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June - July 2003 Summer issue
WORLDWIDE SATELLITE MAGAZINE

Your Satellite Connection
to the World

SES GLOBAL

Ground Equipment Market

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EDITOR, ASIA-PACIFIC

Homage to CommunicAsia

The Singapore air was hot and muggy, typical for a June day on the equator. I was in a last minute rush to find that missing connector for a piece of equipment that we were displaying at CommunicAsia 1992 and I was in cab headed for Sim Ling Square, the high rise, electronic mega-store where you can find just about anything electronic. I spent only about half an hour shopping around the various floors and was surprised to find what I needed (and at a good price too) with only a little haggling. A few minutes later, I was back in a blue NTC taxi on my way back out to the World Trade Center complex and the gateway to Sentosa Island.

The WTC Exhibition Hall that we were exhibiting in, I think it was Hall 5, was home to the US Pavilion and our companies small 8x10' booth. The temperature inside the Hall was stifling, maybe 40c and no AirCon at all until the day before the show started. Set-up was dreadful, hot, sticky and dusty. In our dripping wet Tiger Beer t-shirts, we got the VSAT equipment we were exhibiting operational and aligned "on the bird" after a couple of hours of running in and out of the Hall to the rear car park, where the antenna and ODU were installed.

Once completed and the booth all set-up, my colleagues and I had about only one thing in mind and that was to find a very, very ice cold beer. In Singapore it had to be a Tiger beer and as soon as we were back to our hotel, and after a quick shower, it was off to the Long Bar at Raffles Hotel for a cool half-yard glass of that golden nectar. The Long Bar in Raffles is a favorite "tourist spot" with woven bamboo fans, a huge long mahogany bar and lots of peanut shells on the floor...very colonial and tropical. The beer was a bit expensive but the atmosphere unbeatable. Later, our thirst quenched, we strolled down Orchard Avenue as the sun set (and in Singapore the sun really does set fast) along the myriad of shops, restaurants and hotels, marveling at how clean and neat the City was and how it was a stark contrast to other Asian cities where air pollution and poverty were easy to see.

The next day the Conference was open by a plenary session with the Minister of Communications from Singapore speaking. Later the exhibits were opened by the Minister along with a host of VIP's from around the region. Then the crowd of attendees moved in and it was a very busy and exhausting three days of "conferencing", cocktail parties and a host of telecom events.

I haven't missed many CommunicAsia's since my first in 1992. I was there the year that it was held at Sun Tech City downtown and now its held out by Changi airport at the new Exhibition Center there where you can take the subway right to the Exhibition Center. I was really sorry to hear that this year, the SARS scare had caused the cancellation of Asia's number one telecom and broadcasting exhibit and conference. CommunicAsia has always been a great place to showcase new products, find new business contacts and see old friends and catch up on the latest industry scuttlebutt. The funny thing is that I will be in Singapore this June on business but it sure won't feel quite the same as years past.

Stuart P. Browne

SATMAGAZINE.COM

Published monthly by
Satnews Publishers
800 Siesta Way, Sonoma, CA 95476 USA
Phone (707) 939-9306, Fax (707) 939-9235
E-mail: design@satnews.com
Website: www.satmagazine.com

EDITORIAL

Silvano Payne
Publisher

Virgil Labrador
Managing Editor and Editor, The Americas

Chris Forrester
Editor, Europe, Middle East and Africa

Stuart P. Browne
Editor, Asia-Pacific

Contributing Writers:

John Puetz
Bruce Elbert
Dan Fryer
The Americas

Peter Marshall
Roger Stanyard
Europe

Baden Woodford
Africa

Peter I. Galace
Art and Production Editor

Advertising Sales:
Jill Durfee

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INDUSTRY NEWS

Astrium and Alcatel Space consolidation "inevitable"

By Chris Forrester

It seems a European merger between Europe's two major satellite builders is still on the cards. Alcatel's space division and EADS-owned Astrium are understood to be examining ways of working together. On June 2 Francois Auque, EVP of the European Aeronautic Defence and Space Co (EADS), said a merger of EADS' Space operations with Alcatel's Space unit is "inevitable," and suggested that Italy's Alenia Spazio.could also end up being included in a single European satellite outfit. Auque said that a reinforced Astrium would be well placed to spearhead such consolidation. Alcatel Chairman Serge Tchuruk is on record saying that talks between the two companies will take place.

In an interview with French daily Le Figaro, Auque said the creation of a single European satellite constructor and launcher "is the only chance for survival" against competitors Boeing and Lockheed Martin in the US, and Mitsubishi in Japan. He said he was aiming at creating an "Airbus of satellites," similar to the Airbus model for European jet production. EADS also owns 28% of Arianespace, and Auque said he would not exclude raising this stake to 51%.

Auque also spoke about the cost of launching an Ariane 5 rocket from Kourou would again be falling, from around €190m to about €136m. In May Europe's member governments of the European Space Agency agreed to step up the number of institutional launches. They also endorsed a plan to give EADS sole responsibility for design, development and manufacturing of the Ariane-5 rocket. "We are now in a situation where the responsibilities have been clarified," Auque said. In the second half of next year, a reorganisation of the shareholder structure of launcher consortium Arianespace is expected, with French space agency CNES exiting the group.

On May 26 the EU cleared EADS 100% ownership of Astrium, allowing EADS to absorb British Aerospace Systems' holding in Astrium. SM

Eutelsat-Tiscali in Satellite Broadband Push

by Chris Forrester

The long-expected launch of a Europe-wide Eutelsat-delivered broadband service will take place in June. As anticipated, Eutelsat has linked with Tiscali in what the satellite operator describes as a "partnership and collaboration" to develop satellite-delivered broadband to the estimated 25% of Europe's population which "will never have DSL or cable broadband access". One of the benefits will be to boost Eutelsat's presence in the UK thanks to the launch of its high-speed 'OpenSky' service to the British Isles. Eutelsat will use E-Bird when launched (from 33 deg East), as well as W3 and W3A to supply OpenSky to the rest of Europe. E-Bird's location means it that existing Sky dishes can be used (with an additional LNB) by Sky Digital viewers.

The relationship sees Tiscali, which already has around 8m terrestrial customers across Europe responsible for marketing, sales and customer relations. Eutelsat will supply transponder capacity, with profits/revenues being shared by the two companies "accordingly". The project is already up and running in Italy where a distribution network is in place. This is being extended to the 14 other European countries, plus Italy, where Tiscali has a presence. Additionally, Eutelsat/Tiscali has signed up an additional 20 major distributors to retail OpenSky, ranging from Iceland to Pakistan and Morocco to Turkey.

Antonio Arcidiacono, head of OpenSky at Eutelsat, spoke exclusively to Satcoms Insider about the scheme. "The Italian experience was perfect for us. There are 6m homes with a dish pointing at Eutelsat. We now

have a network of almost 400 shops where users can buy a kit and subscribe, or get an installer to fit a second LNB. This network is now fully up and running and we have several small to medium service providers. Tiscali's arrival will make this a more massive and important venture. The beauty of our partnership is that Tiscali and ourselves are very similar. Like us, they are not the No 1 supplier in Europe. [T-Online probably has that position] but Tiscali, like us, is pan-European. We speak the same language."

Italy and Sweden will have a commercial deployment in June, followed by the other 13 countries "this summer and in the following months," says Arcidiacono. "The UK, France and the Czech Republic are all high on our list, as is South Africa. Tiscali has a presence in South Africa." Currently, including the Italian market, Eutelsat's total is about 7,500 users one or other of the OpenSky services, which includes Fast Internet, Streaming and Push services.

Arcidiacono admitted that numbers to date are still small. "We have been busy building the retail network, but Tiscali's arrival means the good figures should come. For 'fast internet' Eutelsat has a three-tier price structure in what Arcidiacono calls the "Euro 20, 40, 100 ratio, where the three levels more or less equate to residential, club and professional users. We sell accounts to distributors at certain prices and give an indication of the suggested retail price, but we are not imposing prices. Tiscali itself will also bundle these services with their terrestrial service, selling dial-up plus the satellite service in a single envelope. Users then get a DSL-like experience at a flat rate."

As to targets, Arcidiacono admitted it was tough making any firm prediction. It could be anything from a few tens of thousands to multiples of hundreds of thousands," he said. Pushed on expectations, he said anything between 10% and 20% of existing DTH viewers would be a good target, given that they were predisposed to satellite. In his view this could mean at least 600,000 homes in Italy. "But we have good confidence that we will be successful," he said. "Now it is a matter of addressing this market. There will also be competition and this will make us all smarter, but the world is ready for these services now." He said if the service had signed up more than 100,000 users by the end of 2004 he "would be more than happy".

Challenged that the buying public had to date been – at best – apathetic to satellite delivered broadband, he said existing suppliers, like Europe Online, were to be praised because they are the pioneers. "But we'll be more successful," Arcidiacono promised. "The first reason is that broadband awareness exists today in a way it did not exist two or three years ago. People understand what ADSL is, and its benefits over a 'normal' service. Secondly, today's market is much

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"If we get over 100,000 users by the end of 2004 I would be more than happy"

Antonio Arcidiacono, OpenSky

Residential Subscription starts at €20+VAT/TVA:
Tier 1: With the first 300 Mbyte content download per month at 400 kbit/sec average transfer rate
Tier 2: Additional 150 Mbyte at 200 Kbit/sec average transfer rate
Tier 3: Additional Mbytes in best effort mode

Club subscription starts at €40+VAT/TVA
Tier 1: With the first 800 Mbyte content download per month at 400 kbit/sec average transfer rate
Tier2: Additional 400 Mbyte at 200 Kbit/sec average transfer rate
Tier 3: Additional Mbytes in best effort mode

SME/SOHO Subscription starts at €100 +VAT/TVA:
Tier 1: With the first 2000Mbyte (2Gb) content download per month at 400 kbit/sec average transfer rate
Tier2: Additional 1000 Mbyte at 200 Kbit/sec average transfer rate
Tier 3: Additional Mbytes in best effort mode

Note: Eutelsat stress that above prices are suggested/guide prices only (see text) and depend very much on local market demands and competition.

