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Asia-Pacific Market

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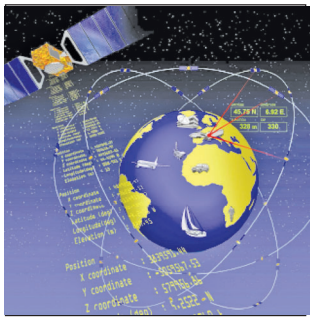

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REGULAR DEPARTMENTS

NOTES *from the* EDITOR

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Calendar of Events 2007

Jun. 5-7, **ISCe 2007: Satellite and Hybrid Network Solutions for the Entertainment and Military/ Government Markets**
San Diego Hilton Resort at Mission Bay, San Diego, California
David Bross
Tel: +1.301.916.2236 / E-mail: dbross@hfusa.com

Jun. 11-12, **Mobile TV World Forum**
Prague, CZECHOSLOVAKI
AIngrid Anusic
Tel: +44 1173 116 220 / Fax: +44 1173 116 221
E-mail: ingrida@junction-group.comhttp://www.mobiletv-forum.com

Jun. 14-16, **3rd International Conference on recent Advances in Space Technologies**
Istanbul, TURKEY
Tel: +90-212-6632490, Ext. 4365
Fax: +90-212-6628551
E- mail: rast2007@rast.org.tr http://www.rast.org.tr/

June 18-24, **47th International Paris Air Show**
Salon International de l'Aéronautique et de l'Espace - Paris Le Bourget,
FRANCEexposants@salon-du-bourget.frhttp://www.paris-air-show.com/en/

Jun. 19-22, **CommunicAsia 2007**
SINGAPORETel: +65 6738 6776
Fax: +65 6732 6776
E-mail:yus@sesallworld.comhttp://www.communicasia.com/

July 30-August 1, **GRIDCOM Summit 2007**
Georgetown University Conference Center
Washington, DC
Christine Fish
212-885-2724
Christine.fish@idga.orghttp://www.gridcomusa.com

August 8-9, **11th Denver DBS Summit**
Denver, Colorado
Phone: (303) 777-7055 / Email:
denverdbs@msn.comhttp://www.LtenDenver.com

Aug. 21-23, **LandWarNet Conference 2007**
Greater Ft. Lauderdale/Broward County Convention Center, Ft. Lauderdale, FL, USA
Terry Rogers
(703) 631-6238
E-Mail: trogers@afcea.orghttp://www.afcea.org/events/landwarnet/

September 3-6, **World Satellite Business Week**
Paris, FranceLinda Zaiche
Tel: +33-149-237517
E-mail: zaiche@euroconsult-ec.comhttp://www.satellite-business.com

INDUSTRY NEWS

$30 Billion FCC Spectrum Auction in 2008 Under Threat

FCC's $30 billion auction is being challenged in Court.

WASHINGTON DC — The upcoming bidding for 60 megahertz of analog radio spectrum set for Jan. 28, 2008—which could earn up to $30 billion for the federal government—has run into a legal roadblock.

Three small telecom companies have filed suit at the Third Circuit Court of Appeals in Philadelphia asking the $14 billion auction of wireless spectrum on the grounds held Aug. 2006 be nullified. Council Tree Communications Inc., Bethel Native Corp. and the Minority Media and Telecommunications Council allege that last-minute changes inserted by the Federal Communications Commission (FCC) made the bidding disadvantageous to them.

T-Mobile, a subsidiary of Deutsche Telekom AG, was the big winner at this auction, receiving $4 billion worth of spectrum in a sale of public airwaves once reserved for government use.

Any decision by the appeals court is bound to affect the Jan. 2008 auction where 60 MHz of analog radio spectrum will be sold. The federal government expects to pocket anywhere from $10 to $30 billion from the spectrum sale.

The FCC, which will supervise the auction, expects to reclaim a total of 108 MHz from analog TV broadcasters. Of this total, 24 MHz will not be auctioned but will be given to public-safety groups to solve interoperability problems during time of crisis involving multiple jurisdictions.

EchoStar Wins Patent Lawsuit

ENGLEWOOD, CO — A jury for the U.S. District Court of Eastern Texas has thrown out a patent infringement lawsuit filed by Forgent Networks, Inc. against EchoStar Communications Corporation (Nasdaq:DISH) over software used for digital video recorders (DVRs). Forgent had asked for over $200 million in damages.

EchoStar executive vice president and general counsel David Moskowitz said that while others had settled, EchoStar always believed Forgent's patent was invalid, and the company appreciated the efforts of Judge Davis and of the jury vindicating the company's position. The jury ruled Forgent's patent was invalid.

DirecTV Inc., EchoStar's closest competitor in the satellite TV business, agreed to pay Forgent $8 million to release all claims on the lawsuit. In July 2005, Forgent also sued Cable One, The Washington Post Company, Charter Communications, Comcast, Time Warner Cable and eight other cable carriers and media outlets. Forgent settled lawsuits with nine of the 15 companies it sued, collecting some $20 million.

Echostar Earth Station.
(Echostar photo)

EchoStar provides satellite TV equipment sales and support worldwide. The company's DISH Network currently serves more than 13 million satellite TV customers. DISH Network offers DVRs and hundreds of video and audio channels as well as national HD and international channels in the U.S., Interactive TV, Latino and sports programming

.

EADS Astrium, Thales Alenia Space to Build Arab Yahsat Satellite System

DUBAI, UAE — Dubai-based Al Yah Satellite Communications (Yahsat) has selected the consortium of EADS Astrium and Thales Alenia Space to build its $1.7 billion dual satellite communications system.

Yahsat, a wholly owned subsidiary of the Mubadala Development Company, Abu Dhabi's government-owned investment arm, will serve commercial and government clients in the Middle East, Africa, Europe and South East Asia. It was organized earlier this year.

Yahsat will develop, procure, own and operate a hybrid communication satellite system, and fill gaps in the existing satellite market. It will focus on providing solutions for Internet trunking via satellite, corporate data networks and backhauling services to telecom operators, as well as broadcasting services. Final negotiations with Astrium and Thales are under way, with a view to commence manufacturing as soon as possible.

INDUSTRY NEWS

Mubadala Chairman and COO Waleed Al Mokarrab Al Muhairi said Yahsat sees a boom in satellite demand and Yahsat is perfectly positioned to take advantage of the wealth of opportunities in the region.

"Thanks to the long-term vision of the Abu Dhabi government, we see Yahsat as equipped to become a leading player in the regional satellite market," he said.

The global commercial satellite industry generated over US$80 billion in revenue in 2005 alone, with the highest revenue growth in the Middle East and Africa.

Russia's Glonass Now Offered Free to Users

MOSCOW — In a bold competitive move, Russian President Vladimir Putin has ordered that Russia's Glonass navigation satellite system, the chief competitor to the US' Global Positioning System (GPS), be provided free to customers. It also adds pressure on Europe's delayed Galileo system, originally intended as a subscription service, to offer a similar free service.

In the presidential decree signed to this effect, Putin said access to the civilian navigation signals of Glonass is to be provided to Russian and foreign customers free of charge and without limitations. The decree also ordered that satellite navigation equipment bought by federal agencies and organizations subordinate to them should use Glonass signals.

Putin has charged the Russian Federal Space Agency (Roscosmos) with coordinating work to maintain, develop and use the system for civilian and commercial needs. Russia expects to increase the number of satellites comprising its Glonass navigation system to 18 by the end of this year.

Roscosmos also said a full constellation of 24 satellites will be ready for global coverage by the end of 2009, but even with 18 satellites, Glonass is expected to be able to start providing services for military and civilian users covering Russian territory.

Glonass or the GLObal NAvigation Satellite System is a radio-based satellite navigation system developed by the former Soviet Union and now operated for Russia by the Russian Space Forces. Development on Glonass began in 1976 with a goal of global coverage by 1991, a target unmet due mainly to budgetary constraints.

Satellite Industry Association Calls for US to Continue Funding Satellite Monitoring Program

WASHINGTON DC — The satellite industry called for greater government-industry cooperation to prevent future collisions of orbiting spacecraft. It also called on the US Congress to provide increased funding for a US Air Force program to monitor satellite locations.

David Cavossa, executive director of the Satellite Industry Association (SIA), told the House Subcommittee on National Security and Foreign Affairs that Congress needs to continue funding a pilot program that provides private companies with data collected by the Air Force on the positions of all natural and man-made objects orbiting the Earth. The Department of Defense had not asked for the funds to continue the program.

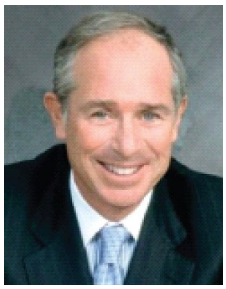
"All space-faring governments should continue to make investments in the capabilities and technologies necessary to provide adequate space situational awareness to increase the safety of all space operations," Cavossa told committee members. "Countries should share space surveillance data to the maximum extent possible, after due consideration to national security and economics."

He asked Congress to fully implement the Congressionally-mandated Commercial and Foreign Entities (CFE) pilot program run by the Air Force, including launch support, end-of-life/reentry support, anomaly resolution, emergency services, and close approach de-confliction. Cavossa said Congress should also require satellite operators to provide timely notice of launch and related orbital insertion activities and notification if an operator has reason to believe that a spacecraft operating under its supervision might interfere with another operator ' s space activities.

"Commercial satellite systems play a critical role in the economy, national security, and disaster response capabilities, Cavossa said. "In short, satellite systems represent a critical infrastructure for the United States, its allies and its trading partners."

Cavossa said the CFE program has proven that government and industry can work well together in coordinating and sharing information about satellite positions, ensuring that routine maneuvers are safe and that the flow of communications is smooth in critical situations.

China Invests in Blackstone



Blackstone CEO Stephen Schwarzman. (Blackstone photo)

BEIJING — China has bought a 9.9 percent stake in New York-based private equity firm The Blackstone Group LP, an investment that marks a major Beijing move to profit from the boom in private equities.

Blackstone, which bought satellite operator New Skies Satellites N.V. in 2004 for $956 million in cash, was reported last month to be in the hunt for Intelsat, Ltd, offering $6 billion to buy the world's largest commercial satellite operator. Both Blackstone and Intelsat have not commented on the Blackstone buy-in reports.

Intelsat has deep business roots in China, and has several dedicated satellites operating over the country. In February 2001, Intelsat came to China's rescue when a sudden network outage created a massive access failure to overseas Web sites across China.

Analysts said China has been looking to diversify its foreign exchanges reserves away from low-yielding US Treasuries. The deal is the first time Beijing has invested its foreign reserve in a commercial transaction. Blackstone CEO Stephen Schwarzman described the investment as a "historic event that changes the paradigm in global capital flows".

