales Director + Satellite Specialist, Pactel International

The PNG LNG Project is an integrated development that includes gas production and processing facilities in the Southern Highlands and Western Provinces of Papua New Guinea, including liquefaction and storage facilities with capacity of 6.9 million tons per year.

With more than 700 kilometres (450 miles) of pipelines connecting the facilities, PNG LNG will provide a long-term supply of Liquefied Natural Gas to four major LNG customers in the Asia region including: China Petroleum and Chemical Corporation (Sinopec), Osaka Gas Company Limited, The Tokyo Electric Power Company Inc., and Chinese Petroleum Corporation.

Esso Highlands Limited (Company), a subsidiary of ExxonMobil Corporation, is constructing and will operate the Project on behalf of the co-venturers—Oil Search Limited , NPCP, Santos, JX Nippon Oil & Gas Exploration, Mineral Resources Development Company and Petromin PNG Holdings Limited. (*Please see Figure 1 below*).

The Challenge

Accommodation Camp B (pictured below) required a new communication system to respond to the welfare needs of 9,000 workers residing at the premises of the LNG Plant. The staff needed fast Internet connectivity for recreational purposes and reliable voice services to be able to communicate with their families.

The link had to be optimized in order to cope with the high-volume recreational traffic, as well as allow bandwidth demanding applications, such as Video Streaming and File Sharing, to perform seamlessly across all user-owned devices. (*BYOD=Bring Your Own Deivce, where employees bring their owned mobile devides to the work site and then use them to gain admission to company servers and information they are allowed to access.*)

Finally, the network design had to be rigid and simple with minimal hardware and maintenance costs as well as simple administration management.

To address these unique requirements, a collaborative partnership was formed between a local communications supplier, Rural Tech Development, and global satellite services provider, Pactel International. The partnership combined the local presence and expertise of Rural Tech Development, who have already performed the majority of fiber optic splice and termination as well as OTDR tests and end-to-end certification at the PNG LNG plant site, with the satellite expertise and global reach of Pactel International, who operate seven welfare networks globally and have more than 30, corporate-grade, satellite links into remote PNG. (*Please see Figure 2 on the next page.*)

The Solution

In late 2012, Rural Tech developed and implemented a wireless solution capable of providing uniform coverage across 1.2km2 camp accommodation quarters. The solution was designed to support voice calls via secure VoIP pay phones and Internet services via the workers' personal devices and the Internet cafe. Using multiple bandwidth reserves and a carrier-grade, cost efficient Newtec platform, Pactel International provided a 10MB satellite link, while Rural Tech managed the complete onsite systems installation and layout.

"Coverage penetration was, and still is, particularly challenging due to the geographical spread of the camp," said Shahram Honarzad (Shaz), Technical Director at Rural Tech Development. "We didn't want to risk having poor and uneven coverage in certain areas, so we had to reconsider the original P2P system layout and add additional access points, where the coverage was particularly poor—a system layout comparable to a multi-story hotel building."

Extending on the hotel network analogy, Rural Tech developed a centralized management and billing system: Every worker can purchase a pre-paid Internet and VoIP card.

To ensure maximum efficiency and seamless operation, Pactel International completed the project by integrating its value-adding services:

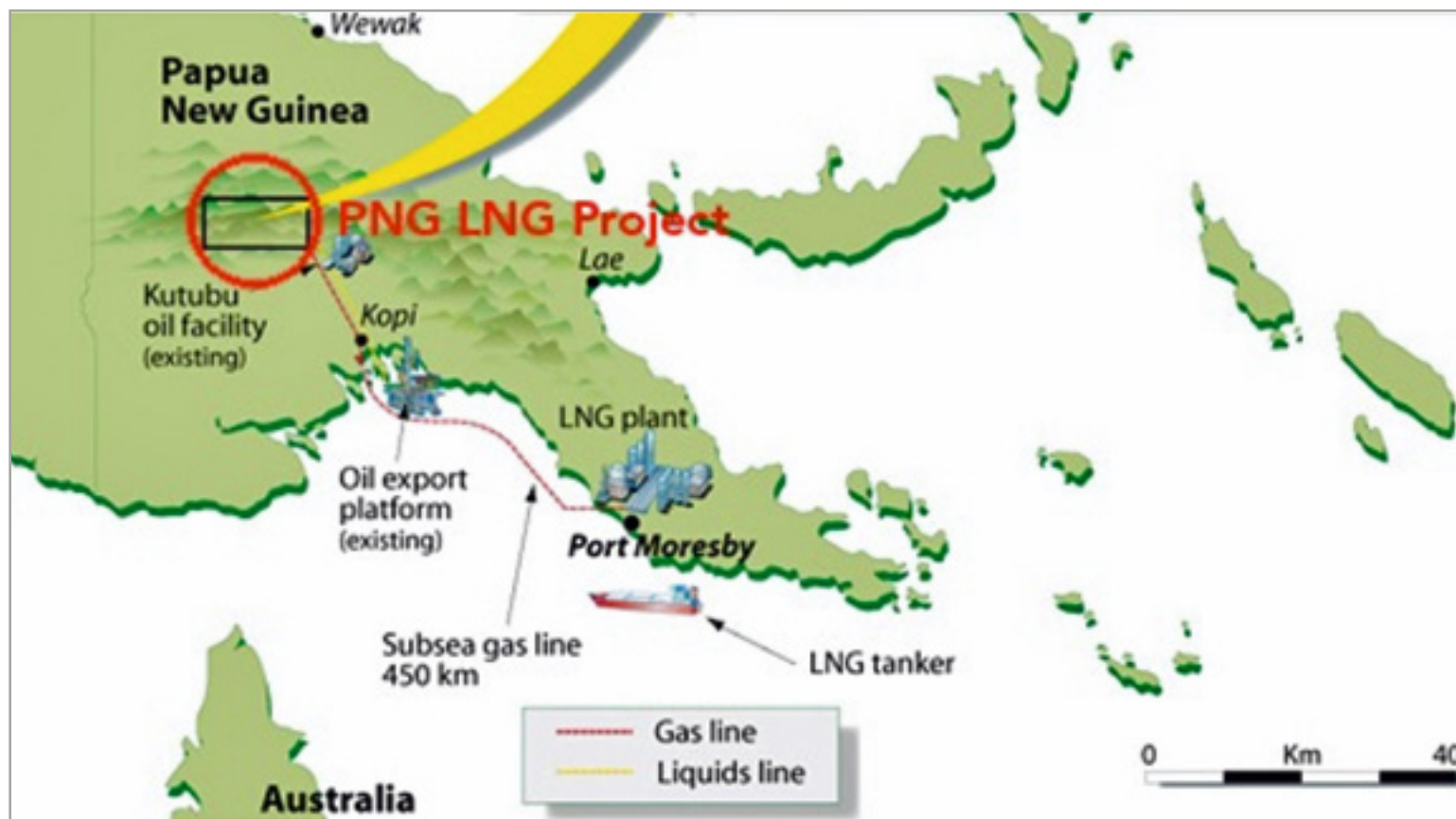- Bandwidth Acceleration: Required due to the high-bandwidth nature of recreational traffic.

Figure 1. The PNG LNG Project Map

Figure 2. LNG Plant Layout

- The NX-2700 is a 2U appliance that supports 10 Mbps of WAN bandwidth and includes 1TB of secure local data store in a resilient configuration. The NX-2700 is ideal for remote and branch offices.

- QoS: Rules were applied to prioritize voice over data traffic and manage video and other application allowances.

- Application Filtering: To limit video usage (as the highest bandwidth-consuming application) as well as DNS to block any offensive web pages.

- Online Network Monitoring: An online portal provides scheduled and on-demand reporting on all aspects of the satellite network, including bandwidth usage and voice performance.

The Results

Complementing each other's assets, Pactel International and Rural Tech Development met all customer expectations in designing a reliable, efficient and simple to operate welfare network. As a result, PNG LNG workers can now communicate with their families via various platforms including VoIP Phone, Skype, as well as Messenger and Social Media.