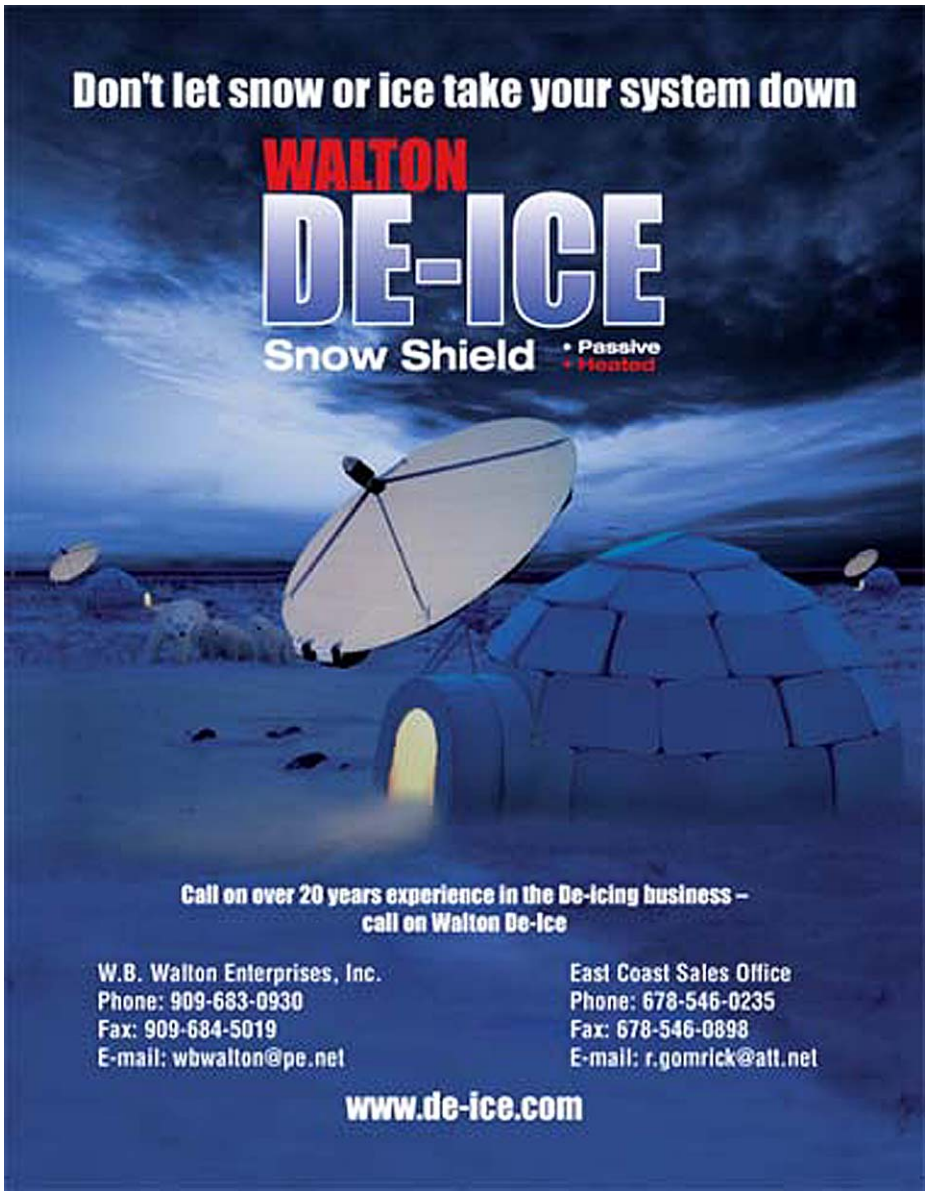
Data:Eutelsat.net

Winston Scott

Florida Space Authority Selects Retired Astronaut Captain Winston Scott as New Executive Director

June 12, 2003/Cape Canaveral/— The Florida Space Authority Board, chaired by Lt. Governor Toni Jennings, has selected former NASA astronaut Captain Winston Scott to be its new executive director. Upon completing contract negotiations, Captain Scott will replace Ed Gormel, who retired in April 2003.

Capt. Scott spent seven years as a NASA astronaut, completing two space shuttle missions, three space walks, and logging nearly 25 days in space. Prior to his NASA career, Capt. Scott served in the United States Navy for 27 years as a pilot. Since his retirement from the astronaut corps in 1999, Capt. Scott has served as a senior level administrator



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With its vast experience and customer-service orientation, W.B. Walton Enterprises is committed to providing products of the best quality backed by superior customer service and support.

at Florida State University; first serving as vice president for student affairs and currently as associate dean of the FAMU-FSU College of Engineering. SM

Loral Skynet Names Marcelo Sant'Anna General Manager of Loral Skynet do Brasil

Bedminster, NJ/June 9, 2003/ — Loral Skynet, a subsidiary of Loral Space & Communications has named Marcelo Sant'Anna as general manager of Loral Skynet do Brasil.

In this position, Sant'Anna will be responsible for managing Loral Skynet do Brasil's sales and marketing activities in Rio de Janeiro, Brazil. Sant'Anna will report to Bob Hedinger, executive vice president, sales, marketing and client services, Loral Skynet. Sant'Anna, 36, most recently was general manager of Latin America for Terayon Communications Systems Inc., a terrestrial-based broadband equipment supplier, where he was responsible for business development and strategic marketing.

Before joining Terayon, Sant'Anna gained a variety of experience in both satellite and fiber services working for NEC do Brazil and Alcatel. SM

Sirius Appoints New Board Member

New York/June 5, 2003/— Satellite radio broadcaster Sirius has sadi Michael J. McGuiness has been elected to serve on the company's Board of Directors.

McGuiness, 39, is a portfolio manager for W.R. Huff Asset Management Co., L.L.C., an investment advisor and private equity boutique, and a large independent manager in the High Yield market. Mr. McGuiness received an undergraduate degree in Electrical Engineering from Rutgers College of Engineering and an MBA from New York University. He is also a Chartered Financial Analyst.

McGuiness' appointment is effective immediately. He replaces Joseph Vittoria, 67, who has served on Sirius' board of directors since April 1998. SM

Steve Doering Named EVA Project Office Acting Manager

June 2, 2003/— Steve Doering has been named acting manager of the Extravehicular Activities Project Office at the Johnson Space Center.

Doering replaces Allen Flynt, who has accepted an assignment as deputy director of NASA's Ames Research Center, Moffett Field, Calif. The EVA Project Office at JSC oversees all areas of spacewalk activity, including planning, training, integration and operations. The office also oversees the development of spacesuits, spacewalking systems, support equipment and advanced spacesuit technology.

A 20-year veteran aerospace engineer, Doering began his career at JSC as a flight activities flight controller in Mission Control. He has supported human space flight in a variety of positions as both a contractor and civil servant, including subsequent flight control positions within Mission Control overseeing environmental control and life support and EVA systems. Doering has served as deputy manager of the EVA Project Office since 2001. SM

Wes Bush

Bush, Maguire Elected to Space Foundation Board

Colorado Springs, Colo./June 2, 2003/— The Space Foundation has unanimously elected two nationally known aerospace industry leaders to its board of directors. Wes Bush, president of Northrop Grumman Space Technology, and Joanne Maguire, vice president of special programs, Lockheed Martin Space & Strategic Missiles, will serve on the board beginning June 2.

Bush was appointed president of Northrop Grumman Space Technology in January 2003. In this position, he holds complete general management responsibilities for the company's Space Technology business. Bush previously served as president and CEO for TRW Aeronautical Systems. He earned a Bachelor's Degree and a Master of Science Degree in Electrical Engineering from the Massachusetts Institute of Technology.

Maguire previously served as TRW Space & Electronics deputy and as vice president of Business Development. She also served as vice president and general manager of the company's Space & Laser Programs division. She earned a Bachelor's Degree in Electrical Engineering from Michigan State University and a Master's Degree in Engineering from the University of California at Los Angeles. SM

FEATURES

Asia's Cable and Satellite Industry is Bouyant

By the Cable & Satellite Broadcasting Association of Asia

Cable TV system operators, satellite platform operators, equipment suppliers and content providers have reason to take an optimistic view of 2003 to date and going forward to year-end, according to information aggregated by the Cable & Satellite Broadcasting Association of Asia (CASBAA) (www.casbaa.org).

"Despite the uncertain economic climate there is plenty of good news out there," said Marcel Fenez, Chairman of CASBAA. "This year we have seen cable operators and satellite platform providers ramping up the subscriber base and continuing their strong moves into profit; the pay-TV channels, too, are reporting increased penetration and healthy revenues as they either consolidate years of hard work or launch new services. And the broadband penetration figures continue to rise inexorably."

Most notably, after up to a decade of investment Asia's cable and satellite system operators and suppliers are reporting firmer numbers.

· **In Hong Kong**, dominant cable operator CASBAA Member **I-Cable Communications** has signed 10,000 new cable subscribers in the first three months of this year, taking its total subscriber base to 620,000 with a target of 650,000 by year-end. I-Cable also has 250,000 broadband subscribers. EBITA for 2002 was US$80.6m million with an operating profit of US$42.6 million. In 2002, I-Cable's subscriber based rose by 8%. I-Cable, meanwhile, has announced a new carriage agreement in China for its Horizon entertainment and cultural channel in three-star and above hotels and foreign compounds via the SinoSat platform.