Under the terms of the deal, the Chinese government took the extraordinary step of giving up its voting rights associated with the stake in Blackstone. The move appears aimed at forestalling US political opposition to the deal at a time of tension between Washington and Beijing over financial and political affairs, including the state of China's renminbi.

The investment will be made via a new Chinese agency that will manage part of China's foreign reserves of $1.2 trillion. It will also coincide with Blackstone's landmark $40 billion stock market listing, expected in the next few months. It will also allow Blackstone to nearly double its original target of raising $4 billion.

NASA Concludes Review of Constellation Program

HOUSTON, TX — The National Aeronautics and Space Administration (NASA) has concluded a six-month review of system requirements for its Constellation Program that will eventually return Americans to the Moon and land them on Mars.

The Constellation Program — including the Orion spacecraft, the Ares launch vehicles and other support systems — involves development of a new space transportation system that will take astronauts into Earth orbit, the Moon and eventually Mars.

NASA said the project's basic design, development, construction and operation architecture remains unchanged, but it now has a firmer foundation built through extensive analyses and validation testing. A "baseline synchronization" was designed to identify any conflicts or gaps between and among the individual systems and to establish a plan for resolving such issues, NASA said.

"This summer will bring a new season of rolling system definition reviews that will finish our requirements for initial mission capability and set us up for our first preliminary design reviews, said Jeff Hanley, Constellation program manager at NASA's Johnson Space Center here.

He said the next series of reviews will begin with the Orion system definition review in August and continue with Constellation program baseline synchronization next March. The synchronization was designed to identify any conflicts or gaps between and among the projects and the program and to establish a plan for resolving those issues.

The Ares I launch vehicle is being designed to send the solar cell powered Orion spacecraft into Low Earth Orbit by 2015, with a mission to the Moon planned in 2019.

Europe to Fund Galileo Satellite Navigation System; Junks Private Consortium

Galileo satellite in orbit.
(ESA illustration)

BRUSSELS - The Europe Union (EU) will take over the troubled Galileo satellite navigation project from the private sector, a decision that could cost the EU a staggering $12 billion before the 30 satellite constellation becomes operational after 2013.

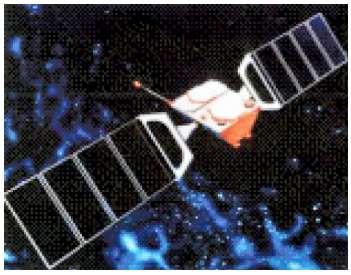
At what turned out to be a very brief meeting, the EU approved the recommendation of Transport Commissioner Jacques Barrot that the EU take charge of Galileo, Europe's challenge to the U.S.' dominant Global Positioning System (GPS). The European Commission (EC) will later on appoint an operator to run the system. A full meeting of EU ministers on June 8 will make a final decision.

Barrot, who in March sounded the alarm about the perils of further delaying Galileo, said EU member states wanted a return on their investment, which could reach $12 billion compared to the initial estimate of $2.7 billion. The latter amount is in addition to the $2 billion allocated to Galileo by the EC from 2007-2013. Barrot believes Galileo could be worth as much as $607 billion by 2025.

An EU take over of Galileo was one of three options—and the one with the strongest backing—Barrot presented during the crucial meeting that will decide the fate of the controversial rival to the U.S.' GPS run by the U.S. Air Force. Other options on the table included partially financing Galileo with public money or abandoning the project completely. The UK and Denmark are opposed to further funding Galileo.

Analysts say the move to take Galileo public betrays a growing resentment at the private sector consortium charged with creating Galileo. Organized two years ago, the consortium consisting of EADS, France's Thales and Alcatel-Lucent, British company Inmarsat, Italy's Finmeccanica, AENA and Hispasat of Spain and a German group that includes Deutsche Telekom and the German Aerospace Center has since made little progress in getting Galileo up and running.

Globalstar and SingTel Form Alliance



Globalstar satellite.
(Globalstar photo)

MILPITAS, CA - Mobile satellite services provider Globalstar, Inc. has entered into a strategic alliance with Singapore Telecommunications Ltd one of Asia's leading communications groups, to expand their services in Southeast Asia's burgeoning maritime and logistics industries.

As part of the alliance, SingTel will construct and operate a Globalstar gateway ground station at its Seletar Satellite earth Station facility in Singapore. The ground station will expand Globalstar's satellite coverage throughout Singapore and Malaysia, as well as parts of Indonesia, Brunei, and the surrounding Southeast Asian maritime shipping region.

The agreement is the initial step needed for Globalstar to offer service with SingTel via the Seletar Earth Station. Globalstar will provide the necessary engineering and technical training support required for SingTel to operate the station. SM

EXECUTIVE MOVES

GeoEye Appoints Uyen Dinh as Senior Director of Government Affairs

DULLES, VA - GeoEye, a provider of satellite, aerial and geospatial information, has appointed Uyen Dinh as senior director for Government Affairs.

Ms. Dinh is responsible for the overall development and execution of the company's Legislative Affairs and Government Relations program. She was born in Saigon, Vietnam and immigrated with her family in 1975. Ms. Dinh's career includes government and private practice experience in antitrust law, and 10 years of service in the U.S. House of Representatives.

Prior to joining GeoEye, Ms. Dinh served as the chief counsel for the U.S. House of Representatives Permanent Select Committee on Intelligence. She has also served as counsel for the House Armed Services Committee, as counsel for the House Government Reform Committee, and as legislative counsel for Representative Tom Davis. Ms. Dinh holds a Juris Doctor degree from The Catholic University of America in Washington, DC and is a member of the Virginia State Bar. She is also the founder and director of Empress Productions, a Vietnamese performing arts organization, and remains active in other Asian-American community activities.

GeoEye is currently building its next-generation commercial satellite imaging system, GeoEye-1, which will provide a ground resolution of 0.41-meter panchromatic (or about 16 inches) and 1.65-meter multispectral or color imagery. Commercial customers, however, may be limited to half-meter GeoEye-1 imagery due to current U.S. Government regulations.

When operational, GeoEye-1 will be among the world's highest resolution commercial Earth imaging satellites. The launch of GeoEye-1 is slated for late 2007 from the Vandenberg Air Force Base in California.

Rick Yuse Appointed President, Raytheon Technical Services

WALTHAM, MA - Raytheon Company has appointed Richard R. (Rick) Yuse, 55, to the post of president, Raytheon Technical Services Company (RTSC).

In his 31-year career at Raytheon, Yuse has held a variety of leadership roles, principally at the company's Integrated Defense Systems (IDS) business, including vice president of IDS' Missile Defense business area, where he was responsible for leading such programs as the Ballistic Missile Defense System (BMDS), Terminal High Altitude Area Defense (THAAD), Upgraded Early Warning Radar (UEWR) and the Sea-Based X-Band Radar (SBX). Yuse most recently served as vice president and deputy general manager of RTSC. He succeeds Bryan J. Even, who has left the company to pursue outside interests.

Yuse earned both his bachelor's and master's degrees in electrical engineering from Northeastern University.

"Rick's proven leadership, history of performance and company expertise will be of enormous benefit to the RTSC business as we continue to focus the organization on growth and operational excellence," said William H. Swanson, Raytheon chairman and CEO.

RTSC, a subsidiary of Raytheon Company, provides technology solutions for defense, federal and commercial customers worldwide. It specializes in mission support, counter-proliferation and counter-terrorism, base and range operations and customized engineering and manufacturing.

Tom Conroy is Vice President of Intelligence Programs at Northrop Grumman

Thomas W. Conroy

ARLINGTON, VA - Northrop Grumman Corporation has named Thomas W. Conroy vice president of intelligence programs for the company. In this position, Conroy reports to Larry Lanzillotta, vice president of customer relations within Northrop Grumman's government relations organization located in the company's Washington office.

As vice president of intelligence programs, Conroy will serve as Northrop Grumman's primary liaison for government customer representatives and coordinate customer interactions with the corporation's business sectors. He will help identify and align company capabilities for the intelligence community with national security requirements to solve problems and increase the company's contributions to the nation's intelligence mission.

EXECUTIVE MOVES

Conroy joined Northrop Grumman's Intelligence Group (TASC), a business unit of the company's Information Technology sector, in 2001 as vice president of national security programs.

Prior to joining Northrop Grumman, Conroy served the U.S. government as senior executive and technical program manager with the Central Intelligence Agency and the National Reconnaissance Office. He formulated, advocated, initiated and directed state-of-the-art technical collection and communications programs. He is experienced in program management, problem solving, systems engineering, program planning and development, budget management, human resource administration, all-source intelligence analysis, collection and operations.

Throughout his government career, Conroy worked closely with senior level decision-makers across the intelligence community, Department of State, the military and Congress.

Conroy earned a bachelor's and master's degree in electrical engineering from the University of Maryland. He serves on the Board of Directors of Northwest Federal Credit Union and was the chairman from 1995 to 2000.

Advantech Appoints Two Key Industry Experts

MONTREAL - Advantech announced two appointments to key positions within its sales and business development teams.

Richard McPhaden has joined Advantech AMT as vice-president sales. He will lead Advantech AMT's worldwide sales activities. Richard has proven his leadership abilities over the

EXECUTIVE MOVES

span of his 20-year career in product management, sales, marketing and system engineering for many leading satellite communications companies, such as Telesat, Spar, Comstream and NSI.

He comes to Advantech with a deep understanding and first-hand knowledge of sales and product management processes, earth station engineering, VSAT networks and applications. Prior to joining Advantech, Richard held the position of VP marketing at Polarsat. Richard holds a MSc and a BSc degree from the Queen's University, as well as a MBA from the University of Ottawa.

Michael DiPaolo has been named to the position of senior director of business development and will be responsible for developing advanced business solutions and concepts for satellite data networking. Michael is a well-known business and technology expert in the data transmission over satellite industry.

Michael has 20 years industry experience, having held senior engineering and business development positions with many significant companies such as Northern Telecom, Oerlikon Aerospace and Memotec, to name but a few. While at Memotec Communications (now a subsidiary of Comtech EF Data) he played a key role in developing systems architecture and value propositions for the highly successful GSM over satellite solution. Michael holds a Bachelor of Electrical Engineering degree from Concordia University.

Richard McPhaden and Michael DiPaolo will both work out of Advantech's Montreal (Dorval) facilities.

Klaus Beecker is Wavestream Executive Vice President

SAN DIMAS, CA - Wavestream Corporation, a manufacturer of compact, solid-state power amplifiers, said Klaus Beecker has joined the company as Executive Vice President - Markets. Beecker will be responsible for leading the company's global sales, marketing and business development initiatives, and will play a key role in product conception, system architecture, design and overall product strategy.