As for the PNG LNG project as a whole, it shall enjoy the following benefits:

- Increased worker quality of life

- Significant time savings in managing the new network due to centralized management

- Improved worker retention

- Improved overall business efficiency due to satisfied and therefore productive personnel

"Retaining quality personnel while sustaining costs are the two primary challenges our customers in the resource industry are faced with. The PNG LNG project was another opportunity for us to provide a responsive welfare network to address these challenges as well as strengthen our market position in PNG by providing a large-scale link into a remote location of the country", said Nick Miller, Sales Manager of Pactel International. "I thank Rural Tech Developments for their responsiveness and professionalism throughout. It was their expertise in the PNG LNG venture and local presence that made this project possible," added Mr Miller.

Moving Forward

Throughout the multi-year deal, Pactel will continue monitoring the existing network and provide recommendations and adjustments to the QoS rules and acceleration technology to ensure link efficiency, maximize throughput and network uptime.

For additional information regarding Pactel International, please access their website at: ***http://www.pactelint.com***

About Pactel International
Founded in 2003, Pactel International is an Australian-based global satellite communications provider, supplying connectivity across all areas of the Asia-Pacific region. The company's offerings range from commercial and corporate to carrier-grade networks that support services such as Internet, Private WAN, Telephony and Voice and Mobile GSM.

Pactel joined the SpeedCast Group in May 2013. This reinforces Pactel's customer commitment by enabling us to provide global coverage; expand our service portfolio to offer an integration of telecommunications, network management and maritime solutions; and have access to a wider, diverse-carrier network and infrastructure.

About RuralTech Development
Rural Tech Development is a traditional and independent Information and Communication Technology (ICT) provider established since 2005 in PNG. The main focus of the firm is to provide professional solutions rather than selling products and to work closely with customers and adopt a collaborative approach during the design, implementation, and delivery of all solutions to ensure the highest level of customer satisfaction.

SatBroadcasting™
Popular Doesn't Always Mean The Best

By Dr. Dawie de Wet, Ph.D., CEO, Q-KON

If 54 million people in Africa use 3G for data connectivity, and three million people use ADSL, and less than 500,000 people use satellite, does this mean 3G is the best option for broadband Internet access services? Is the number of subscribers indicative of performance, marketing excellence—or both?