· **In Hong Kong** further details of new CASBAA Member **TVB Galaxy's** satellite delivered platform have emerged with a launch date of November 2003 now in place. Industry reports suggest the launch package will comprise 24 channels with at least four channels supplied by 49% investor TVB. The Galaxy package should increase to 40 channels within 18 months of the launch and will be distributed via satellite capacity leased from TVB Galaxy partner and CASBAA Member **Intelsat.**

· Also in **Hong Kong**, ADSL-based VOD platform operator and CASBAA Member **Yes Television** continues to sign new content deals recently adding a Playboy adult service to its line-up alongside Channel NewsAsia, The Soundtrack Channel and soccer service MUTV (Manchester United Television). Yes has also announced a deal to deliver content to broadband companies Hutchison Global Communications and Powercom.

· **In Taiwan** CASBAA Member **TVB International**, the overseas arm of TVB, produced some good news recently when it was revealed that its

Taiwan-based cable network TVBS posted US$8.08 million in operating profits for 2002. TVBI's syndication arm produced US$62.05 million in revenues for 2002.

· **In Japan,** satellite platform operator SkyPerfect TV reports that it will move into profit next year and now has 3.4 million subscribers (with 3 million DTH subs) and has exceeded its break even point with taxable profits set to begin rolling in March 2004.

· Also in **Japan**, cable operator Jupiter Telecommunications (J-Com Broadband) increased its subscriber base by 271,000 to 1.6 million subscribers as of the end of March, an increase of 20% over the previous 12 months. "The cable industry in Japan is experiencing the same dynamics as other parts of the world," said Tomoyuki Moriizumi, President and CEO of J-COM Broadband, which is 45.2% held by Liberty Media.

· **In Singapore**, CASBAA Member **StarHub CableVision** has announced that it had attracted 362,000 cable subscribers as of the end of April along with 110,000 cable modem subscribers. StarHub says it should hit the 400,000 subscriber mark by the end of 2003.

· **In Malaysia**, the news is also positive with local DTH platform operator Astro, which is by controlled CASBAA Member **Measat Broadcast Network Systems (MBNS),** announcing that it now has 1 million subscribers to its package of 40+ television channels. The announcement that Astro has broken the 1 million subscriber barrier comes shortly after CASBAA Member **Binariang Satellite Systems** and CASBAA Member **Boeing Satellite Systems**, announced a US$200 million+ agreement for the procurement of a Boeing 601HP satellite designated Measat-3 to be co-located with Measat-1 at 91.5 degrees East. Scheduled for launch in 2005, Measat-3 will carry 24 C-band and 24 Ku-band transponders, each providing 36 MHz of bandwidth over a 15-year minimum service life.

· **In Thailand,** CASBAA Member **UBC** reported 437,589 cable subscribers at the end of 1Q 2003, up from 413,028 12 months earlier.

· **In Indonesia,** cable operator and CASBAA Member **KabelVision** has revealed plans to launch a DTH platform in the final quarter of this year from the Palapa C satellite. Within 12 months the platform could be distributing up to 35 channels.

On the **channel performance** front the Indian focussed STAR Plus channel led the CASBAA Member STAR Group contribution to the quarterly News Corp. results. STAR Group Advertising revenues increased by 12%.

· Chinese movie channel, Celestial Movies, a division of CASBAA Member Celestial Pictures, has signed carriage agreements with satellite platforms Indovision (Indonesia) and Astro (Malaysia) as well as with acble operators StarHub Cable Vision (Singapore) and Brunei's Kristal. Celestial, which has centered its strategy on exploiting the classic Chinese movie library of the Shaw Brothers studio, says its DVD sales have "far out run" its expectations. It is also making new movies (with at least two on general release in Chinese) with plans for English-language products which will be distributed internationally by Hollywood studio Miramax.

· CASBAA Member **CNBC Asia-Pacific**, has inked a strategic partnership agreement with the Shanghai Media Group (SMG) which has been approved by China's State Administration of Radio, Film and Television (SARFT) with the support of relevant Shanghai government departments.

· In the past month, Singapore-based Channel NewsAsia, a division of CASBAA Member **Media Corp News** saw its SARS-related specials draw

more than 1.4 million Singapore viewers, aged 15 and above. This pushed Channel NewsAsia's average daily reach in April for these viewers to 24%, the highest recorded in the past year.

· CASBAA Member **ESPN Star Sports** (ESS) reported revenues of US$34 million for 1Q 2003 compared to US$30 million for the first quarter of 2002. Revenues for the nine months to the end of March were US$110 million compared to US$92 million for the same period the previous year.

· **In China**, CASBAA Member **MTV Networks** has been granted 24-hour landing rights for MTV and Nickelodeon in Guangdong Province. In a separate agreement, Nickelodeon will co-produce and distribute Chinese language Nickelodeon television series on DVD/VCD with Shanghai Audio & Video Press (SAVP). MTV China has been available as a 24-hour channel in hotels and foreign compounds since 1995, while MTV branded programming airs on terrestrial and cable channels across China, reaching 70 million TV households. Nickelodeon branded programming is currently seen via terrestrial and cable channels reaching 50 million TV households in China.

Regulatory Environment

"We also see distinct improvements in the regulatory environment in markets such as India, China, Hong Kong and Taiwan, although plenty of work remains to be done," said Mr Fenez.

The Cable & Satellite Broadcasting Association of Asia is the region's leading non-profit trade organisation for the promotion of multi-channel television and data transmission via cable and satellite networks. CASBAA represents some 120 Asia-based corporations, which in turn serve more than 3 billion people. Member organisations include AOL Time Warner, Motorola Asia Pacific, IBM, MTV, Discovery, ESPN STAR Sports, Encore International, UBC, ABN Amro, PCCW, Sony Pictures Television, MEASAT, PricewaterhouseCoopers, Scientific-Atlanta, BBC World, Bloomberg Television, Boeing Space Systems, STAR TV, AsiaSat and Turner International. For more information go to: www.casbaa.com

· On the **regulatory** front, in **Singapore** the lead-in to awarding at least one new pay-TV operator license continues, with CASBAA Member the **Media Development Authority** consulting a wide range of interests including those of CASBAA and its member companies. Issues under discussion are content controls and intellectual property issues.

· On the anti-piracy front, in **Hong Kong**, in line with consistent lobbying by CASBAA, the government has tabled new legislation to criminalise the distribution of unauthorised pay-TV signals for commercial use, with penalties running to up to five years in gaol and up to HK$1 million fines. Also in Hong Kong, two of seven civil actions against defendants in private prosecutions for allegedly importing and trading in unlicensed satellite TV signal decoding equipment were settled in April. Five more cases remain to be resolved.

· In Taiwan the draft Broadcasting Bill, recently tabled before the Legislative Yuan, firmly outlaws the practice of "Advertising Masking" in line with CASBAA representations made over the past two years. The Bill also starts to addresses the issues of tiering and the central role of the Government Information Office, both long overdue initiatives.

· In India, the introduction of a mandatory Conditional Access System in four cities, while difficult to implement demonstrates a clear determination on the part of all parties push the industry to the next stage of its development. SM

FEATURES

International Satellite & Communications Exchange (ISCe) Conference and Expo

Where Innovative Satellite Technologies and Business Meet

Long Beach Convention Center - Long Beach, California
August 18 – 21, 2003

Event Overview

The International Satellite & Communications exchange (ISCe) Conference and Expo is the premier West Coast annual event that highlights the innovation and use of satellite technologies and services in the global commercial, government and military sectors.

Spotlight Speakers, Compelling Conversations

The lineup for ISCe 2003 includes many of the top executives and most respected thinkers in the satellite industry. They'll share their views on both the challenges and opportunities facing this international business community. The sessions promise to be both enlightening and interactive, providing participants valuable opportunities to engage with their leaders, peers and constituencies in meaningful dialog and leave the conference with tangible strategies for real-world success.

A sampling of the speaker roster for ISCe 2003 includes:

- **Yousuf Al Sayed**, CEO – Thuraya SatelliteTelecommunications
- **Lt. General Brian Arnold**, Commander – SMC/CC
- **Dr. Illhami Aygun**, Director General and CEO – EurAsiaSat
- **Robert Berry**, Chairman – Space Systems Loral
- **Mark Bitterman**, Chairman, US Space Enterprise – US Chamber of Commerce
- **Michael Butler**, CEO – Inmarsat
- **Anita Cohen**, Director, Office of the Americas – NIMA
- **Mark Dankberg**, Chairman and CEO – ViaSat, Inc.
- **Ted Gavrilis**, President – Lockheed Martin Comm'l Space Systems
- **Keith Hall**, VP – Booz Allen Hamilton (and former Director – NRO)
- **David Helfgott**, President & CEO, Government Services – SES AMERICOM
- **Susan Miller**, President, Government Services – Intelsat
- **Elon Musk**, Founder and President – Space Exploration Technologies
- **Dean Olmstead**, President and CEO – SES Americom
- **Dr. William Patzert**, Technology Transfer Office – NASA JPL
- **Gino Picasso**, CEO – Iridium Satellite
- **Ramu Potarazu**, President and COO – Intelsat, Ltd.
- **Rick Sanford**, Director, Space Initiatives, Space & Defense Group – Cisco Systems
- **Herb Saterlee III**, CEO – DigitalGlobe
- **Michael Shaw**, Director, Radionavigation and GPS – US Dept. of Transportation
- **Frank Stirling**, Executive Director – Boeing Digital Cinema
- **Gregory Withee**, Asst. Administrator for Satellite & Information Services – NOAA
- **R. James Woolsey**, VP – Booz Allen Hamilton (and former Director – Central Intelligence)

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Matchmaking Program

Unique to ISCe is its Matchmaking Program, which creates and coordinates opportunities for selected small businesses to meet with representatives from the world's leading satellite, space and communications companies. Private meetings between potential business partners will take place on August 19 and 20. All companies interested in participating in the Matchmaking Program must submit a registration form, complete a profile questionnaire and pay a one-time $99 fee for a maximum of three on-site meetings to be arranged by Hannover Fairs USA, the official show organizer.