A 40-year veteran of Communications and Power Industries Inc (CPI), Beecker brings more than 30 years of senior-level management experience as well as more than 25 years of successful and highly relevant business development experience to Wavestream.

"Klaus brings a compelling combination of industry experience and entrepreneurial vision to our company," said Wavestream CEO Chris Branscum. "Klaus operates from a very strong technical and strategic foundation. We are thrilled to have him join our management team."

Beecker most recently served as Vice President of Business Development for CPI's Communications and Medical Products Division (CMP) since 1995, and since 2000 was also responsible for managing the business development efforts for CPI's Satcom Division. His new product development leadership and highly customer-focused approach maintained both divisions as leaders in their diverse technological portfolios. During his tenure at CPI, Beecker demonstrated multilingual skills and cultural knowledge in developing global business partnerships. In addition, for 10 years, he managed research and development efforts on microwave and millimeter amplifier development for satellite communications and on high-frequency switching power supply technology for medical X-ray and microwave communications products.

He earned a Bachelor of Applied Science degree in Engineering Physics at the University of Toronto with specialization in microwave RF technology. He completed an executive MBA program at Western University in London, Ontario. For 11 years, Beecker taught adult education courses in Mathematics and Physics at Sheridan College of Applied Arts and Technology.

SkyBitz Appoints Abdul H. Rana, Ph.D. as CTO

STERLING, VA — SkyBitz, a satellite-based asset tracking and information management service provider, has appointed Abdul H. Rana, Ph.D., to the management team as CTO.

An expert in engineering and product development, Rana comes to SkyBitz with more than 28 years of technical and business experience in satellite and cellular communications, information systems and data networks. Prior to joining the SkyBitz team, Rana held a similar post at Arrowhead Global Solutions. Also at Arrowhead, he served in numerous management positions in the areas of operations, capture, program management, P&L, engineering and service management.

Rana's appointment as CTO follows the company's recent Series D funding round, which allowed the company to extend new product development, strengthen service delivery and

EXECUTIVE MOVES

expand into new markets and applications. In his new role, Rana will lead and provide strategic direction to expand the SkyBitz suite of products and services, as well as technical enhancements to its industry-leading asset tracking system.

"Product development is a key area of focus and opportunity for SkyBitz as we continue to help our customers manage their most important investments: trailers and their assets," said Rick Burtner, president and CEO of SkyBitz. "This appointment strengthens our leadership team by incorporating a strategic voice with firsthand knowledge in the satellite and wireless industry. We are confident that Abdul's broad-based expertise and proven track record will be an asset to our organization and most importantly to our customers."

George Maier to Lead MRC Broadcast Product Marketing Efforts

NORTH BILLERICA, MA — Microwave Radio Communications announced that George Maier has joined the company as Director of Product Marketing for the Broadcast Sector.

Maier will lead product development activities for MRC's core marketing group and will be responsible for managing the life cycle process. He will be working closely with broadcast industry leaders to develop the requirements for new transport solutions and solicit feedback on existing products. MRC is also looking to Maier to be a key strategist in the development of MRC's long-term goals.

"George has distinguished reputation in the broadcast industry, and brings a great deal of knowledge and experience to the table," said MRC president Tony Finizio. "His technical ability and insight into market trends is well-established, and his understanding of the issues comes from close association with broadcast decision makers," Finizio said.

A veteran of broadcast and telecommunications businesses, Maier is known in the industry as a broadcast transmission consultant, under the name Orion Broadcast Solutions. His company provided engineering expertise and market analysis for a wide range of projects and companies. He has also held the positions of vice president of marketing and business development at Telco Systems and at Artel Video Systems, as well as various technical, sales and marketing positions at well recognized major manufacturers of broadcast and telecomm equipment, including: Harris, ADC, and M/A-COM.

BAE Systems Names Ian MacLaren General Manager of Geospatial Products and Solutions

MOUNT LAUREL, NJ - BAE Systems has named Ian "JR" MacLaren general manager of its Geospatial Products and Solutions (GP&S) product line, based in Mount Laurel, New Jersey.

GP&S serves government agencies, commercial organizations, and regional planning commissions with photogrammetric 3D mapping, geographic information systems, and aerial imagery in support of such activities as transportation, emergency response, and national security. GP&S employs more than 150 people at facilities in Mount Laurel, Pittsburgh, and San Diego.

SM

NEW PRODUCTS

Thrane & Thrane Introduces AERO-SB+ System

OSLO, Norway — Thrane & Thrane, which develops satcom systems for business jets, will soon introduce its Aero-SB+, a full featured office system with voice and data channels.

The system will offer full WiFi connectivity in-cabin, which enables the addition of wireless VoIP to the service, providing benefits in flexibility and cost to the operator, which can be passed on to the business traveler.

Key to the new functionality is the ability of passengers to utilize their own VoIP equipped mobile phone with the system for voice and data, which allows users to communicate more effectively through the use of their own address books and familiarity with their handsets.

As part of the introduction of the new Wifi and VoIP functionality, Thrane & Thrane is also announcing the development of a new VoIP handset as part of its Aero-SB+ system. The company now offers the use of a wide variety of wired and wireless handsets by ensuring compatibility with other manufacturers' in-cabin handsets, and own handsets, using a six channel proprietary handset interface (PBX).

Thrane & Thrane has developed Aero-SB+ as a total cabin solution, providing a full featured office system with five channels for voice and data, at speeds up to 432kbps. The new Wifi and VoIP functionality joins a long list of features that ensures travelers can conduct business as if they were in their own office.

Based on SwiftBroadband from Inmarsat, Aero-SB+ promises to improve voice, data and video conferencing quality whilst at the same time reducing voice costs by up to 75%. The flexibility of the service enables operators and users to choose between billing types, by being charged for the amount of data transferred or for the Quality of Service, which ensures bandwidth is always available.

Comtech EF Data Deploys CDM-Qx Satellite Modem With DoubleTalk Carrier-in-Carrier

TEMPE, AZ - Comtech EF Data Corporation has deployed its CDM-Qx Satellite Modem with DoubleTalk Carrier-in-Carrier by Gateway Communications on Intelsat capacity to support cellular backhaul infrastructures.

The CDM-Qx and CDM-QxL are the first Multi-Channel Satellite Modems with a modular architecture that fits in a 1RU chassis. Designed with the needs of satellite operators, communication service providers and enterprise users in mind, they offer flexibility, redundancy, integration and performance. The unique four-slot chassis architecture allows a cost-effective deployment of multiple modulators, demodulators or modems. The CDM-Qx and CDM-QxL are also the first satellite modems to offer DoubleTalk Carrier-in-Carrier capability.

Carrier-in-Carrier is based on Applied Signal Technology's DoubleTalk bandwidth compression technology. DoubleTalk uses "Adaptive Cancellation," a patented technology that allows the transmit and receive carriers of a full-duplex satellite link to be transmitted in the same transponder space.

"Comtech EF Data has demonstrated its ability to maximize wireless extension networks, delivering bandwidth efficiencies and increased throughput with its state of the art DoubleTalk Carrier-in-Carrier technology," said Jay Yass, vice president, network services for Intelsat.

Gateway Communications provides services to telephone companies and businesses in Africa. Gateway, a space segment customer of Intelsat's and a infrastructure product customer of Comtech EF Data, selected the CDM-Qx with DoubleTalk Carrier-in-Carrier to address the set of communications challenges unique to Africa. The challenges include the lack of legacy infrastructure, the rapid expansion of cellular networks and subscribers, satellite capacity demand over Africa, and a variety of landscapes - from deserts to rain forests - that can make terrestrial solutions difficult or impossible.

Tecom Wins Raytheon Systems Contract

THOUSAND OAKS, CA - Tecom Industries, Inc. has been selected by Raytheon Space & Airborne Systems, Electronic Warfare Systems to develop and manufacture the mid- and high-band receive and transmit antennas for the ADM-160B Miniature Air Launched Decoy program.

MALD is a new effects-based approach to counter-air operations to neutralize enemy air defenses. MALD can replicate manned aircraft combat flight profiles and radar signatures of US aircraft, diverting enemy air defense resources to engage the

NEW PRODUCTS

decoys to leave manned aircraft less vulnerable.

"Tecom antenna systems are proving to be vital components in many of our nation's new electronic warfare systems," said Ralph Phillips, Tecom Industries president. "This contract award by Raytheon Systems is further proof of our capability to develop and deploy antenna system solutions that are on the leading edge of 21st century military technology."

Tecom Industries, an ISO-9001 and AS-9001 company, designs and manufactures antennas and antenna systems for the aerospace, military, satcom and commercial wireless markets. Tecom's antenna products are used for telemetry, satcom, asset tracking, electronic warfare, direction finding, data links, positioning systems and embedded commercial wireless applications.

SkyWave and Dilupe with Low Cost Satellite Text Messaging

OTTAWA, Canada - Dilupe BVBA, a manufacturer of mobile data and messaging terminals and SkyWave Mobile Communications, a supplier of D+ communications products and services, said they are fully supporting SkyWave's DMR-200 series of D+ satellite terminals on Dilupe's DMT-50 mobile display terminal. The DMT-50 is a low-cost, two-way text messaging display terminal that offers easy-to-read and flexible messaging for remote asset monitoring and tracking applications.

The DMT-50 is ideal for use in a wide range of marine, land mobile and securities applications, enabling text messages to be sent and received from the vehicle via SkyWave's secure D+ network. Dilupe's mobile display terminal provides SkyWave

NEW PRODUCTS

customers with the ability to quickly build and deploy text messaging solutions using a reliable, low-cost display that has been tailored for use with their applications.

"The DMT-50 follows in the Dilupe tradition of high quality, industrial-strength terminals that provide a high level of reliability at a low cost," says Kevin Killian of Dilupe. "We chose to work with SkyWave because they are the D+ market leader, as well as their strong commitment of supplying quality products, service and support. Text messaging solutions are required today and with SkyWave, they can be delivered quickly and reliably."

"The DMT-50 has been designed to work with SkyWave satellite and GPRS products, making it very easy to deliver text messaging solutions quickly," said Solomon Wong, VP marketing for SkyWave. "Our goal is to make it as easy as possible for our customers so that they can focus on their applications."

RT Logic's Next Generation RF Receiver Available

COLORADO SPRINGS, CO - RT Logic, a wholly-owned subsidiary of Integral Systems, Inc. is now marketing a next generation RF Receiver product, Telemetrix 400XR RT Logic's T400XR is a modular, software-defined radio including transmitter, receiver, and digital signal processing unit.