When marketing pricing policies advantages then it is rather difficult to differentiate the principles and what service will be best for a particular application. Within this situation in which it seems that providers are actively collaborating to disguise the fundamentals, having our own reference of the fundamental principles will certainly help.
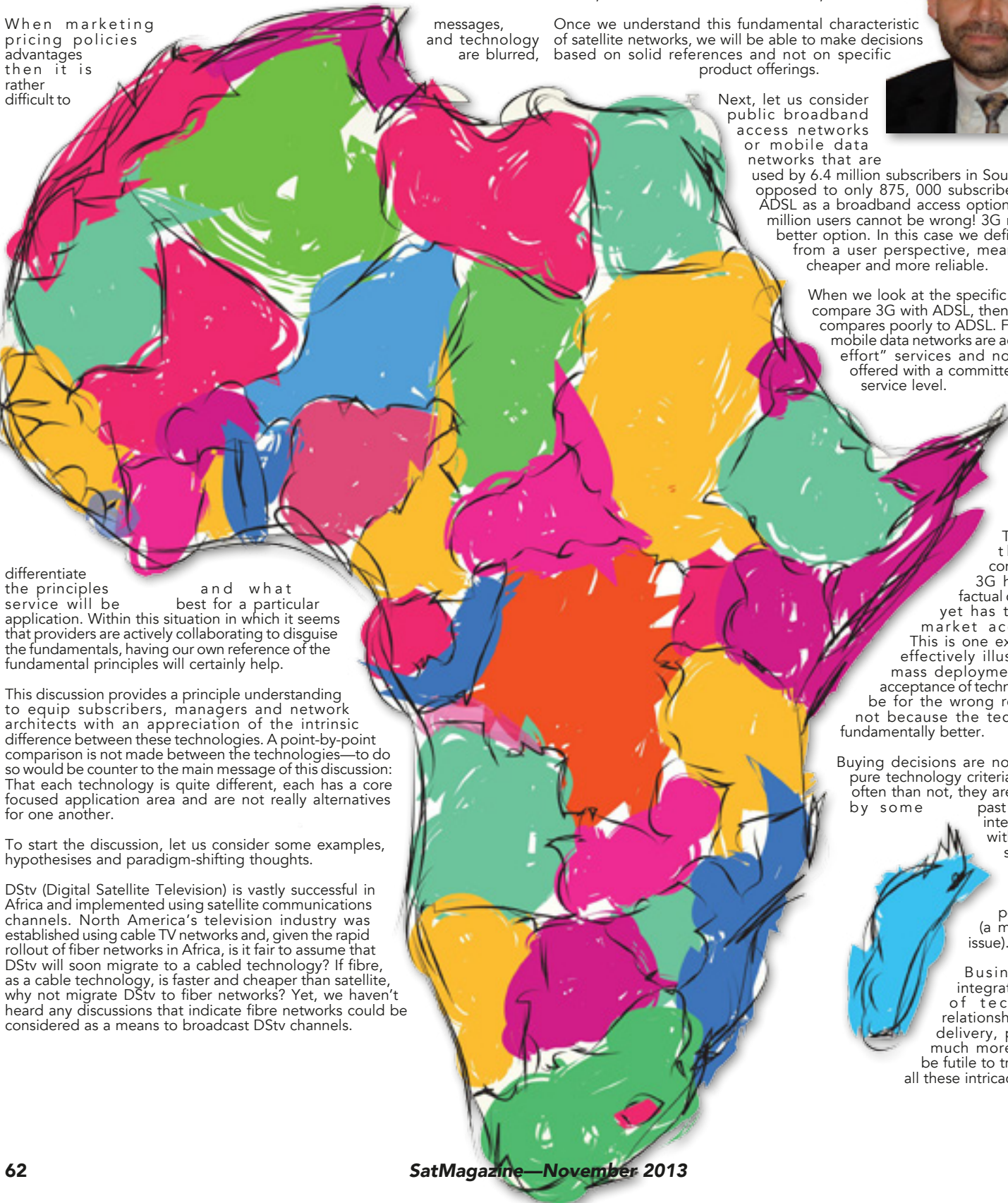
messages, and technology are blurred,

This discussion provides a principle understanding to equip subscribers, managers and network architects with an appreciation of the intrinsic difference between these technologies. A point-by-point comparison is not made between the technologies—to do so would be counter to the main message of this discussion: That each technology is quite different, each has a core focused application area and are not really alternatives for one another.

To start the discussion, let us consider some examples, hypothesises and paradigm-shifting thoughts.

DStv (Digital Satellite Television) is vastly successful in Africa and implemented using satellite communications channels. North America's television industry was established using cable TV networks and, given the rapid rollout of fiber networks in Africa, is it fair to assume that DStv will soon migrate to a cabled technology? If fibre, as a cable technology, is faster and cheaper than satellite, why not migrate DStv to fiber networks? Yet, we haven't heard any discussions that indicate fibre networks could be considered as a means to broadcast DStv channels.

This is because satellite networks are ideal for broadcast services, i.e., services where the same content is distributed from a single point to many remote locations as applicable to television broadcast, digital media, educational content distribution, and more.

Once we understand this fundamental characteristic of satellite networks, we will be able to make decisions based on solid references and not on specific product offerings.

Next, let us consider public broadband access networks or mobile data networks that are used by 6.4 million subscribers in South Africa, as opposed to only 875, 000 subscribers that use ADSL as a broadband access option. Surely, six million users cannot be wrong! 3G must be the better option. In this case we define "better" from a user perspective, meaning faster, cheaper and more reliable.