Welcome Luncheon

Kicking off this year's event will be a welcome luncheon – *free* for the first 250 guests – on Monday, August 18. Hosted by the **California Space Authority** (CSA), the session will feature **U.S. Representative Dana Rohrabacher**. A Congressman who's served Southern California since 1988, Rep. Rohrabacher currently serves as a senior member of the International Relations Committee and Chairman of the Space and Aeronautics subcommittee of the powerful House Science Committee. He'll share with attendees his views on the future of the space industry and California's role in it. CSA is a non-profit organization that serves as the policy advisor to the Secretary of the California Technology, Trade and Commerce Agency on all space-related matters and represents the State of California on space issues to the international community, federal government, other states, and local and regional government entities.

Roundtable participants include:

- Illhami Aygun, Director General and CEO – EurAsiaSat
- Christopher Baugh, President – Northern Sky Research
- Jeanette Chan, Partner – Paul, Weiss, Rifkind, Wharton & Garrison
- Tom Choi, CEO – SpeedCast
- Richard DalBello, President – Satellite Industry Association (SIA)
- Kalpak Gude, Vice President of Government and Regulatory Affairs and Associate General Counsel – PanAmSat Corporation
- Eui Koh, President – Asia-Pacific Satellite Communications Council (APSCC)
- K.C. Kuo, Vice President and General Manager, Asia-Pacific Group – Hughes Network Systems International
- John Stanton, President of Data, Carrier and Internet Services – Intelsat SM

U.S.-Asia Satellite Business Roundtable

The satellite industry is inherently global in nature and continues to evolve into a tightly knit international community. Asia is home to a concentration of satellite businesses and users, which presents great opportunity to U.S. companies and trading partners worldwide. ISCe 2003 will feature an intensive two-part **U.S.-Asia Satellite Business Roundtable**, hosted by the **Asia-Pacific Satellite Communications Council** (APSCC) and the **Satellite Industry Association** (SIA).

Part one, **"Opportunity Abroad: Prospects and Potential in Asia,"** is an ideal venue for satellite manufacturers, ground equipment and services companies, and launch providers to gain insights into emerging business opportunities and market strategies in the Asian marketplace. While the challenges and growing pains affecting this region have received much attention, there is long-term growth potential and important short-term considerations. Among the topics to be addressed are the impact of consolidation in the telecom industry, potential regulatory changes, and the effects of the SARS epidemic. U.S. companies interested in pursuing business opportunities or aligning strategic partners in Asia should be sure to attend.

Part two, **"Satellite Services: Growing Demand and Upcom-**

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ing Breakthroughs in Asia," will focus on many of the advances in next-generation satellite technologies – such as DBS, broadband and VSATS – that are being steered by the Asian marketplace. This provides great opportunity for savvy satellite operators, content providers, and the services sector in the U.S. Top executives from some of the leading companies helping build consumer demand and create business opportunities in the region will share their perspectives on the possibilities of today and the promises of tomorrow. This session is a can't miss for anyone interested in learning about and leveraging the growing demand for satellite broadband, DBS, and voice, video and data services in Asia.

CNN Special Session: The Use of Satellite Technologies During the War in Iraq

Closing ISCe 2003 will be one of the most timely and compelling sessions of the conference, **"The Use of Satellite Technologies During the War in Iraq."** A distinguished panel of experts, in a conversation moderated by **CNN Headline News Anchor Renay San Miguel**, will share insights on how the recent war in Iraq truly highlighted the value and advantages of satellite technologies and services. For the strategist in the war room, pilot in the air, soldier in the battlefield, reporter embedded with the troops, and viewer watching the war on television as never seen before, satellite technologies proved to be a tremendous asset. Come hear the providers and users of those technologies share firsthand experiences and lessons learned. Gain insights into the role satellites played in applications such as navigation, remote sensing, communications and broadcasting during this war and the ways in which our military and media may be forever changed.

Registration

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FEATURES

Europe's new sat-channel boom and bust

By Chris Forrester

2002 was a record year in Europe for new channel launches. According to a recent Screen Digest study more than 175 new channels were launched. That's the good news. The bad news is that 2002 saw many channels closed or go bust. The report says that Europe currently has some 1132 different channels (see explanation), with 30 new additions already added this year, and net new channels are still being added at more than 100 a year, with 2002 being the best year for new launches since 1998. Over the past six years channel growth has been nothing short of staggering, with total numbers up from barely 300 in 1996.

But roughly 25% of the channels that launched between 1996 and 1998 (the last boom years for growth) have closed within the past two years. Screen Digest say the multichannel sector has become a battlefield, with that dreaded word "churn" now being applied to channel launches and their death rate watched just as closely as subscriber numbers. The 1996-1998 period showed great optimism thanks to the number of digital platforms that launched during the period. Screen Digest suggest that with platform consolidation taking place in Italy and Spain, and expected over the next year or two in Scandinavia and perhaps even France, then a further shake-out is inevitable.

As to this year (to the end of April), the UK remains Europe's

What constitutes a 'different' channel?
Fox Kids Germany, for example is counted separately to Fox Kids UK in that it has a separate language/schedule. But if a channel is carried in ten countries that does not make 10 channels. For example VH-1 is counted just three times, matching the distinct number of feeds. A pay-per-view service, even if it has 50 'channels', is counted as just one.

The Big Hitters

Country	status	channel growth (2002)
UK	381	62
France	256	33
Spain	239*	18
Nordic	236	33
Italy	218*	18
Germany	156	14

*Prior to merger
Data: Screen Digest

Europe's Channel growth, by genre*

	2002	(new in year):	2003	(new in year)
General	107	18	114	7
General (national)	108	5	112	4
General (regional)	34	4	35	1
Adult/Erotic	34	9	34	0
Business	28	6	29	1
Children's	77	11	78	1
Computer/Games	10	4	10	0
Culture	13	0	13	0
Documentary	81	8	81	0
Education	5	0	5	0
Employment	2	0	2	0
Entertainment	63	3	64	1
Ethnic	19	5	21	2
Health	3	1	3	0
Lifestyle	14	3	16	2
Male Interest	6	0	6	0
Movies	142	14	143	1
Music	74	10	75	1
News	50	8	52	2
Parliament	7	1	7	0
Professional	3	0	3	0
Promo/barker	31	6	31	6
Religion	18	2	19	1
Shopping	47	14	52	5
Sport	92	10	92	10
Travel	15	2	15	0
Weather	3	0	3	0
Women's Interests	10	0	11	1
Misc	6	1	6	0
Total	1102	145	1132	30

Data: Screen Digest, May 2003

most buoyant market in terms of channel growth (15 so far) although almost as many have fallen by the wayside. Nevertheless, the UK still has 381 channels on air even though a handful of its massive 49 shopping channels have closed since January.

The most interesting conclusion within the report says that even with this proliferation of channels, seemingly with no genre left unexploited, in fact broadcasting niche opportunities do exist. Documentary and music channels have grown in number,

FEATURES

with music fast approaching sport in the number of selections available. Kids channels have also grown. But as Satcoms Insider has frequently commented, the real explosion has been within the tele-shopping sector. While, in the UK at least, some of the 'Simply' branded channels have failed, other markets have not even begun to tap into this potentially lucrative genre.

One other key genre, that at least does well in the USA, is weather. Canalsatellite's Meteo channel in France is highly-appreciated by viewers as is the TPS service. Spain also currently has a pair of weather channels, but nobody has ventured into the UK since the withdrawal and demise of The Weather Channel some years ago. Religious channels, often despite some tough local regulations on fund-raising, are also fast growing. There are even now religious shopping and music channels.

One other area that's bound to see growth is in parliamentary broadcasting along the lines of C-SPAN in the USA. While most major European countries now have their main elected chamber covered with satellite transmission, there are many that do not. Additionally, few governments broadcast their upper parliamentary chambers, or those of the EU.

As to individual country performance, the Nordic region matched France with 33 new channels launching last year. The UK out-performed everyone with a thumping 62 new channels on air. However, we are likely to see some consolidation in both the Italian and Spanish markets during 2003 with platform consolidation taking place. 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

FEATURES

Preparing for "Acquis"

By Chris Forrester and Roger Stanyard

There are now a slew of 12 Central and Eastern European countries recently welcomed into the larger 'club' of full European Union membership. Others are queuing up to join the European community, Some high-profile nations (like Poland) are already well-known to so-called Western countries and companies. Others are less so. London-based DTT Consulting has just published a major study of each Eastern European country in terms of their broadcasting appeal. These following paragraphs are just a taster [readers wanting more can e-mail: interspace@enterprise.net].

"Acquis"

The entire body of European laws is known as the acquis communautaire. This includes all the treaties, regulations and directives passed by the European institutions as well as judgements laid down by the Court of Justice. The term is most often used in connection with preparations by the candidate countries joining the EU.

The 12 New EU Members

Bulgaria	**Lithuania**
Cyprus	**Malta**
Czech Rep.	**Poland**
Estonia	**Romania**
Hungary	**Slovakia**
Latvia	**Slovenia**

Central and Eastern Europe's new European Union members range from tiny Estonia with just 1.2 m population (but with an impressive 64.7 internet hosts per 1000 persons in 2002) up to massive Poland (38.6m) and with 1000 years of history. We take a few of the dozen new European member states and look at their activity in terms of ISPs and satellite Earth Stations/VSAT, and the like.