RT Logic is a provider of products for ground-based space applications, primarily for satellite and launch range operations.

The T400XR's flexible architecture supports many different mission configurations. The supported ranges of frequencies

NEW PRODUCTS

include L/S/C/X/Ku-Band RF, 70 MHz IF and baseband telemetry and/or command data. Multi-channel configurations enable capabilities such as diversity combination or multiple simultaneous downlinks or uplinks. The T400XR signal processing engine supports virtually all popular commercial and Government signal waveforms. Custom signaling waveforms can also be supported.

The standard packaging is a 2U high, 19" rack-mount unit capable of hosting multiple downconverters, upconverters, and modulator/demodulators. Units also come as 1U high for less complex architectures, and 5U high to satisfy more complex requirements. The T400XR can be controlled through a built-in front panel display and control interface or through the local RT Logic Java GUI. The GUI can also be run over the Ethernet from any standard computer.

"The modular architecture of the system and the software defined nature of the signal processing allow the T400XR to support both legacy and new receiver applications with little or no new development," commented Jim Brandt, Business Area Manager of the RF and Communications Products group. "This provides our customers with an economical solution that avoids obsolescence with the advent of new waveforms or new frequencies of operation in the future". SM

COVER STORY

The Asian Satellite Market is Rocking

By Peter I. Galace

New TV applications, particularly DTH, HDTV, Mobile TV and broadband Internet access is driving growth in the Asia-Pacific satellite market

Television, whether DTH, HDTV, IPTV or Mobile TV to handheld devices and motor vehicles, is rocket boosting the fortunes of Asia's satellite industry and helping set the stage for sustained future growth for both satellite and launch service providers.

TV appears to be not only The Next Big Thing but Everything for Asia's satellite industry at the moment. In India, the successful launch last March of the DTH satellite, Insat-4B by an Ariane 5 rocket, was accompanied by massive publicity befitting a Bollywood superstar. China will broadcast the 2008 Beijing Summer Olympics via satellite on HDTV, throwing caution to the wind concerns about the potentially huge cost and the myriad technical challenges involved.

South Korea's TU Media is now reaping revenue success with the world's first satellite-enabled Mobile TV to handheld devices. While Europe and the USA are to commercially deploy technologically different Mobile TV devices only by next year or in 2009. A new Malaysian DTH satellite, Measat-3, became operational recently.

And Asia's commercial launch service community welcomes India into an exclusive club whose only bonafide members are Japan and China. India last April orbited an Italian scientific satellite, its first major commercial payload. India has since announced a launch manifest consisting of five more satellites for foreign customers.

The consensus in Asia is that the year 2007 is turning out quite well for Asia's satellite industry, thank you. And analysts expect the year to begin a cycle of sustained growth that should, at the least, cut the transponder overcapacity that has held back the industry's growth in the last few years.

Consolidation with its precious economies of scale is again being bandied about in Asian satellite circles. Last April, Japan's Mitsubishi Heavy Industries, Ltd. (MHI) and Arianespace S.A. agreed to combine their commercial satellite launch services in a competitive move to enhance services to customers in Japan and around the world.

Samsung SCH B200 Satellite TV Mobile Phone

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The agreement is a further development of an ongoing cooperative relationship between MHI and Arianespace in the area of commercial satellite launch support. The two partners propose to offer launch services using either MHI's H-2A or Arianespace's heavy lift Ariane 5 to more flexibly accommodate customers' launch needs at their desired timing.

2007 and beyond

Asia's leading satellite service providers are generally upbeat about 2007 and beyond.

With its 11 satellites (either wholly or partly owned), Singapore Telecommunications, Ltd (SingTel) is Asia's largest commercial satellite operator. For its full financial year ending March 2007, SingTel's overseas associates contributed 43 percent of its profits ($2.5 billion), up from 37 percent the previous year. Full-year operating revenue was $13 billion.

One of these overseas associates is Australia's Singtel Optus that operates a fleet of three active communications satellites providing DTH and mobile services.

Optus CEO Paul O'Sullivan said the company spent much of the year investing in state-of-the-art infrastructure, including its D-series satellites. The first of this series, Optus D1, was launched in 2006; the second, Optus D2, is to launch later this year.

Optus said its mobile division continued to lead in the prepaid mobile market in the fourth quarter and defended its market position by adding 60,000 new subscribers.

Optus' three key strategies of growth for Optus Mobile in 2007 include leveraging scale in the consumer segment, stimulating SMS and other data and growing market share in the business market.

Samsung SCH B130 Satellite TV Mobile Phone

SingTel CEO Chua Sock Koong said Optus delivered a robust performance despite aggressive competition during the year. Optus posted a 36 per cent increase in net profit to $804 million for the year ended March 31.

Optus Mobile contributed 55 per cent to the total revenue figure of $7.5 billion for the year, which increased four per cent from the comparable period.

SingTel said its total mobile subscribers grew by a record 12 million to over 124 million users at the end of March, the largest such base in Asia outside China. Compared to a year ago, the number of mobile users increased by 46 percent or 39 million subscribers.

Hong Kong-based Asia Satellite Telecommunications Holdings, Ltd (AsiaSat) reported revenue and profit growth during 2006 in what it described as an Asian market oversupplied with transponder capacity.

Chairman Mi Zeng Xiu said sales and profits rose in 2006. Transponder leases were up six percent. There was also an increase in the number of transponders leased out on its three satellites: AsiaSat 2, AsiaSat 3S and AsiaSat 4.

Describing 2006 as a "stable year," Mi said results from the company's core business "remained largely in line with the previous year." He noted a lack of significant growth in Asia's satellite services sector, despite Asia generally experiencing positive economic expansion.

"While the satellite sector typically lags behind other industries as economies pick up, this situation is exacerbated by overcapacity and price cutting at the lower end of the transponder market," said Mi.

This situation is also holding back growth in the premium sector, he added. "Nevertheless, it is encouraging that AsiaSat's blue chip customers are committed to our premium services and reliability, and that an increasing number of customers are signing contracts with AsiaSat," Mi added.

Mi reported that work on the company's new satellite, AsiaSat 5, was progressing on schedule. The new satellite is to replace the aging AsiaSat 2

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at the orbital location of 100.5 degrees East. He was, however, disappointed at the delay in launch vehicle availability.

He noted positive trends in Asia's telecommunications and video markets. These include a general increase in the demand for video, which is being driven by growth in IPTV, HDTV, Video to Mobile and DTH. He was also pleased with the gradual liberalization of Asia's regulatory environment, and saw increasing demand for satellite services in India.

Thai satellite operator Shin Satellite Pcl (ShinSat) reported lower revenues but higher profits for the first quarter of this year.

ShinSat, however, expects revenues to improve starting the second quarter from sales of satellite services in China, the major market for its $400 million iPSTAR-1 Broadband Internet Satellite. iPSTAR services contributed some 26 percent of ShinSat's revenues in 2006, a share that is expected to rise with iPSTAR's increasing utilization.

The company also expects China and India to contribute strongly to revenues beginning 2008. This will allow iPSTAR to reach its breakeven utilization rate of 25 percent by late 2008 or early 2009. ShinSat considers the Asia-Pacific

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Samsung SCH B100 Satellite TV Mobile Phone

market one of the fastest growing in the world for broadband Internet demand. It also plans to expand its broadband satellite services in Indonesia and South Korea.

China and India, however, are top two markets for iPSTAR, with China taking 25 percent of iPSTAR's capacity. ShinSat foresees a continuation of growth in China during the second half of 2007 but says growth should start peaking early 2008.

It described the pent-up demand for Internet services in China as enormous. China should become IPSTAR's largest market over the next five years with some 25 percent of sales. ShinSat claims it provides the cheapest bandwidth in China.

Shin Sat plans to launch iPSTAR services in India this fourth quarter after it finishes building two ground stations in Mumbai and New Delhi. India accounts for 17 percent of iPSTAR capacity.

Sales of iPSTAR user terminals were expected to double this year from some 70,000 in 2006. iPSTAR's terminal equipment consists of an indoor modem for Internet connection, a voice service and a small dish antenna with a signal receiver and transmitter. ShinSat has distributed some 70,000 sets of iPSTAR user terminals to more than 10 Asian countries and expects to increase the number to 150,000 sets by the end of 2007.

Growth everywhere on the horizon

Asia is expected to lead other markets in the growth of subscribers and revenues in satellite pay-TV. Western Europe and North America, however, should continue to account for the largest market shares, according to research firm In-Stat

It said most DTH satellites launched in 2006 came in emerging markets in Asia and Eastern Europe. Key satellite market trends include consolidation in established markets, interactivity, HDTV, launches and bundling.

It also projected total DTH pay-TV subscribers at over 117 million in 2010 while global DTH-TV revenues will exceed $88 billion in the same year.

The upbeat outlook for Asia's satellite industry is matched by a similarly positive outlook for the worldwide satellite industry from international research firms.

The Teal Group believes the commercial satellite industry is on the verge of growth cycle that might extend until well into the next decade.

"Last year marked the second consecutive year of growth in the number of commercial communications satellites launched to geostationary orbit," says Marco Caceres, Teal Group senior space analyst. "This hasn't happened in at least the past 20 years, and it may signal the start of an up cycle for the overall market."

Teal also estimates orders for more than 200 geostationary commercial communications satellites worth more than $25 billion through 2016. Orders for more than 100 Low Earth Orbit (LEO) mobile communications replacement satellites are expected to generate up to $4 billion in business. Next-generation U.S. military satellite programs are estimated at a total cost of $100 billion.

Teal senior space analyst Marco Caceres noted that the emerging cycle within the commercial satellite market is coinciding with an up cycle in the military satellite market, which has over 200 new-generation US military satellites valued at about $120 billion. "Many of these military satellites have been delayed and are severely over budget, but they will be built and launched because the requirements for them exist regardless," said Caceres.

Caceres said 2006 was a year of positive change, with 107 satellites launched, or a 32% increase over each of the previous two years. This represents the most satellites launched since 2000. "The total value ($9.39 billion) of the

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satellites launched last year was also higher than it has been since 1999."

Before 2006, the satellite market had been stagnant for five of the first six years of this decade, launching around 80 satellites per year. But that changed in 2006, said Caceres.

Caceres also notes the positive numbers for geostationary (GEO) commercial communications satellites. "We have now seen two consecutive years of growth in the number of GEO commercial communications satellites launched and ordered during 2005-2006. This is important, given that this segment of the satellite market is a key indicator for the overall market."

In order to pay for the construction and launch of these satellites, operators are attracting increasing levels of investment capital to their programs. Investor interest in both GEO and LEO satellite systems is on the rise, and this is good news for the satellite manufacturing and launch services industries.