When we look at the specific pricing and compare 3G with ADSL, then 3G actually compares poorly to ADSL. Furthermore, mobile data networks are actually "best effort" services and not generally offered with a committed minimum service level.

Taking this into consideration, 3G has lost the factual comparison, yet has the lead in market acceptance. This is one example that effectively illustrates that mass deployment or mass acceptance of technology could be for the wrong reasons and not because the technology is fundamentally better.

Buying decisions are not based on pure technology criteria and, more often than not, they are influenced by some past experience, interaction with a specific service provider, or general market perception (a more serious issue).

Business is an integrated domain of technology, relationships, service delivery, pricing and much more—it would be futile to try to explain all these intricacies.

Rather, we will focus on providing a general understanding of the principles of each of these technologies so that users and network architects can align technology principles with requirements and then add all the other considerations.

First, we consider ADSL networks. South Africa and most countries across Africa operate on a fixed line infrastructure that is provided by public network operators. The service is implemented using either copper cable networks, or in very limited areas, fiber distribution networks.

In South Africa, the service is implemented over Telkom's infrastructure and is defined in terms of the expected data rates with no further service level definition or commitment. ADSL can only be offered in areas with digital exchanges and also when the subscriber premises are within a limited range from digital exchanges.

ADSL services are implemented over point-to-point circuits from the customer premises, through Telkom's network, to the data center of the head office. Even national customer networks are implemented using this "circuit" philosophy and are comprised of multiple, integrated, point-to-point links.

3G (or other mobile data) services, initially developed as a data connectivity solution for individual users, are offered using mobile network infrastructure and is available throughout South Africa. The phenomenal success of mobile network operators has resulted in this service being made effectively available "anytime and everywhere."

The success of the 3G networks has also led to the use of 3G services for corporate data connectivity applications, such as bank ATM networks, office connectivity, remote data collection, and much more. However, with the mass adaptation of 3G data connectivity services and the increase in GSM network traffic, network congestion has become more of a hindrance and limitation and more so because the "best effort" nature of this service is part of the principle technology characteristics.

Satellite networks (except for the latest Ka-band deployments) are available anywhere and anytime. These networks are developed with extremely high availability and reliability. Have you ever wondered what would happen if the national television broadcast is distributed on a "best effort" basis? Satellite networks are perfectly positioned for broadcast application and, remember, distribution of IP content is just another format of broadcasting (technically referred to as multicasting).

While this is not an in-depth analysis of each technology, it does strive to communicate a better understanding of the satellite vs 3G vs ADSL to guide users and network architects.

The key technology differentiation points are summarized in Table 1, below, with the principles noted as follow:

- Satellite networks provide "anywhere and anytime" communication at extremely high availability and is perfect for broadcast applications, including data broadcast

- ADSL and cables networks are the cost leaders for services to fixed locations within metropolitan areas and where available

- 3G and mobile data services are the ultimate in convenience and ease of deployment yet limited by a "best-effort" service level commitment for enterprise applications

For additional information about Q-KON, access their website at:
http://qkon.com/

About the author
Dr. Dawie de Wet (PhD Eng) is the Chief Executive Officer of Q-KON Africa and Chairman of the Group. He has more than 24 years of experience in the design, development and implementation of Wireless, Microwave and Satellite communication systems in Africa. In 1988 he joined the Q-KON board and was appointed Managing Director in 1993. In 2013, Dawie completed his Ph.D. in Engineering. His thesis titled: A scalable business model for mass customization of broadband services in the emerging Africa market summarised the result of seven years of research work focused on the value proposition of the domain where technology, business and market domains intersect. The research work provides both Dawie and Q-KON with a sound reference and foundation to meet current and future market demands in challenging landscapes.