Hungary, for example, is an interesting market, already very 'Western' in outlook. Antenna Hungária is the local transmission outfit. The organization has its origins within the old PTT system. Its prime role was as the transmission arm for the country's communist controlled radio and television services. In 1990 the PTT was split into a telecoms company, MATAV and a Postal arm. At the same time Antenna Hungária was split off as a stand alone broadcasting transmission company (and called the Hungarian Broadcasting Company). However, its relationship with Eutelsat was handled by Hunsat.

Antenna Hungária remains state-controlled. Its main shareholder is the State Privatisation and Holding Company (AVH). Nowadays Antenna Hungária acts along the lines of NTL broadcast in

the UK, operating terrestrial transmissions and teleport services. It provides two main uplinking services, one onto Israel's Amos 1 (since 1996) satellite and one onto Eutelsat's Hot Bird fleet (since 1998). Both are for digital broadcast services. The teleport is in Budapest. A major upgrading of the Amos earth station took place in 2002.

Antenna Hungária also uplinks a number of TV channels unconnected with the Hungarian domestic

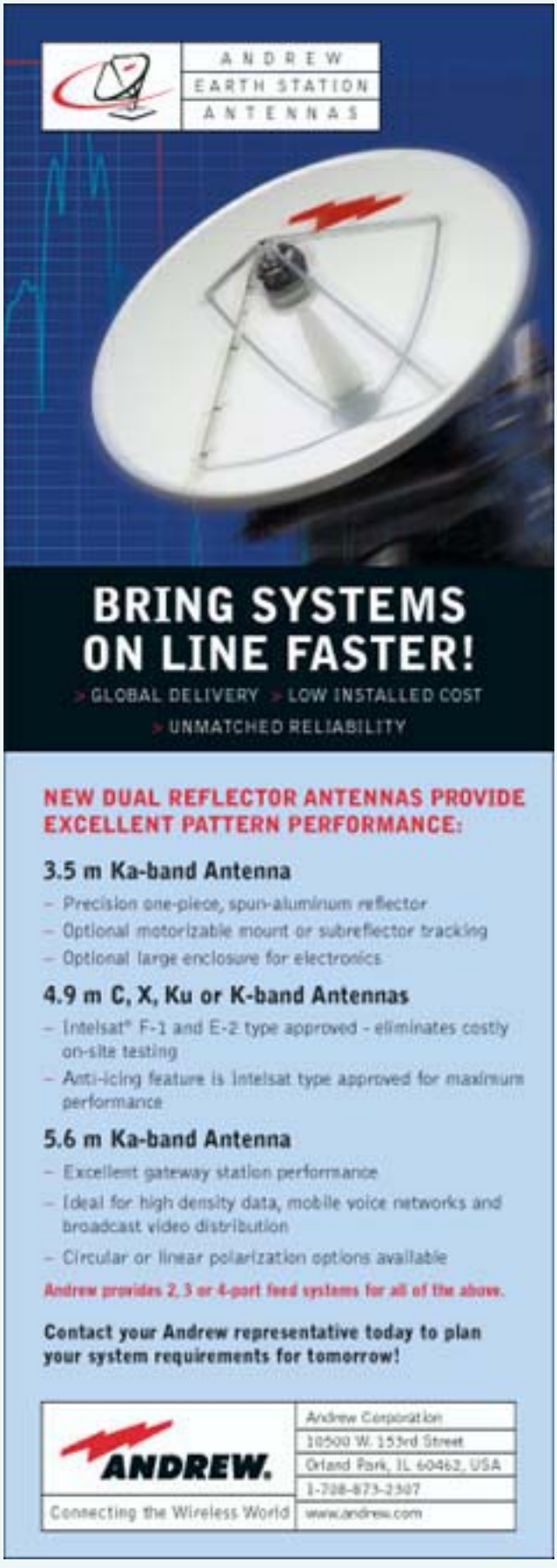
market place. These include the Kazakhstan international television channel, Caspionet, carried on Eutelsat Hot Bird 3, and the Tunisian channel Tunis 7 (also on Hot Bird). Antenna Hungária also has other satellite communications interests. It is a 50% shareholder in Hunsat and a 54.12% shareholding in HungaroDigitel, a VSAT operator established in 1993. Antenna Hungária also operators a large MMDS network in Budapest under the brand name AntennaMikro.

In 2001 the State Privatization and Holding

Company (ÁPV Rt.) put on sale a share packet of Antenna Hungária consisting of nearly 5 million shares for Hungarian and international investors. It was planned that APV would retain a 50% share plus one vote. However, the sale fell through because of unexpected losses arising from Antenna Hungária's shareholding in Vodafone Hungary and the downturn in the TMT sector.

Hunsat: The full name of this organization is the Co-ordination Association of Hungarian Space Communications. It is the country's shareholder in Intelsat, Eutelsat, Inmarsat and New Skies (shares received after privatization). It describes itself as a middle-man between satellite operators and communications customers in Hungary. It is 50% owned by Matav, the country's PTT which, in turn is 59% owned by Deutsche Telecom. The other 50% is owned by Antenna Hungaria. Hunsat was formed in 1992. It is our understanding that when Hunsat was set up in 1992, both MATAV and Antenna Hungária had the right to utilise international satellite operators (although Hungary was then a member of Intersputnik, it was not a member of Inmarsat, Eutelsat or Intelsat). Hunsat was intended to be a one-stop coordinating shop for the two organizations and the vehicle through which the country's investments in International satellite operators were handled.

Hunsat does not operate satellite earth stations for Eutelsat and Intelsat access. Rather, satellite capacity used by Antenna Hungária and Matav Hungary is booked through Hunsat. In January 2003 it was announced that Hunsat was being converted into a limited liability company.



The Hunsat arrangements have not blocked broadcasters and VSAT operators from taking capacity directly from other satellite operators such as Loral Skynet, PanAmSat, New Skies and Telenor. Apart from the peculiar position of Hunsat, we understand that the provision of satellite services in Hungary is a totally free marketplace.

Matav retains ownership of international PSTN gateway facilities through Intelsat, although PSTN via satellite is now of minor importance to Hungary. Hunsat suggested that satellites are now mostly used for cable restoration services in the PSTN environment. We understand that MATAV's Intelsat teleport has only Intelsat Standard A terminal. MATAV lost its monopoly on international PSTN traffic at the end of 2001. Moreover, Hungary signed the 1997 WTO Agreement on Basic Telecoms including the agreements on satellite communications. The satellite agreements came into force on 1st January 2003.

Nearby Croatia is another fascinating emerging market that is well-placed to benefit from EU membership. Croatian Radio and Television (HRT) already operates an uplink station in Zagreb. The on-premises teleport operates three main satellite terminals plus SNG equipment. One of the three fixed stations is used for EBU feeds. It is the only satellite service provider in Croatia. HT has never operated its own international satellite gateway and, instead has used Telekom Austria satellite facilities (apparently mostly for calls with Australia). Croatia is well connected by fibre optic cables to neighbouring countries and has an extensive domestic fibre infrastructure.

There are not many ISPs in Croatia, despite its size and the relatively high quality of its Internet and telecoms infrastructure. We put this dearth down to the control the local PTT has over connections to backbone (a complete monopoly until the end of 2002). Hrvatske Telekom (HT Croatia) is both a major ISP and, it appears, a monopoly provider of capacity to other ISPs.

Until the market was liberalized at the end of 2002 HT had a monopoly on VSAT communications. However, a local company, Marine Electronics, had a concession to offer VSAT services. Use of VSATs with Croatia has been very limited, mostly to embassies, international organisations (United Nations, NATO) and a handful of business enterprises. Anecdotal evidence suggests that the installed base is less than 100 and may have fallen as international organizations wind down their use of satcoms in the region. However, Croatia is a maritime state and Marine Electronics offers mobile and fixed satellite equipment and services to the maritime market.

The three countries of Latvia, Estonia and Lithuania comprise the Baltic States. The only true satellite service provider in Latvia is NSAB which operates a teleport under the name Skyport, based on Zakusala Island in Riga. The teleport opened in 2002 and involved an investment of US$2 million. The teleport is a regional rather than a national teleport and provides uplinks to Sirius spacecraft. However, Latvian Television also uses a 9.2 metre Eutelsat terminal to connect to the EBU programming exchange network. The facility was opened in 1996 using funding from the European Bank for Reconstruction and Development (backed by an EBU guarantee). Up until the end of Soviet domination Latvia international PSTN traffic was routed through Russia.

As we have already stated, Estonia is tiny. Consequently the demand for VSAT terminals and networks in Estonia is small. This is, in one sense, surprising, as the PSTN networks taken over after the