Mobile TV opportunities

International market research and consulting firm NSR said mobile TV will produce a variety of satellite opportunities for S-band direct access and FSS channel distribution/backhauling in many regional markets.

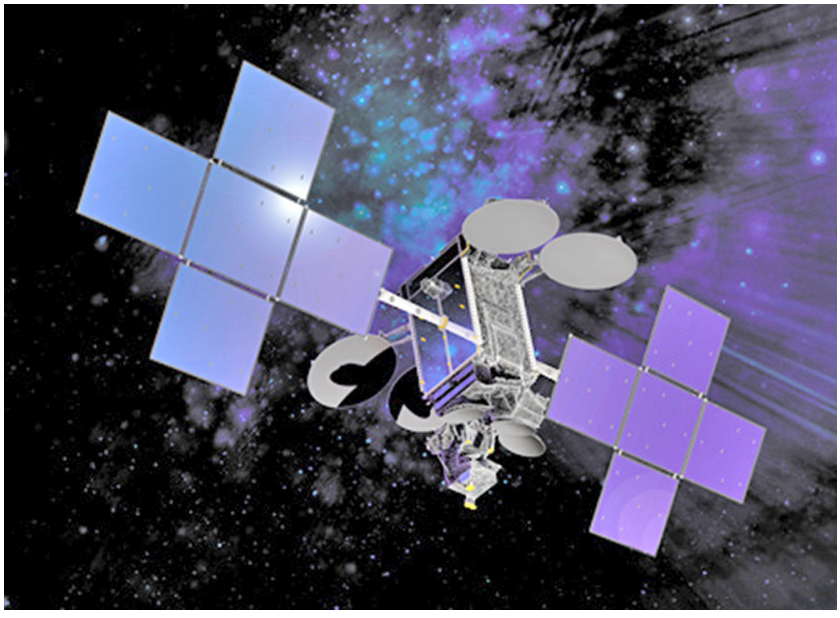
NSR noted that S-band services are generating positive results in Asia via TU Media in South Korea with over 1.1 million subscribers. Additional S-band plans in Asia, Europe and potentially North America all point to positive momentum for mobile TV service delivered via S-band capacity. The continued deployment of S-DMB services and the recently approved DVB-SH (Digital Video Broadcasting-Satellite to Handheld) standard point to positive standards-based momentum for this market segment.

NSR anticipates an emerging market for mobile TV channel distribution and backhaul via FSS satellite capacity, especially as mobile carriers scale their networks and consider the cost of terrestrial distribution alternatives, in addition to terrestrial spectrum scarcity. Channel distribution and backhaul deals are already in place over FSS capacity in North America, Europe, Africa and Asia, and NSR expects these markets to generate incremental growth in tandem with terrestrial network buildout.

Mobile TV via satellite, however, will face several challenges, all of which will affect the shape of its growth curve. NSR president Chris Baugh remains optimistic about the potential for using satellites to distribute and deliver mobile TV services.

"However, we have great concern about a few key hurdles. The cost of building out S-band networks, including satellite capacity and terrestrial repeaters, is a significant barrier to growth. Very little S-band capacity is available or planned worldwide, and the cost to implement S-band mobile TV may limit the opportunity outside of Asia in the next several years."

"Terrestrial broadcast spectrum scarcity might actually negatively affect satellite-based channel distribution and backhaul growth over the next several years," Baugh added.



GEO remains the leader

Geostationary satellites will continue to dominate the commercial satellite market in terms of revenue growth and number of launches, according to research firm Euroconsult. Government launches will account for most of the market.

Euroconsult said that after 40 years, the commercial geostationary satellite industry is entering its fourth demand cycle with 28 communications

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satellites ordered in 2005 and 24 in 2005. The strong ordering activity in the past two years was driven by the replacement and expansion of existing operational orbital slots by companies such as SES and Eutelsat and by new entrants such as Kazsat, Vinasat, Hylas and Protostar.

Euroconsult anticipates that 343 satellites will be launched by commercial operators worldwide over the next 10 years, representing 36 percent of total satellite demand over the period, with the bulk of the market remaining with government operators.

The commercial satellite market remains dominated by geostationary comsats that represent 84 percent of the manufacturing and launch revenues, 65 percent of the satellites to be launched and 94 percent of the tons to be orbited. A total of 223 geostationary comsats are expected to be launched in the next ten years, a five percent growth over the past 10 years.

Commercial satellites also populate LEO orbit with three constellations for mobile communications services (Iridium, Globalstar and Orbcomm) and a few satellites for Earth observation. A total of 120 commercial satellites are expected to be launched into LEO over the next 10 years, of which 75 are to replace the first generation Globalstar and Orbcomm systems.

India's DTH Boom

Its billion plus populations place India and China at the core of Asia's commercial satellite industry. DTH is going from strength to strength in these two countries, especially India where a massive DTH boom is going into full swing.

A month after its ride into space aboard an Ariane 5 heavy lift rocket, the Insat 4B satellite became fully operational in April and will soon begin broadcasting to India's huge DTH market.

The Indian Space Research Organization (ISRO) said Insat 4B is located in its final orbital location of 93.5 degrees East longitude. The $68 million Insat 4B carries 12-Ku and 12-C band transponders and has a life span of 12 years.

Built by ISRO, Insat 4B is one of three DTH satellites that are fuelling the huge growth of India's young DTH industry. The 3,025 kilogram Insat 4B joins the in-orbit Insat 4A. Insat 4CR, another DTH satellite, will launch the middle of this year.

ISRO chairman Madhavan Nair said ISRO is planning to launch Insat-4CR, a replacement of Insat-4C, by the middle of this year. Insat-4CR will allow ISRO to meet its clients' immediate requirements for DTH transponders. Insat-4C was destroyed on launch last year, one of ISRO's few failures.

Among ISRO's major clients are DTH providers Reliance's Blue Magic, Bharti, Doordarshan's DD Direct and Sun TV's Sun Direct. All are in the race to acquire as many of the 24 Ku-band transponders on Insat 4B and Insat 4CR.

These DTH providers should need from 7-10 transponders each, said industry analysts. Each transponder is capable of providing between 15 and 30 channels depending on its frequency capacity.

There are only two satellites with a pan-India footprint capable of providing the Ku band required for DTH services: Insat 4A and SES Global's NSS-6. Both satellites, however, have been cornered by TataSky (all 12 on Insat-4A), DD Direct (five on NSS-6) and Dish TV (seven on NSS-6).

ISRO stands to earn a hefty $282 million following the launch of Insat-4B. The transponders on this dedicated DTH satellite are fully booked and are fueling the ongoing "DTH War" being waged by India's largest telcos.

The HDTV Olympics

Technology-wise, the 2008 Beijing Summer Olympics will be notable for two Chinese firsts: the national launch (finally) of DTH services and the world's first HDTV broadcast of an Olympic Games.

China has said it would launch DTH services in the country before the Games, but has not given a firm date. They have also announced the Games will be broadcast in HDTV.

China said its plan is to broadcast 60 HDTV programs during the Beijing Olympics. Fifty HDTV production teams will work full-time during the event producing simultaneous HDTV programs and transmitting them worldwide. Large volumes of satellite bandwidth will be required for this massive HDTV effort.

China, however, remains a closed market to foreign-owned satellites. The failure last year of the Chinese DTH satellite, Sinosat-2 (due to a power failure), is forcing Beijing to reconsider the satellite service offerings of foreign operators.

Demand for HDTV in China and Asia remains high. Australia, Japan and South Korea are broadcasting programs in HD on their DTH platforms. Viewer response to HDTV has been quite positive, which is good news Asia's satellite operators want to hear.

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The good news is IPTV

IPTV is also good news for satellite operators. IPTV is bound to produce a variety of opportunities for satellite C-band TV distribution in Asia.

NSR noted that retail satellite IPTV plans in Asia point to positive momentum for services delivered via Ku-band capacity. It said C-band services are rapidly driving capacity in the USA via Intelsat IPTV and SES IP-Prime turnkey offerings targeted at U.S. telcos.

The mounting competitive pressure on telcos to diversify their business and increase Average Returns Per Unit (ARPU) through entertainment allows satellites to contribute through their broadcast advantage to capture part of the growth.

NSR also anticipates new IPTV services opportunities emerging from the fusion of IT and communication elements. Existing satellite IPTV turnkey solutions reduce telco total cost of ownership dramatically, but thanks to the IP virtualization advantage, satellite operators and their resellers will have an opportunity to play roles of higher value than in traditional satellite services.

"Telcos are entering television at a time of great disruptions because IPTV is the result of accumulated pressures from Internet/IT technology build-up over the past decade, enabling so much efficiency that results in a paradigm shift," said Chris Baugh, NSR President.

"Satellite-based outsourced services can seize their aggregation advantage to command higher returns per transport bit, by becoming an active part of the move toward open services architectures that empower telcos to differentiate while containing operating costs," Baugh added.

Asia leads mobile TV

Last March, DaimlerChrysler AG's Chrysler Group made the headlines by offering mobile TV delivered via satellite in selected vehicle models, a first in the US.

Sirius Satellite Radio, Inc., one of only two providers of satellite radio in the US, reached a deal with DaimlerChrysler to provide this limited satellite TV service.

The introduction of mobile satellite TV to moving vehicles in the U.S., however, comes two years after the world's first such commercial service was introduced in Japan.

Mobile Broadcasting Corp. (MBCo) of Tokyo began transmitting video and audio programming via satellite to Japanese consumers in October 2004.The services are delivered via the MBSat-1 satellite.

From its geostationary orbital slot at 144 degrees east longitude, MBSat-1 broadcasts TV and radio programming in the S-band to mobile customers equipped with specialized terminals. The satellite is owned jointly by MBCo and SK Telecom of Seoul, South Korea, which is developing a similar service for that country.

Japan and South Korea are the first two countries to launch digital multimedia broadcast (DMB) services. TU Media in South Korea and MBCo launched DMB services on the co-owned MBSat-1.

Satellite DMB (S-DMB) uses Ku-band uplink and S-band downlink to stream multichannel live TV programs, data and voice directly to PDAs, mobile phones and moving cars.

In 2006, TU Media had 750,000 subscribers to its mobile TV service. The number, however, was lower than the one million subscribers it expected.

MBCo, however, has been somewhat less successful than TU Media in subscriber uptake for its handheld service. If these DMB initiatives succeed commercially, both satellite and mobile operators in China and India are expected to seriously consider implementing DMB.

The Asian satellite market has always been touted for its potential but never quite fully realizing it. Recent indicators, however, with the opening up of DTH services in the two largest countries in Asia—China and India—coupled with the influx of new applications such as mobile TV and broadband Internet access in many parts of Asia, may just lead to sustained growth in the Asian satellite market.