About Q-KON
Q-KON is a South African based engineering group that provides turn-key solutions and managed network services to the African and South African telecommunications industries. The company focuses on the delivery of innovative wireless, satellite and VoIP (Voice over IP) solutions. This technology is expertly designed to meet increasing demands for connectivity and enhanced telecommunications capabilities within these developing economies. For 23 years, Q-KON has followed successful strategies to establish advance technologies in challenging environments to unlock real business benefits for all. Since its inception, the company has distinguished itself in the solutions and services it provides and has conquered many business impossibilities. Q-KON's engineering achievements throughout its target markets are underwritten by sound business practices and long-term ethical relationships.

	Satellite Networks	Mobile Data	ADSL
Biggest strength	Rapid deployment and service reliability.	Convenience, anytime & anywhere.	Best pricing for point-to-point data and broadband services.
Biggest constraint	The cost to deploy the remote user equipment.	Defined as a "best effort" service with very limited quality of service options.	Fixed deployment with limited national footprint and prone to service disruptions due to last mile risks.
Ideal user environment	Remote location that required high reliability and absolute service level commitments.	Mobile user with best-effort anywhere & anytime service requirements.	Fixed locations within metropolitan areas that require broadband services at most economical costs.
Service level commitments	Defined and contracted SLA up to 99.95%.	"Best-effort" linked to network congestion.	"Best-effort" linked to last mile connection risks.
Network architecture	Simplistic, one-hop between hub and remote.	Complex network of base stations and interconnect links.	Complex network of exchanges and interconnect links.

Focus: Savvy Savings With Used Uplink TWTAs

By Dan Freyer, Principal, AdWavez Marketing

TWTAs (traveling wave tube amplifiers) are typically the most cost-effective and reliable solution when compared to other Earth station HPA (high power amplifier) technologies (such as SSPAs and klystrons) for applications that require medium to high power level requirements across a wide bandwidth.

Used Earth station TWTAs can offer price savings as much as 50 percent, when compared to the price of new units. Above and beyond the fact that used TWTAs can function well as the primary amplifiers in a facility for many years, pre-owned HPAs also work for a variety of business cases, including:

- Temporary services (urgent services needing fast turn-up)

- Low-budget services

- Test services

- Occasional use or ad-hoc services

- Backup systems

- Short-term contracts (e.g., the increasingly common one to three year service agreement)

- Emergency services

Getting On-Air—Fast

The recent experience of Santander Teleport (http://santanderteleport.com) in Santander, Spain, is an example of how purchasing used TWTAs equipment can save time and money, and at manageable risk levels.

Santander Teleport offers commercial and government organizations access to C-, Ku-and X-band services to satellites in the GEO orbit from 60 degrees West to 65 degrees East, covering a region from Western Australia to North America, the Mediterranean Sea, as well as the Indian and Atlantic Oceans.

According to Mónica Delgado, Technical Director for Santander Teleport, "Many customers request services that need to be on air very quickly. Sometimes, manufacturer delivery times for new RF equipment are too long to allow us to commit to our customers' requested in-service dates." When this has occurred, Santander Teleport has found success by taking quick delivery of pre-owned TWTAs that are shipped from New Era Systems (www.newerasystems.net). New Era Systems is a company that specializes in providing deep discounts and fast worldwide delivery of used equipment that ranges from large and small satellite antennas, modems, VSATs, BUCs, transceivers, amplifiers and more.

A Case Study In Savings

Quick delivery can certainly be important. However, the costs savings achieved with pre-owned gear tend to be the key factor when considering used equipment. Consider the following typical and actual example where a buyer experienced a 50 percent price savings.

A supplier of new and used RF equipment supplier was asked to quote on a redundant set of amplifiers for a customer in South America. The requirement: A Ku-band solution of at least 400 watts with a fully automatic switch-over in case of a failure of the operating amplifier. The customer had no preference for either a TWTA or SSPA and wanted a quote for the most reliable and cost effective solution.

The price quotes for new Ku-band and extended frequency amplifiers are show in *Table 1*, below. The customer saved $50,000, while gaining an additional 300W of power in each of two amplifiers in the 1:1 system, with years of service remaining on the equipment.