Continue to page 36

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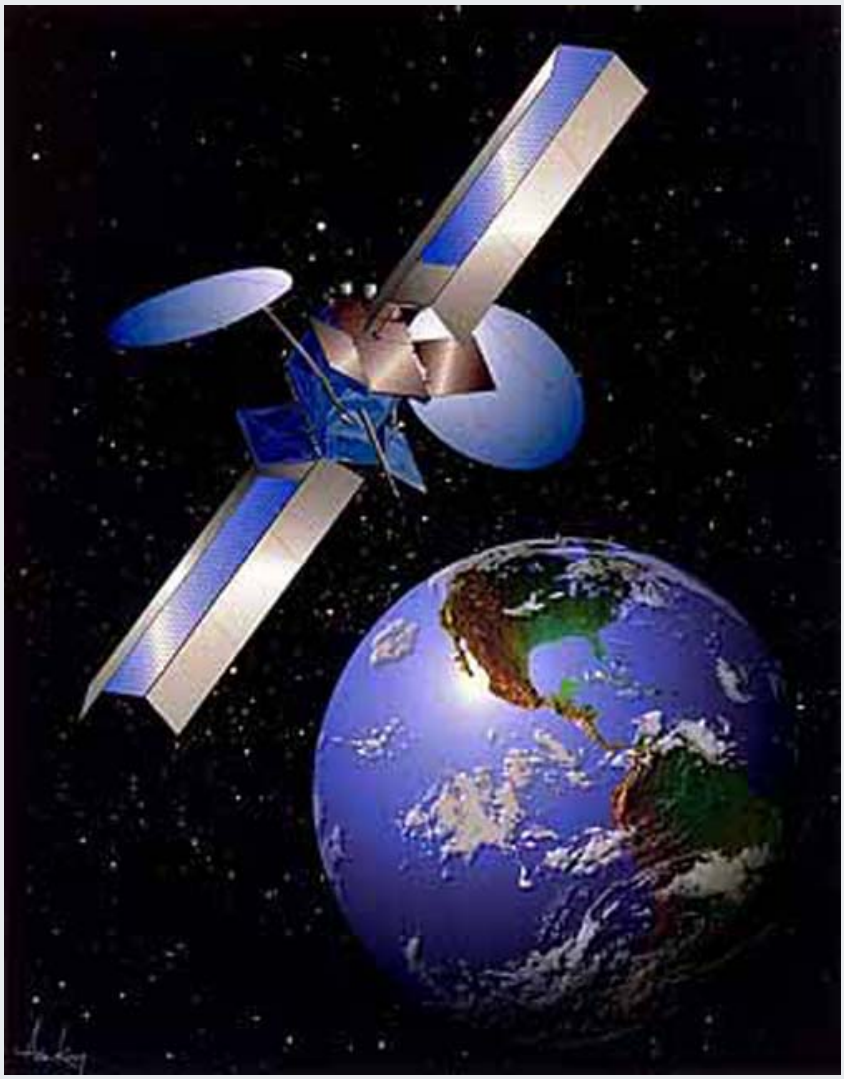
Roger Stanyard has some 19 years experience as a consultant and publisher in the field of satcoms and advanced communications technologies. Stanyard provides consulting services to major PTOs, broadcasters, satellite service providers and satellite operators throughout Europe and North America. He is also a frequent speaker at conferences.

FEATURES

Europe Satellite Radio Goes Ahead "Free" Channels, plus pay tier

By Chris Forrester



Notwithstanding the recent collapse of the Luxembourg-based Global Radio DARS project for Europe, it seems the Alcatel-Worldspace Digital Satellite project is very much alive and kicking. Back in January Pascale Sourisse of Alcatel Space implied that the Alcatel project was somewhat on the back-burner and not likely to see financing achieved much before next year at best. That has now changed.

Worldspace sources in Paris speak enthusiastically about their European DARS project, saying it is very much on schedule for an early 2006 service introduction. "We have selected the satellite [the former Ameristar/FM3 craft built for Worldspace] and changed the configuration to have an initial service launch for three countries: Italy, France and Germany. Others will follow. There will other news, probably during July. The project should then be able to talk about positive agreements with major industry partners."

No doubt the impressive success of XM Satellite Radio, along with promising results from rival Sirius, has spurred the Alcatel-Worldspace project forward. Clearly, since January there have been some major strategic decision taken. At one stage the project called for two new satellites to be built. A two-satellite operating model remains the overall objective, but the 'short-cut' route of choosing a modified Ameristar puts the project back on a faster track. The GEO-positioned satellite, as with both the XM and Sirius models in the USA, will need terrestrial back-up by means of repeaters. Indeed, because of Europe's higher latitudes there will almost certainly be a greater density of L-Band repeaters, hence the focus on three initial markets. This means that the initial funding needs have changed with a consequent alteration to the project's business plan. The first satellite's beams will cover the whole of Europe. Worldspace's fourth satellite (dubbed FM4) and part-built as a ground spare is a

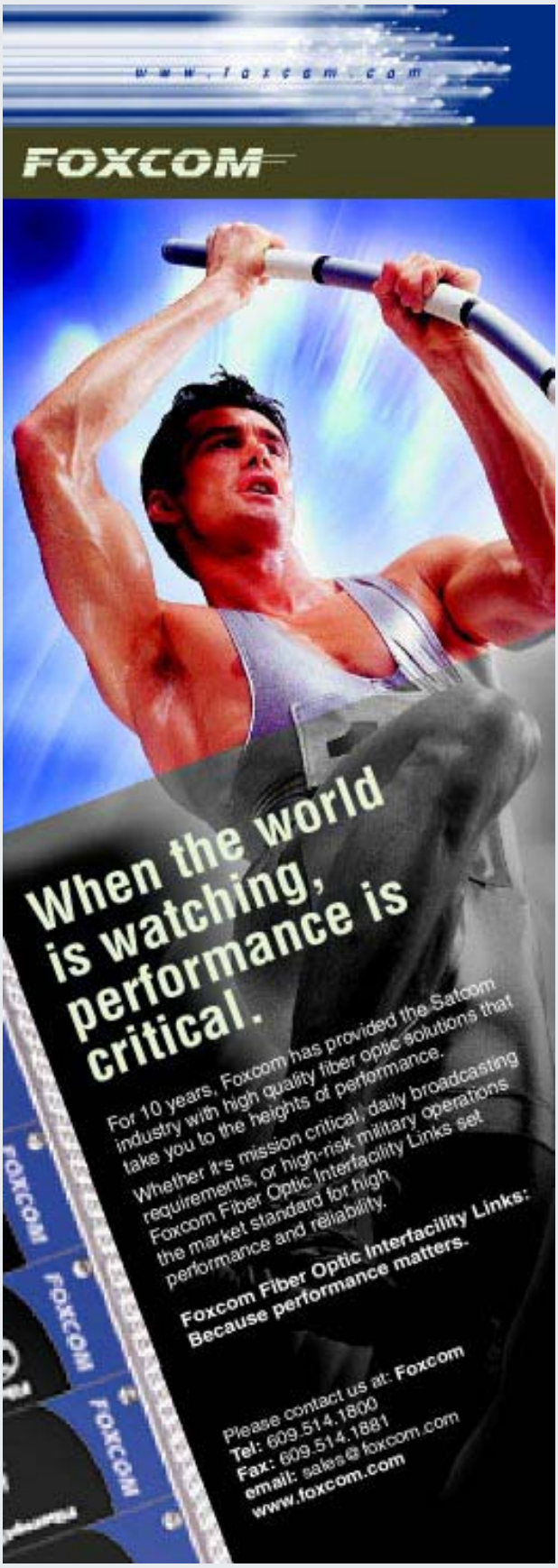
FEATURES

likely candidate for the project's second satellite.

Key to the project's success will be signing up European motor vehicle manufacturers, and Satcoms Insider understands that some major names will figure in next month's announcement. Citroen of France tested and demonstrated the system last autumn. Radio France, Europe 1, RTL, RFI and NRJ took part in that experiment which ran from Sept 6 through Nov 31st 2002. The trials used Worldspace's Afristar craft and TowerCast's terrestrial repeater network in and around the Paris region using a T-DAB bloc of frequencies allocated by the French regulator.

As to finance for the project it is understood that an investment bank will also shortly be named in order to seek first-round major financing. Currently the project's partners are Alcatel Space, Worldspace Europe (which uses a Danish-registered business as its operational vehicle).

The commercial launch is now slated for the beginning of 2006 following a late-2005 satellite launch. As to content our sources say they are working closely with radio broadcasters and the general trend across Europe to signal digitisation makes this an easier, not more difficult, task. New programmes can be more easily created. Worldspace expects to remain a key player in the project, probably also via a service company. The service will supply a mix of audio channels, some



live and some stored. Besides audio channels, it also talks about music downloads, video clips and pay-per-downloads and events.

The project also refers to as supplying 'telematics' which it lists as navigation systems, maps, traffic info, weather/news and the ability to interact with cell-phones. The Alcatel/Worldspace-backed project has seemingly already decided on one major element. Like the current Worldspace radio system, some channels will be free and in the clear and available to all receiver-owners without subscription.

SM

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TECHNICAL TUTORIAL

Introduction to TCP/IP

By D.C. Palter

TCP/IP and Satellites

The initial research work in packet switching gradually morphed into the modern version of TCP/IP starting in 1969, when the first RFC was published, through 1981 when many of the core TCP/IP protocol specifications were published. The protocols were then tested and refined through most of the 1980s.

The use of satellites for TCP/IP connectivity is not new and actually dates back to the early development of TCP/IP. In fact, ARPA (Advanced Research Projects Agency), the military research organization that funded the development of TCP/IP and ARPANET, the predecessor to the Internet, was created in 1957 as a response to the launch of the Sputnik satellite by the Soviet Union. Satellites are therefore at least partially responsible for the birth of the Internet.

However, it was during the 1970s, when TCP/IP was being actively developed, that satellites really entered the picture. As early as 1972, the developers of TCP/IP were discussing the complications of satellite delay, including the "small buffer problem" as well as the effect on interactive Telnet traffic. The decision to split what was originally just TCP, which ran only over the ARPANET infrastructure, into distinct TCP and IP protocols, was mostly driven by the desire to interconnect ARPANET with other types of networks, which at that time meant work being done on satellite and packet radio networks.

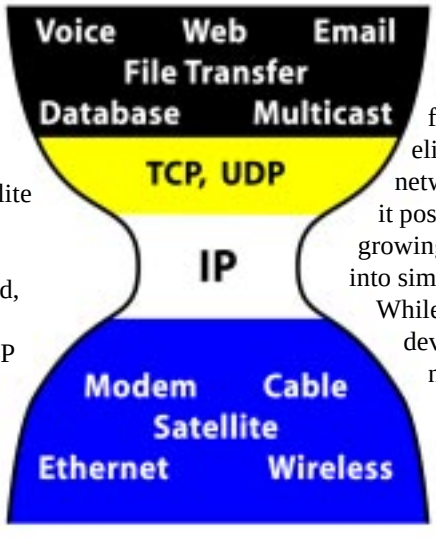
By 1975, some of the first tests of TCP were conducted by Stanford University, BBN, and University College London running over a satellite link between Hawaii and the U.K. Subsequently, in 1976, SATNET, the Atlantic Satellite network was created, linking the U.S. to Europe over an INTELSAT satellite. By 1977, a TCP connection starting from a mobile node on a packet radio network in San Francisco, across the continental U.S. over the terrestrial ARPANET, running across SATNET to Norway, down to London over a terrestrial network, back over SATNET to West Virginia, then across the continent over ARPANET to the University of Southern California in Los Angeles, demonstrated that independent networks could be linked using TCP/IP.