But as anyone who is familiar with the Asian market will tell you, things aren't always as they appear to be. So, we'll have to wait and see. Stay tuned—the next few years will tell whether Asia will finally live up to its potential. SM

Peter I. Galace is editorial director of Satnews Publishers. He has written extensively on the telecommunications developments in Asia for numerous publications. Currently he is associate editor of Satnews Daily and Weekly editions, and art and production editor of the International Satellite Directory and the monthly e-zine, Satmagazine. He can be reached at peter@satnews.com.

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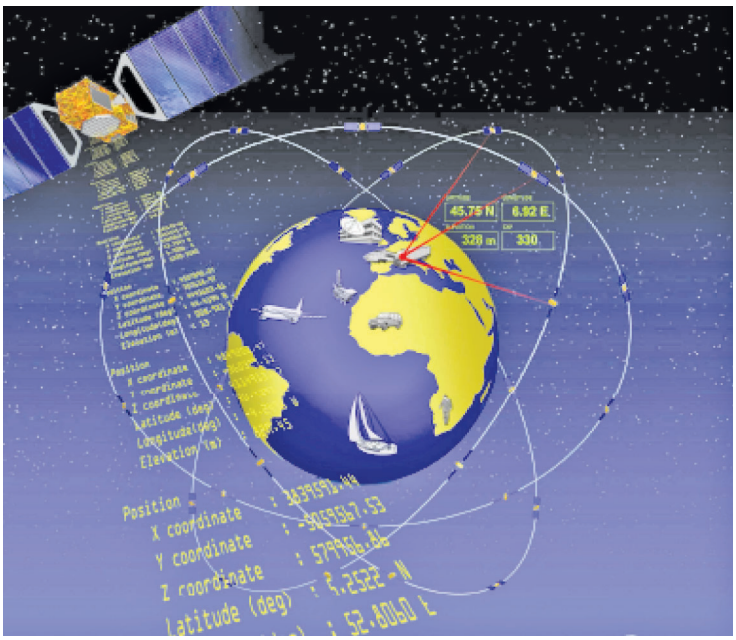
Galileo: Can success come from the mess? Europe's "Lost in space" project

By Chris Forrester

Europe, for some bizarre reason best known only to a handful of bureaucrats, wants its own independent GPS system. The European Commission gave its formal (and belated) approval to the project in July 2005, following the June 2004 signing of a US-EU agreement on compatibility between the USA's highly successful system and the planned EU version. However, the project has been in the planning since 2000, and was initiated as a public-private partnership in 2002. Planning, and signing assorted protocols was the easy part.

Since then the project has gone downhill faster than a runaway vehicle, with or without an onboard GPS! European taxpayers were promised that the first batch of satellites would launch by 2008, with a working system by 2010, a date that is now way behind schedule. The best anyone can now suggest is that something might be cobbled together by 2012 – but the overwhelming consensus is that 2014 is a more likely date.

The project is beset by squabbles between the various "commercial partners". Even the influential 'Economist' news-weekly is calling for the project to be abandoned because it is "floundering", "lost in space", "years behind schedule" and without key elements like a CEO, a headquarters, nor any sign of an agreement as to how profits (there's wishful thinking) might be distributed.



The Galileo GPS constellation: Will it ever get off the ground?

Despite these essential missing links – or perhaps because of them – the project, besides being years behind schedule, is also way over budget. The original plan called for a total investment of •3.6bn ($3.4bn at today's rates), with Europe's taxpayers coughing up one third and the rest coming from the 'private' finance side of the so-called partnership, comprising that paragon of fiscal prudence EADS (Franco-Germany), Thales (France), Alcatel-Lucent (mostly France), Italy's Finmeccanica, AENA and Hispasat of Spain, the UK's Inmarsat and a German consortium (TeleOp) led by Deutsche Telekom. They have collectively applied to the EU for more public cash, asking for another •2bn on top of the •1.5bn already received. Overall costs have rocketed to as much as $5bn, with more bills to come.

The financing consortium was obliged to create a single management body to run the project by May 10th. The deadline, like all the others, was missed. The European Commission is now expected to throw together new plans that will give the project a much needed reworking. The EC reckons that one way to fix the disaster is to use public money as a guarantee for the economic risks that the project brings.

EU enterprise and industry commissioner Guenter Verheugen said on May 9: "We have to secure financing through public funds," and arguing that Europe would have decided in favour of Galileo even if it had been clear from the

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It has also been claimed that the US could "switch off" their GPS system on a whim, leaving the rest of the world not knowing how to drive home!

start that it could not have been conducted as a commercial project. The fact 'that the European industry is not prepared to take the risk doesn't change the fact that we need the project,' he told Die Welt in an interview. German Transport Minister Wolfgang Tiefensee told the BBC that Galileo is going through a "deep and grave crisis." Germany is especially involved because it is currently performing the European presidency role.

"I regret that today saw the failure of months of negotiations within the European consortium on their participation in the building of the European satellite navigation system. It is now important to take the right decisions so that Galileo can succeed as a driver of high technology in Europe," said German Parliamentary State Secretary within the Economics and Technology Ministry, Peter Hintze. "Europe needs an independent navigation signal which can be used reliably even in times of crisis," he added. "Our view is that the current scenario to put Galileo into place cannot work," said Michele Cercone, spokesman for EU Transport Commissioner Jacques Barrot on 7 May 2007, just days before the 10 May deadline given to the Galileo consortium partners to agree a way forward.

Transport ministers from the EU's 27-member countries will meet in June to consider their next options, and given that admitting they got it wrong is an unlikely result, it seems that the public will have to throw more good money after bad.

It is no longer clear that the project will even deliver the desired USP once claimed, of greater accuracy than the US system. While the US military relaxed their deliberate softening of GPS' accuracy some years ago, it is still claimed to be only accurate to a few meters, at least on conventional commercial units, although the US is upgrading its GPS systems to deliver greater accuracy by 2012. It has also been claimed that the US could "switch off" their GPS system on a whim, leaving the rest of the world not knowing how to drive home!

The European situation is now beyond even a joke, and summed up by a letter from the EU's Transport minister Jacques Barrot to German transport minister Wolfgang Tiefensee: "As I write this letter, there is no single company structure that regroups the eight partners, nor is there a single negotiator representing the such single company in the negotiations with the Galileo Joint Undertaking or (as of 1 January 2007) the Galileo Supervisory Authority. Furthermore, there is no evidence that the merged bid would improve either of the two initial bids, as in the course of the negotiations between September 2005 and November 2006 the private side has repeatedly raised there expectations as to the share of the risks that they expect the public side to take in the future concession contract. The preliminary version of the Heads of Terms agreement signed on 23 November 2006 therefore leaves major issues open. This

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concerns in particular the design risk and the market risk as well as a whole range of other matters."

Barrot admits the implied importance of the project, saying: "Galileo is one of the most ambitious industrial projects Europe ever gave itself – it is truly European as no single Member State could launch it on its own. More than ever we have a responsibility to make this project succeed, ensuring at the same time Europe's independence and excellence in a sector critical to our future competitiveness. I am determined to achieve this and I trust that you share this conviction with me." His letter seems to assume that the EU will fund the extra cash needed, but the risk of further delay is considerable.

And the question must be asked whether Europe now needs its "own" system. The Russians and Chinese are working on their own versions, and the US has further relaxed its own fuzzy reception so that next generation satellites likely to be on station by 2012 are at least as accurate as the proposed European versions.

As to today's technical status, Europe has launched just one satellite, a pre-constellation test craft (in Dec 2005, called Giove-A, for Galileo In-Orbit Validation Element) that's now started to transmit its location in space. Built by Surrey Satellite Technology, it is a 614 kgs craft, and its urgent launch was needed in order to secure the transmission frequencies. Giove-B, a 495 kgs craft, is being built by ESNIS with a launch date scheduled for later this year (and a couple of years behind schedule). Giove-B slipped initially to September 2007, then was further delayed to December 2007. It is currently under test at Alcatel Alenia Space Italy in Rome. Giove-A2, is also

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"Don't call us Galileo"

The ultimate stupidity of the Galileo project is that it cannot officially be called Galileo any longer. There's an old-established airline computerised booking system called 'Galileo' that has now successfully sued and won the absolute rights to the name. The 'satellite' Galileo system must now be called "European Satellite Navigation Industries", or ESN. Snappy, eh?

In January 2007 it was stated that "because ESN doesn't operate in the public market there is no obligation to inform the public," according to an ESN spokesperson. ESN is the general contractor with a now largely spent •1bn budget to build the two test satellites and the first four navigation satellites. ESN reports to the European Space Agency and its shareholders, Alcatel, EADS and Thales. The ESN company has a staff of roughly 60 in Munich and 70 in Rome.

on order from SST at a price of another •25m-$30m with a planned launch date in the second half of 2008, which if earlier experience is any guide will also slip.

China, despite coming very late to the GPS party (it is also part of the Galileo programme) launched its first satellite as part of its planned 'Compass' constellation in April, and says it is on schedule to switch its system on next year. The system includes at least 35 satellites, five geostationary Earth orbit (GEO) and 30 medium Earth orbit (MEO) satellites. China still says it is willing to cooperate with other countries in developing its satellite navigation industry to allow the "Compass" system to operate with other global satellite positioning systems such as the United States' GPS, Russia's GLONASS and Europe's Galileo, according to local reports.

May 16 saw a meeting of European ministers where the Galileo project headed a very short agenda, and resulted in Jacques Barrot (EU transport commissioner) admitting that the project would now need a staggering EUR9bn ($12bn) of public cash. His fellow commission members agreed, and have decided to recommend that Europe proceeds with the project, ending the stalled plans to create a European construction consortium to manage the project. At some time in the future the Commission would appoint an operator to run the system. A full meeting of Ministers on June 8 will make a final decision. It is understood that the UK and Denmark are not in favor of further funding.

Barrot said Galileo would still be in action by 2012. "Member states seem to think they should get back all [the money] they put in. The benefits will come later," he added. The satellite navigation market should be worth EUR450bn by 2025, he claimed, and the EU could win a third of that if it had an independent system.

So, with a Crystal Ball sitting on the desk, where does Europe go from here? Spending another $3bn or $4bn of public money on such a vanity project is surely a waste of money? Now retired French president Jacques Chirac summed up the true reason for this profligate waste back in 2002, saying that were Europe to scrub the project "would lead inevitably to a vassal status, first scientific and technical and then industrial and economic".