Quoted price of new equipment		
• *400 Watt TWTA The lowest price configuration was $103K* • *Prices for narrowband SSPAs ranged from $106K to $148K*	*Either of the following used equipment options were available, complete with all of the necessary cables, controllers and dummy loads to care a 1:1 package* • *400W TWTAs—$38K* • *700W TWTAs—$53K*	*$65K, or 63% savings, at 400W* *or* *50% savings, plus 300W additional rated power (redundant) per TWTA*

Table 1 — Source: New Era Systems

Tube Health + Lifespan Of The TWTA

According to manufacturers, TWTAs can operate for 100,000 hours (more than 11 years) of continuous service at their rated RF output power.[1] How does one assess the risk versus benefit when it comes to buying a used TWTA?

As engineers are fully aware, the heart of a TWTA is the tube. When the tube reaches life's end, the cost of a replacement tube can range from $17,000 to $27,000. As a buyer, it is vital to know the condition of the tube in the amplifier under purchase consideration. Fortunately, there are some good parameters that offer clear intelligence about the condition of the tube.

According Phil Thomas, President of New Era Systems, "Clients are typically interested in three items: First, the total hours of operation; second, the 'beam on' hours; and third, the Helix Current. The hours of total operation and the beam on hours are of lesser significance but do give an indication of the age of the amplifier. However, the most important parameter is the Helix current."

According to Thomas, "When a tube is in good condition, irrespective of its hours of operation, if the Helix current at designed output is less than 5mA (milliamps), then the tube is in good shape. The tube can be predicted to offer several more years of service. Conversely, if the Helix current is in the 9mA range, then the future of that particular tube is cloudy."
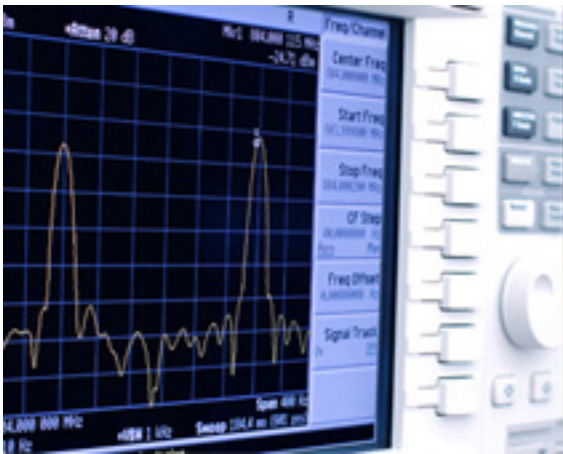

Photo courtesy of New Era Systems.

Useful Life

Manufacturers' statements say that the vast majority of TWTAs live up to, and past, their planned lifetimes. Cooling fans and power supplies are likely to fail first, before the tubes fail.[2] There are electronic control circuits in TWTAs that age, and, eventually, deteriorate.

The overall reliability of a TWTA is affected by the failure rates of both the tube and the power supply,[3] so an estimate of reliability must include the MTBF of the high voltage power supply. Advances in power supply reliability have, in part, been the result of a large market for high voltage power supply circuit components, resulting in improved high production manufacturing process and quality control.[4]

"Each manufacturer has its own expiration guidelines—most manufacturers recommend about 45,000 hours of use on a TWTA. Although a manufacturer may specify a set number of hours of operation as the 'expiration date' for the unit, that date may not reflect the capabilities of the HPA to continue to provide reliable service," said Thomas.

Well-designed TWTAs have been known to supply a beam of electrons in excess of 100,000 hours of continuous operation.[5] "At the other end of the scale we have seen amplifiers with a few thousand hours on the clock with tubes that are clearly destined for imminent failure," Thomas notes. "We believe that manufacturers are much too cautious. This is based on our company's field experience with customers who buy TWTAs with 45,000 hours or more, which run successfully for years to come."

To be fair to TWTA manufacturers, the hours of operation are obviously important as a TWTA does not run by tube alone. However, failure of the control circuits is normally not the catastrophe that would be caused by a complete tube failure. "We have purchased and resold amplifiers with as many as 90,000 hours on the meter. And yet, with good tube characteristics, they can be expected to last for many more years," added Thomas.