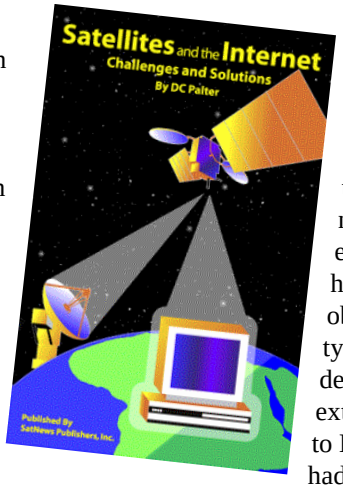
IP Hourglass

While there are plenty of networking protocols available, some of them more efficient than TCP/IP especially for particular purposes, the great value of TCP/IP comes from its ubiquity and flexibility.

Almost every computing device now includes TCP/IP functionality, and this means that every computing device is capable of communicating with every other device attached to a network, whether that be Windows-based personal computers, Macintoshes, Unix servers, mainframe computers, printers, file servers, mobile phones, or anything else. In the future, even our kitchen appliances may be networked using TCP/IP.

This ubiquity has been self-reinforcing. Initially only a tool for academic researchers to communicate, the TCP/IP network grew to become the Internet. Where TCP/IP was once only available for PCs as a separate product from third party vendors, as the Internet grew, TCP/IP became a fundamental component of essentially all computer operating systems, making it the obvious choice for all computer networking and eliminating the need for any other networking protocols. This, in turn, made it possible for the Internet to continue growing and make most corporate networks into simply a local branch of the Internet. While arguably better protocols have been developed, it is now impossible for any new protocol to compete with the installed base of TCP/IP and the applications developed to run over TCP/IP.





However, ubiquity does have a downside in that it is now difficult to revise or enhance TCP/IP. Originally, as new versions of the TCP/IP were developed, network administrators scheduled a "flag day" when all TCP/IP devices would be required to switch over to the new version of the protocol. Versions were not backward compatible. After the flag day, any devices which had not switched over to the new protocol could no longer communicate on the Internet. This was possible when the Internet was a relatively small, close-knit community of sophisticated computer operators, but the concept of calling a flag day on the current Internet is incomprehensible.

For this reason, any new enhancements to TCP/IP must be backward compatible with current versions. This has been especially problematic in the case of IPv6, a necessary enhancement to enlarge the IP address space and allow for continued growth of the Internet. With all applications tied to the current version of IP, there is no reason for users to switch over to IPv6, and with no IPv6 users, there is no incentive for network operators to expend the time and money necessary to upgrade their networks to IPv6.

The other differentiating factor between TCP/IP and its predecessors is its flexibility. First, TCP/IP has the flexibility of an open standard which can be implemented by anyone to run on any type of machine. Most early protocols such as XNS, NetBIOS, AppleTalk, and DECnet were developed by computer manufacturers specifically for their machines to communicate between each other or with dumb terminals or peripherals. With a very specific usage in mind, these protocols could be simple and efficient (although in actuality, most emphasized simplicity and were not particularly efficient) but only worked with particular hardware or could not scale to large numbers of users. Even for Novell NetWare, the first networking protocol to achieve wide-scale usage among the general public, the proprietary nature of the IPX/SPX protocol (although really just an extension to Xerox's XNS) limited its usage to the printer and file server applications included as part of the NetWare package.

Second, TCP/IP has the flexibility of running over any sort of underlying network. Early protocols, including NCP, the predecessor to TCP/IP, were tied to the design of the physical network. The protocols needed revision every time improved networking hardware became available, which obviously made it difficult to roll out new types of networks. When IP was developed to allow the ARPANET to be extended to work over satellite in addition to Ethernet, it is fortunate that the designers had the foresight to redesign TCP/IP to be independent of the physical network itself rather than simply adding the ability to use satellite links.

While there is no single standard for the interface between IP and the link layer, each operating system vendor makes its interface specification publicly available so that any networking hardware manufacturer can write a driver to allow its cards to work with the operating system. New networking technologies require only a new driver supplied by the networking card manufacturer without having to depend on an update to the operating system. SM

To be continued next issue

DC Palter is Vice President of Sales and Marketing of Mentat—a supplier of high-performance networking solutions to the computer and satellite industries. Previously, Mr. Palter held marketing and engineering positions at Hughes Electronics, Allied-Signal Aerospace, and Kobe Steel. Mr. Palter holds a BSME degree from Northwestern University and an MBA from the Anderson School at UCLA. Mr. Palter is also the author of a textbook on the Osaka dialect of Japanese. He can be reached at dc@mentat.com

This tutorial is excerpted from a forthcoming book by D.C. Palter entitled "**Satellites and the Internet: Challenges and Solutions"** due out June 2003. For more information about the book go to: www.satnews.com/free/pubs/internetinfo.html

PRODUCT & SERVICE REVIEWS

ND Satcom's SkyARCS: Interactive Broadband DVB-RCS IP Solutions

ND Satcom has recently introduced SkyARCS, a modular, scalable, high-performance satellite IP network solution. It is fully compliant with the ETSI/DVB standard DVB-RCS and due to its ability to support each terminal with up to 2 Mbit/s bursts in the return link, it is ideally suited for business applications with a high demand for information exchange of any kind. ND SatCom's SkyARCS platform allows Service Providers to serve the growing IP business applications markets.

Through the application of intelligent algorithms for transponder allocation and IP burst traffi c management, SkyARCS is designed to provide optimal network performance while guaranteeing minimal cost of ownership. ND SatCom provides customer tailored solutions using various terminal technologies as well as integrating best-of-breed application packages.

ND Satcom said the SkyARCS solution represents a highly attractive value proposition for Service Providers, Telcos, ISPs and Satellite Operators providing high quality networking services in sectors such as corporate, governmental and SME's.

Main Applications

- Broadband Internet/Corporate Intranet access
- Voice over IP
- Legacy to IP protocol conversion support (e.g. X.25)
- IP multicasting for cost effi cient data distribution
- Media streaming
- Large data contribution to central location
- Backup network for remotes to central location
- Virtual Private Network (VPN) support
- Hub

The SkyARCS platform allows Service Providers to serve the growing IP business applications markets. Through the implementation of intelli-

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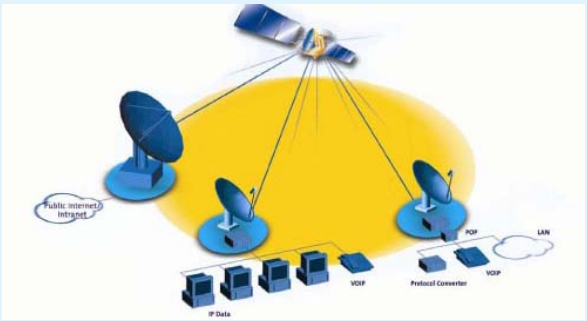
gent algorithms for transponder bandwidth allocation and IP burst traffic management, SkyARCS is designed to provide optimal network performance whilst guaranteeing minimal cost of ownership. ND SatCom provides customer tailored solutions using various terminal technologies as well as integrating best of breed application packages.

The following diagram shows some of the possible network scenarios with SkyARCS:



*Sky*ARCS Network Overview

Product

SkyARCS is a 2-way satellite system for IP data based applications. The star type network architecture consists of a hub as a central node and a large number of terminals. The system can either be used for large dedicated corporate networks or for providing service to multiple customers or user groups on a single hub, implementing Virtual Private Networks per customer.

SkyARCS is compliant with the DVB-RCS standard. In general Ku-band (12-18 GHz) is used for the forward link as well as for the return link. Recently launched Ka-band (18-30 GHz) satellites offer the possibility to support Ka-band for the return link. This introduces the advantage that multiple spot beams can easily be realized for the return link and improves the link budget thusreducing equipment cost significantly. C-Band support is also given by the SkyARCS systemoffering complete amplifier and antennas packages for this frequency range, which is mostlyrequested for rainy areas in the world, but with reduced maximum burst rates. SM

For more information on ND Satcom and its products go to www.ndsacom.com

VIEWPOINT

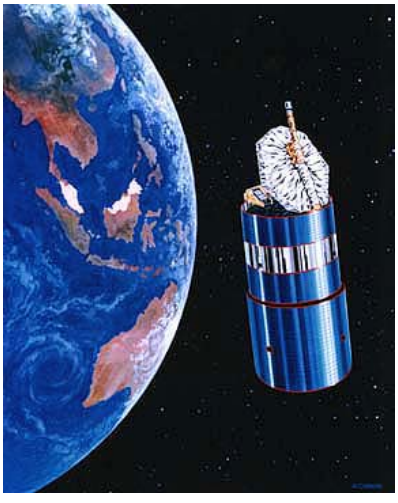
Guidelines for Success in the Asian Satellite Equipment Market

By Bruce Elbert
President, Application Technology Strategy, Inc.