An optimist might argue that designing a GPS system accurate to a claimed 4" of resolution might have commercial merit. Five years ago it was all about landing aircraft automatically, and delivering GPS signals into the "concrete canyons" of our city centres, something that 'ordinary' GPS sometimes struggles to achieve. "Galileo would enable anyone with a mobile

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phone to find directions to a friend's house, locate the nearest pizzeria or book cinema tickets. Ships and aircraft would become more efficient. Emergency services would be able to pinpoint incoming calls. The market for such devices is now •60bn annually and is potentially worth a yearly •300-400bn, according to the Commission," said the Financial Times last week. But the influential FT also posed a question, admitting that even the most enthusiasttic of supporters were now having doubts: "Why sell Pepsi-Cola when you can get Coca-Cola free?" SM

London-based **Chris Forrester,** a well-known broadcasting journalist is the Editor for Europe, Middle East and Africa for SATMAGAZINE. He reports on all aspects of the industry with special emphasis on content, the business of television and emerging technologies. He has a unique knowledge of the Middle East broadcasting scene, having interviewed at length the operational heads of each of the main channels and pay-TV platforms. He can be reached at chrisforrester@compuserve.com

CASE STUDY

Radio Republik Indonesia: The Search for a Versatile Satellite-based Radio Network

By Dieter Dreizler

Installation of the network antenna at the Palembang radio station in rural Indonesia.

Radio is the most important channel of information for the archipelago that constitutes the state of Indonesia. Consisting of more than 18,000 islands, of which about 6,000 are inhabited, radio keeps some 210m Indonesians better informed than any newspaper or magazine. Radio also provides the remotest rural areas with local content and national breaking news. Funded by the government of the Republic of Indonesia and KfW, the German Reconstruction Loan Corporation Bank, the Jakarta-based state-owned radio broadcaster Radio Republik Indonesia decided to modernize and extend its network infrastructure to enhance its service to its listeners. Germany's Studio Hamburg Media Consult International (MCI) was hired to take charge of coordination and project management of the radio network, and partnered with ND SatCom for the satellite-based part of the project. MCI and ND SatCom have teamed up before in numerous satellite news gathering projects including SNG vehicles and TV uplinks.

The issue

RRI issued a set of challenging requirements for its IP based radio contribution and distribution network: The public broadcaster wanted not only a radio network with the greatest possible availability and more cost-efficiency than its existing SCPC-based system, but also demanded a "fit for the future' radio network offering a wide choice of scalability, digitalization and application variety. This network has to collect and distribute regional and national content in form of MP3 audio data streams from several studios for its various radio programs. From DVB-IP receive relay stations, the radio programs are distributed terrestrially via VHF to private households.

Why satellite?

The South East Asian region presents several challenges for reliable communications. The geographically fragmented country of Indonesia has little in the way of terrestrial infrastructure and is subject to power surges or electricity outages. High seismic activity and natural disasters such as earthquakes or tsunamis are an even greater challenge to technology. The tropical climate with its heavy rainfall and high

CASE STUDY

humidity requires robust, environmentally-proven equipment.

Network design

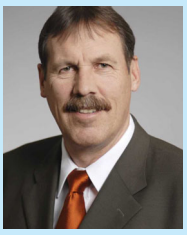
ND SatCom has implemented a star topology VSAT network with the core *Sky*WAN® technology platform for RRI. Due to heavy rainfall in the region, C-Band was chosen since it provides low atmospheric weather attenuation. To equip the customer with the maximum of redundancy and network control, similarly equipped central 4.9m antenna hubs are located in Jakarta and Bandung. *Sky*WAN® offers RRI a user-friendly media network management platform and effective management of MP3-based IP data streams. Using MP3 streams, the transmitted data rate is decreased which additionally saves bandwidth and satellite capacity. One national and 21 regional audio programs are distributed via DVB-IP stream to each receive station where the locally broadcasted program is finally chosen.

Sky*WAN*® as technology of choice

*Sky*WAN® is a highly flexible and versatile VSAT system for establishing wide area corporate networks while providing IP, frame relay and voice connectivity. This enables a wide range of end-user business communication applications. *Sky*WAN® is a perfect fit to RRI's requirement for network upgradeability. The state-owned broadcaster wants to have full flexibility and scalability for a network extension – using fully meshed topology in which any station can be reached via a single satellite-hop connection. Besides the IP radio application, RRI is also thinking of using the network future for telephony and internet applications as well as disaster alerts such as tsunami warnings and mobile program contributions.

RRI's benefits

MCI and ND SatCom have implemented a fully scalable, highly available and versatile network which offers the radio broadcaster viable future options. The satellite communication equipment provided is robust enough for the most challenging of weather conditions. There have been no recorded instances of system network failure due to environmental conditions up to now. Nor have we registered any loss of quality during audio stream processing and distribution. Furthermore, scarce satellite capacity is used efficiently with MP3 streams at a lower bandwidth. Until today RRI has been broadcasting analogue streams but the network is now ready for the switch to digital. Streams may even be made available on the internet. The option for a fully meshed network with additional broadcasting and office communication applications provides RRI with high flexibility and attractive upgradeability for the future. SM



Dieter Dreizler is sales director at ND SatCom, a leading global supplier of satellite-based broadband VSAT, broadcast, government and defence communication networks and ground station solutions. He can be reached at dieter.dreizler@ndsatcom.com.

VIEWPOINT

The Rise of the Enterprise Market

Robert Bell,
Executive Director, World Teleport Association

When you are inside an industry, everything happens in slow motion. When you are outside an industry looking in, the same rate of change can be dazzling.

This fact was brought home to me during a recent conversation about broadband. My colleague was complaining about the painfully slow pace of deployment and adoption of broadband. When will we have the 20, 50 or 100 megabits to the office and home that people have been talking about forever?

But wait, I said, broadband is undergoing the fastest adoption of any technology in history. Fewer than 1% of South Koreans were on the Internet in 1995, but that nation now leads the world with a 71% penetration rate for broadband. The US ranks only 19th in the world in broadband adoption, but a Pew study found that US adoption increased by 40% from March 2005 to March 2006 - from 60 to 84 million - twice the growth rate of the previous year.

Progress just feels slow because hype always outruns reality. Hey, as a child of the 1950s, I thought that by the 21st Century I would at least be driving a flying car if not going to the moon on vacation.

Changing Patterns

Something similar is going on in the satellite communications business - or as I should probably start referring to it, in the satellite-fiber-wireless hybrid business. As recently as five years ago, the business appeared stuck in a pattern than would never change. Television was its dominant customer, responsible for as much as 90% of revenues. Enterprise and government business made up about 10% and telephony barely registered as a percentage.

I was showing off my knowledge of this business mix while moderating a panel session at SATELLITE 2007 when the panelists brought me up short. Their unanimous position was that those days were gone. According to Jay Yass, vice president, network services marketing for Intelsat, video was only about half of their business, while enterprise and government made up the other half. Okay, I said, but Intelsat's history as a former international monopoly is unique. Everybody knows that, prior to the PanAmSat acquisition, the company was a very small player in video.

True, said Jay, but PanAmSat's mix of business still had a comfortable balance of enterprise/government network traffic and video traffic. Other panelists, from Errol Olivier, former president of CapRock Communications, to Stefan Jucken of ND SatCom agreed. Thanks to the success of Internet Protocol as a unifying standard, and a lot of good work on IP optimization and acceleration, satellite was finally taking its rightful place in the network manager's toolkit.

Good news for the industry, bad news for me. All of the questions I had planned to ask the panel about breaking into the enterprise market were now irrelevant. Forty minutes to go and no tricks up my sleeve. So I winged i. Thanks to great panelists, we gave the audience an insightful and wide-ranging discussion of the topic.

Carrying More Data Than Video

If only I had had available the results of WTA's *Inside the Top Operators of 2006* report. Every year, the World Teleport Association publishes rankings of the Global Top 20 (compa-

VIEWPOINT

nies by revenue including independent teleport operators, carriers and technology companies), the Independent Top 20 (companies by revenue excluding satellite carriers) and the Fast 20 (based on year-over-year revenue growth, including independents, carriers and technology companies). We produce these rankings by surveying teleport operators in many nations on their revenues, revenue growth, facilities, services and business results. The rankings make good headlines. But we also put the information to use by publishing an annual "snapshot" of the industry, called *Inside the Top Operators of 2006*, based on the operators' facilities, services, mix of business and experience with prices.

Had I known then what I know now, I would have been able to report that more Top Operators said they offered IP and enterprise data services than said they carried video. Only one

in five respondents said they generated more than 25% of revenues from TV/radio. Enterprise video, audio and network services, as well as Internet backbone and VoIP services, were second to TV/radio in the total volume of business identified by respondents.

WTA will publish *Inside the Top Operators of 2006* on June 5, the opening day of ISCe 2007. It will be available free to members and for sale to non-members. June 5 is also the day when WTA and GVF team up to offer the Day 1 program at ISCe 2007, titled "Profiting from Hybrid Networks." It explores how innovative users and service providers are integrating satellite into a broad range of fixed, mobile and wireless applications, wherever satellite can extend capabilities, lower costs and build profits.

And, since I now know what I know, I hope to resist the temptation to plant foot firmly in mouth when it comes to our fast-changing industry. SM

Robert Bell is Executive Director of World Teleport Association (www.worldteleport.org). WTA is headquartered in New York City and has regional representatives in Los Angeles, London and Tokyo. Robert welcomes your comments at rbell@worldteleport.org.

EXECUTIVE VIEW

The Asian Broadcasting Market:

From Direct to Home (DTH) to Direct to Person (DTP) Services

by Tom Choi
CEO, Asia Broadcast Satellite

In this new section of **SatMagazine,** we invite CEOs of leading satellite companies to provide their views on the industry. For this first feature, we have Tom Choi, a industry veteran who recently co-founded Asia Broadcast Satellite based in Hong Kong, Asia's newest satellite operator. In this article he speaks on the evolution of the Asian broadcast market from "DTH" Direct-to-Home to " DTP" Direct-to-Person services-Editor

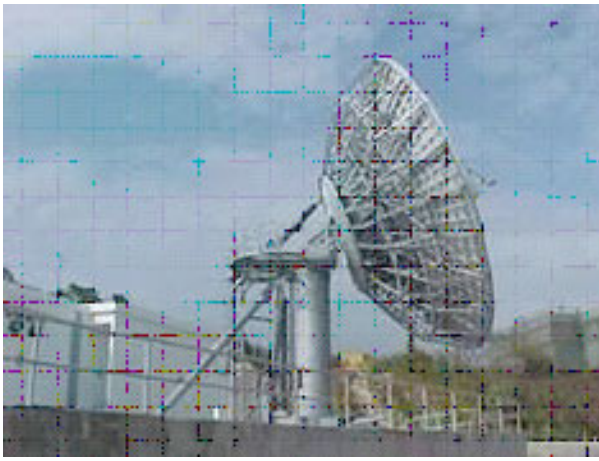
The Asian broadcasting market has the potential to become the largest in the world with two third of the world's population. Direct to Home (DTH) satellite services was actually introduced in Asia in 1991 with the launch of Star TV, a full three years before DirecTV launched its service in the United States in 1994. However, despite the long history of DTH services in Asia, few DTH operators have met with real success in terms of getting a critical mass of audiences in a diverse, multilingual Asian environment.