> **As engineers know, the heart of a TWTA is the tube. When the tube reaches life end, the cost of a replacement tube can range from $17,000 to $27,000.**

Replacement Tubes

Even if the heater hours (total time operated) indicator reports 80,000-90,000 hours, the actual Beam On hours for the specific tube could be much lower. It may have been a replacement part that was installed later than the first tube initially shipped from the factory.

Testing

A good practice is to ask a used equipment suppliers what testing they perform, and what guarantees are offered on the items they ship. Does your supplier perform diligent testing to ensure the unit is in good condition and can be predicted to deliver the expected performance for the planned term of use?

"We believe that our industry-leading quality testing, and refurbishment services, and resale guarantees, are key part of why ground station facilities worldwide have continued to rely on New Era Systems as a trusted supplier of pre-owned RF gear over two decades," said Thomas.

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

Delivery + Performance

Know your supplier. Be sure that they will support their sales—if it is necessary to go back to the manufacturer for help, that can be a costly and time consuming necessity.

Photo of a Xicom 100W Rack Mount C-Band TWTA. Courtesy of New Era Systems.

"We know used equipment can have failures, normally detected during early operation," says Delgado. "That's why we like New Era, because we know they'll provide a solution if a piece of equipment has issues. For example, we purchased 1:2 TWTA systems and had a problem with the switch on the first day. They shipped a loaner unit immediately serve us while the switch was being repaired. We like that type of response to a provider."

"Because we have a policy of guaranteeing our products, failure costs us money," said Thomas. "We have to ship a replacement at our cost and have the damaged item returned, also at our cost."

Proper Installation

When a used TWTA is purchased, it is essential the equipment be properly commissioned into service. Manufacturer's safety precautions exist for storage, set-up, testing, and operation of TWTAs and their components, all of which should be observed. For example, CPI (Communications & Power Industries) has published a guide that discusses out-gassing the tube and then only increasing the output power gradually over several hours.

Tube amplifiers demand a certain amount of skill on the part of the user. Turning them on, and immediately cranking up the power is a prescription for failure. TWTAs have a long warm-up time, especially if they have been turned off for a protracted period.

Make sure you have the proper instructions for the unit and follow the correct procedure for placing your pre-owned TWTA into use. "It is not unheard of in our business that customers have turned on a used HPA without following proper instructions, and they immediately burned out their tube by applying too much power without adequately warming up the system," states New Era Systems. Also, if an amplifier is run in a dirty environment, the cooling fans ingest grime that gathers on the surface components, preventing efficient cooling of those components and most likely causing early failure.

Another killer of the tube is dirty AC power. Pre-owned TWTA buyers who connect them directly to utility power sources or generators without the protection of a good quality UPS between the generator and the amplifier are also destined to shorten the life of the tube. Power spikes can scrub an HPA as well. It is essential to have the properly conditioned and surge-protected power and the prescribed grounding for the installation.

Careful packing is also essential to avoid shipment damage. Make certain the supplier properly packs the equipment prior to shipping—ask for test data documentation before shipment.

The Bottom Line

When you stand to save more than 50 percent in cost, the pre-owned TWTA option makes business sense for a variety of situations. Although an occasional deal for satellite gear can be found on eBay, savvy buyers and sellers say your best bet for used TWTAs is to work with an experienced, reputable supplier, one that follows test procedures and provides delivery and performance assurances that can be relied upon.

References

[1]Source: http://www.cpii.com/rffactcheck/

[2]Ibid.

[3]Via Satellite, October, 1998, "Earth Station High Power Amplifiers KPA, TWTA, or SSPA?" by Robert A. Nelson

[4]Ibid.

[5]Source: Howard Hausman, VP Engineering, MITEQ, Inc. ,"A Comparison of High Power Amplifier Technologies: TWTAs vs SSPAs", MPDigest.com, January 2008, Page 1. Article states that tubes have a typical life limited to 70,000-100,000 hours of continuous operation.

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