I spent five years at Hughes Communications which created DirecTV. Building a multimillion pay-TV platform requires a staggering amount of financial resources, unique and compelling programming as well as an army of personnel for logistics, customer support, billing and sales.

We have seen in Asia DTH operators with deep pockets, legitimate licenses and a good understanding of their markets succeeding in South Korea, Japan, Malaysia and India.

On the other hand, DTH operators who have a combination of limited financial resources, dubious regulatory (if not outright illegal) operations and~~and~~ poor understanding of their markets have failed to reach ~~a~~ significant penetration of their markets in China,~~the~~ Philippines, Thailand and Indonesia.

In the cable television broadcasting market, the trend in the Asia-Pacific ~~is~~ that growth is coming more on a local basis with some domestic markets such as India now having hundreds of locally produced programming. The Philippines, Taiwan, Korea, Japan, Thailand and Pakistan are following suit with dozens ~~dozens~~ of new channels launched over the past few years in each market. This trend will continue. The international broadcasters have been conservative in looking at the Asia-Pacific market as it is so heterogeneous and fraught with daunting challenges. Therefore, satellite operators that have traditionally relied on serving internationalbroadcasters have not seen a significant growth of their revenue in recent years.



ABS' teleport facility in Hong has over 10 satellite earth antenna sand 300 sq. meters of building space in a 2,500 sq.-meter lot..

The key to the growth of local channels is the regulatory environment which favors liberalization of the cable television industry and broadcasting. After Japan, India due to the positive regulatory environment has become the second largest broadcasting market which has developed very formidable domestic players who are now challenging the strongest international broadcasters in their home market. In this regard as there should be plenty more upside in our industry if China continues to allow more players to enter into the pay-television market in either the Cable or DTH market.

EXECUTIVE VIEW

PanAmSat which is now merged with Intelsat has done a remarkable job of positioning at 68.5^0 E their two satellites, IS-10 and IS- 7, which serve the South Asian market. These two satellites generate significant income from local broadcasters from the Indian sub-continent which includes India, Pakistan, Bangladesh, Nepal and Sri Lanka. Our company, Asia Broadcast Satellite (ABS) is positioning itself to take part in the growth of the Asian community by partnering with domestic broadcasters in strategic markets that have room for growth.

Building a Free-to-View Neighborhood

We are not a DTH operator but a satellite operator that provides open access to broadcasters who wish to transmit their content. We provide an end-to-end solution inclusive of play-out, compression, encryption, uplink on a MCPC platform and the satellite capacity. We of course charge the broadcasters for these services and it is up to them to define their business model be they free-to-air, free-to-view or pay if they have the appropriate local licenses. Our investment in our infra-structure on the ground significant but not in the hundreds of millions of dollars that is required to launch a successful DTH operation. We would welcome the opportunity to make our capacity available to a DTH operator or any other MCPC platform provider to expand our business in the future.

We have an open access DTH platform on our Southern Ku-band beam where we allow broadcasters to deliver their content to a potential audience of 3.5 billion people with a wide coverage that stretches from Japan to France from our premium position at 75^{0}E. Broad-casters who seek a direct relationship with the end-viewers can place their programming on our platform on a free-to-air, free-to-view (encrypted but not charged) or pay basis (regulatory approvals required) without the arduous task of seeking and negotiating carriage agreements with CATV operators or DTH providers. This approach is similar to those adopted by Eutelsat and SES-Astra in Europe where free-to-air channels and pay-packages on their respective slots have attracted thou-sands of channels and millions of end-user dishes.

Because we operate the first-ever pan-Asian Ku-band coverage, we would like to attempt to emulate their success. We are keeping our fingers crossed and having a lot of negotiations with broadcasters at this stage and our first MCPC platform is about half full since its launch in January of this year. If we have learned anything from FreeView in the UK, it's that there is huge pent-up demand on a consumer level for more high quality relevant programming on a free-to-air basis. From its inception, it has quickly grown to be a larger commu-nity that is now the BSkyB platform. We are convinced that this model will work in Asia as well.

Direct To Person (DTP) Services

Another area where Asia has been ahead of the US is in Mobile TV. While Mobile TV is just starting to take off in the US this year, Mobile TV services in Japan and Korea have been launched almost three years ago and have been experiencing tremendous growth. In South Korea, TU Media already has 1.1 million subscribers to its mobile TV service using the Digital Mobile Broad-casting (DMB) standard.

The Direct to Person (DTP) broadcasting concept arose from the trends in the evolution of satellite communications technology where we are now experiencing ever powerful satellite platforms which are now pushing the 20KW barrier and antennas that are enormous. In the past 30 years, we went from having 32-meter antennas on the ground and 1-meter antennas in space to 30-Meter+ antennas in space and antennas on the ground built into mobile phones. It's only logical to extrapolate from that trend that we will see microchip reception of low fre-quency signals from space from high powered satellites operating with very large antennas.

We believe that DTP will be the next killer application in satellite broad-casting. With a very powerful satellite, we can broadcast directly to a tiny~~30 cm.~~ receiver/decoder microchip on the ground about the size of small coin. This chip, which I call "the multimedia token" can be connected and integrated into any digital device with a video display such as a PC, laptop, PDA, cell phone, MP3 player, even household appliances. Because DTP will operate in frequencies below 1 GHz, unlike DMB-S, there would be no need for terrestrial repeaters and it will work either indoors or outdoors over a very wide coverage area of which satellites are known for. The applications are limitless. SM

Tom Choi is co-founder & CEO Asia Broadcast Satellite (ABS) based in Hong Kong. He can reached at tom@absatellite.net

MARKETING INTELLIGENCE

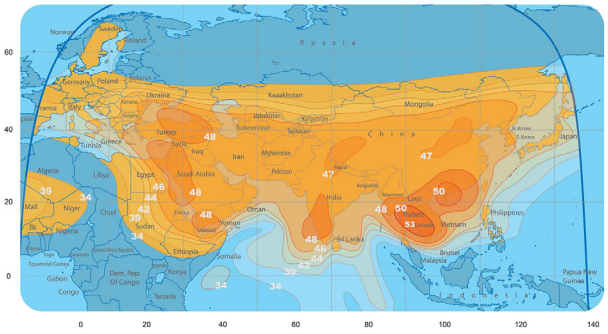
FEATURED SATELLITE

For our special focus issue on the Asia-Pacific market, we are featuring the satellite of Asia's newest satellite operator, ABS Satellite. The Hong Kong-based ABS Satellite operates ABS-1 satellite located at 75^0 E , formerly the LMS-1 satellite acquired from Lockheed Martin. The satellite has more than 17 years of on-board fuel remaining and can. connect Asia, Australia, the Indian Subcontinent, CIS, Middle East, Europe and Africa from its orbital slot over the Indian Ocean region. For more information on ABS satellite go to www.absatellite.net.

Satellite Information

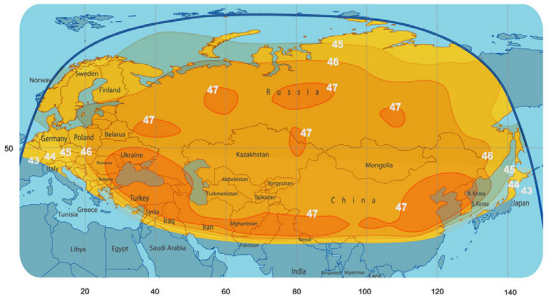
Bus Type	Lockheed Martin A2100 AX
Orbital Location	75° East
Stabilization	3 Axis
Station Keeping Accuracy	± 0.05 E-W and N-S
Life Time	Greater than 15 years
Full Eclipse Protection	Yes
Launch Date	September 27, 1999
Start of Service	October, 1999
Spacecraft Control Centre	A2100 Satellite Operation Cei
Monitoring in Coverage Area	Dubna, Russia and Shipka, E

Ku-BAND: SOUTHERN BEAM (Asia, Middle East, E Europe)



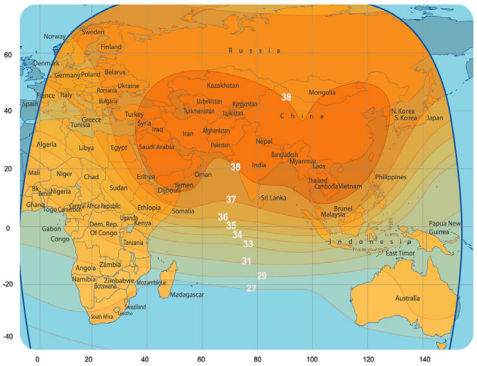
8 Ku-Band transponders @ 27MHz
polarization: linear horizontal
downlink frequency range: 12.500 GHz - 12.750 GHz
uplink frequency range: 13.750 GHz - 14.000 GHz

Ku-BAND: NORTHERN BEAM (E Europe, Russia, CIS)



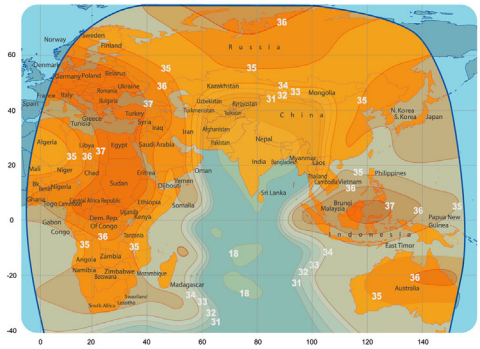
8 Ku-Band transponders @ 27MHz
polarization: linear vertical
downlink frequency range: 12.500 GHz - 12.750 GHz
uplink frequency range: 13.750 GHz - 14.000 GHz

C-BAND: B BEAM (Europe, CIS, Middle East, Asia)



14C-Band transponders @ 36MHz polarization: linear (H & V) downlink frequency range: 3.400 GHz - 3.700 GHz uplink frequency range: 6.425 GHz - 6.725 GHz

C-BAND: A BEAM (Europe, Africa, Asia and Ausralia)



14C-Band transponders @ 36MHz polarization: linear (H & V) downlink frequency range: 3.700 GHz - 4.000 GHz uplink frequency range: 5.725 GHz - 6.025 GHz

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