Asian companies and governments buy technology from developed economies – most in the West but some in industrialized Asian nations. In my past experience, the buyers had a general understanding of what they wanted to do but lacked detailed knowledge necessary to acquire precisely what they needed. This does not mean that suppliers of satellite ground equipment can apply the typical selling pressure to get results. Rather, they need to work proactively with the buyer to find the right solution and offer it in a way that allows the buyer to get to where they need to go. Most importantly, buyers in Asia expect suppliers to give them value for their money; and they expect products to work the first time and thereafter. In short, they want a solid package that serves the business application so that they, too, have satisfied customers.

Since bits and pieces won't work, the supplier has to get their act together to sell ground equipment and establish a long term, growing business base. This is important because a satisfied Asian customer is much more loyal than one in the West. Long term profits and solid relationships will result from this foundation.

I'll describe a process of marketing and implementation



that I learned during my 35 years of doing business and working in Asia. Here are the key points:

1. Understand what the customer wants to do – help them get their requirements into the right form so that they are satisfied and comfortable with the approach. In developing the first GEO mobile system in the world, our team from Hughes collaborated with potential partners in Singapore and Indonesia to establish the technical, financial and operational feasibility of the system. Having completed this effort on our own money, we were in prime position to win the hardware project – which we did.

2. Do the necessary systems engineering and design work, in consultation with the customer, so the equipment can be specified and then priced correctly.

3. At all times, be sensitive to the culture. Westerners sometimes make the mistake of seeing Asia as a monoculture when in fact it is very diverse. Business and personal styles in Malaysia, Thailand, Indonesia, Japan, Korea, Philippines, etc., have their own subsets of customs and rituals which anyone dealing with should be made aware of. On the other hand, locals understand that foreigners are unfamiliar with the fine points and are usually tolerant if they view you as doing your best to work with them honestly.

4. Work closely with the customer at every step of the process – don't throw the solution "over the transom" and expect them to pick it up. Most buyers in Asia will see right through this shortcut.

5. On the other hand, respect the customer organization, its members and their intelligence and ability. They may not know your product but they have survived in their own environment (which in most respects is much more challenging than your own back home). Listening will reward you with facts of life that can save time and money.

6. Provide the training they need to take over. Done right, they will pick up the task. S. Gunawan, the first director of the Indonesian Palapa System, told

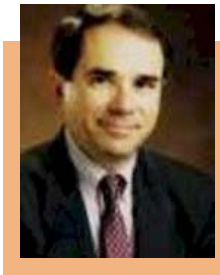
me in 1976 that "you Americans have built this system and made it work, but now it's our turn!" He and his Indonesian team took over and have never needed to look back. Over the years, our company sold literally millions of dollars of ground equipment and satellites as a result of gaining their acceptance and trust. Gunawan, a friend whose competence and sincerity I value to this day, rose in the ranks of government and business and attained the position of President Director of Satelindo.

7. Contracts and specifications are important, but relationships matter most. During a negotiation in Indonesia, the lead manager on the other side, R. Wikanto, said "we must come to agreement on the technical specification and statement of work. After we are done, the contract should go "in the drawer" and hopefully never be viewed again. However, if we run into difficulties, we must revisit it to resolve the issue."

8. Expect the customer to demand everything you promised, and that you won't waste their money. One Chinese customer stated during negotiation, "if we decide not to include something, we expect a price reduction. However, if you didn't include something that's needed, we expect you to provide it at no additional cost to us".

9. Learn the markets in those countries of interest. Do this on the ground and make good friends who can help overcome hurdles and make your life easier. Agnes Yeow, currently the Regional Manager for Aon Space, Asia-Pacific Region, told me the story of her experience in Vietnam selling transponder capacity. While still new to her job as a satellite marketing person for MEASAT, she nevertheless understood that selling a solution in another Asian country required care and intelligence. She learned that rather than push her way in and try to force a sale, one should take the time to get to know the players. One should never take anything or, more importantly, anyone for granted. It turned out that a key decision maker was a reticent old gentleman dressed very plainly who sat in the back of the room. Treating everyone with dignity proved the best strategy for her success.

Technology may originate in industrialized countries, but engineers and business people the world over understand what it can do in their environment. For this we can thank higher education and more recently the Internet. Astro, the first digital DTH operator in Southeast Asia, grew to prominence by blending a western style of consumer marketing with an Asian spirit of meeting the customer on their own level. They acquired the latest DVB technology by building a team of engineers and then purchasing equipment from the West. Still, the platform for program creation and customer management was uniquely Malaysian. This is an excellent example of how Asian satellite equipment buyers demonstrate that they can and do know what they are doing, and can work effectively with Western satellite equipment suppliers. Currently, Shinsat is about to embark on one of the world's first broadband consumer satellite Internet services called iPSTAR. Shinsat entered the satellite business 15 years ago when they purchased two satellites in the US and built a team in Thailand capable of operating and marketing the system to users throughout the region. In moving to the forefront of our industry with iPSTAR, Shinsat now offers the opportunity to reach a market potentially measured in billions, rather than millions, of subscribers. Satellite equipment suppliers who have worked with Asian companies like Shinsat are in the best position to profit from the ensuing economic recovery in the world's most populous region. SM



Bruce Elbert has over 30 years of experience in satellite communications and is the President of Application Technology Strategy, Inc., which assists satellite operators, network providers and users in the public and private sectors. He is an author and educator in these fields, having produced seven titles and conducted technical and business training around the world. During 25 years with Hughes Electronics, he directed major technical projects and led business activities in the U.S. and overseas. Web site: www.applicationstrategy.com email:bruce@applicationstrategy.com

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EXECUTIVE SPOTLIGHT

Interview with Americom Asia-Pacific Managing Director Deepak Mathur

To shed light on the current state of the Asian satellite market, Satmagazine managing editor, Virgil Labrador spoke with Deepak Mathur, managing director of AMERICOM Asia-Pacific, a joint venture company of Lockheed Martin and SES AMERICOM based in Singapore. The venture owns and operates AAP-1— an all Ku-band satellite located at 108.2 degees East which offers high-powered services into China, India, South Asia and North East Asia. Prior to joining AAP, Deepak was the Vice President Sales for Loral Cyberstar Asia-Pacific. He has also held senior managerial and sales positions with NagraVision (SA) and EchoStar International Corp. Excerpts of the interview:

Q. Overall, what are the short-term prospects of the satellite market in Asia?

A. The prospects vary across the region and by frequency band. We have seen a fairly stable C-Band market for the past couple of years (due in part to the regional nature of the coverage) and to a large extent, I anticipate this will continue. There are some specific applications (such as IP trunking) which may take a hit as fiber prices continue their downward spiral and connectivity through Asia grows. However, other applications such as traditional video distribution seem to be holding up well and the explosion of channels in some markets has favorably influenced the demand for C band capacity.

Ku on the other hand is more market specific and, as a result, has seen a great deal of volatility. Simply stated, and almost without exception, there has been a substantial mismatch between demand and supply. The supply overhang over most key markets in Asia will take some time to correct itself and I anticipate 3-4 years before we reach an equilibrium. That being said, there are some encouraging signs coming from the market and I am cautiously optimistic about the next 12-24 months.

Q. How has the SARS crisis affected business?

A. Travel and direct contact with customers has definitely suffered. Business plans across the region have been delayed and some of the most seriously effected regions are still struggling to come to terms with the impact of SARS on business. Some industries have suffered more than others, particularly travel and tourism. Telecommunications has not been hit directly but the long term impact on business sentiment is still an unknown. However, almost without exception we have found our customers to be exceptionally resilient and patient. The telecommunications tools and resources that have been adopted throughout the region has presented many of us with excellent temporary alternatives to the travel restrictions that we have all faced. Longer term, assuming that we have seen the back of the SARS epidemic, all signs seem to indicate that we will come out of this crisis somewhat bruised, but stronger.

Q. What do you think will be driving the demand for transponders in Asia in the short- to medium-term? What are the key markets and regions?

A. The demand for transponders continues to be driven largely by the traditional applications and to a lesser extent by new ones. Video distribution continues to be the mainstay of industry with IP trunking and telephony representing the bulk of the remaining capacity sales. We are also seeing a modest increase in the demand for broadband data services as well as excellent growth in the traditional VSAT network market segment. A large driver for demand will likely continue to be video; this will be reinforced by the emergence of DTH platform(s) in key markets like China, India, the Philippines. Also as we roll out inexpensive two-way technologies in rural or remote parts of Asia, there is excellent potential for capacity uptake for

interactive services. New and layered applications on traditional platforms are also helping to drive demand. VOIP is another application that has seen strong growth in our region in the past two years and is likely to be a contributor to demand in the near term.

Q. How is Americom Asia Pacific approaching the Asian market? How would you differentiate your approach from your competitors?

A. While this may sound cliched, it is really by focusing the basics - on our customers needs, by being flexible and proactive in the market and by providing excellence throughout the interaction — from the time we become aware of a requirement to the delivery of our services. All too often in a tough market there is a tendency to cut price and compromise on service - we have tried to remain focused on the fact that providing satellite services is a long term business with a premium on quality relationships. Fundamentally we are here for the long haul in what is our core business.

Q. What are your thoughts on the current downturn in the worldwide satellite market and how has this affected the Asian market?

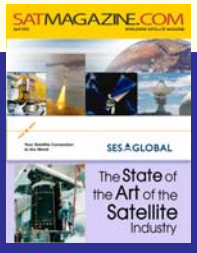
A. There is no question that we are in a difficult period for the industry as a whole and Asia is no exception. Indeed in some areas the problems in Asia (i.e., oversupply, price cutting, a depression in the general business sentiment) are more chronic than in other parts of the world. That being said, we are in the fastest growing region in the world, serving the largest population with the greatest potential for the future. Asian audiences generally love their entertainment, education and their ability to communicate. The essential ingredients and drivers for our business are in place. It is a matter of timing more than anything else.

Q. Are there any new applications —I hate to use the term—"killer apps"— that are in demand in Asia?

A. I would say that at the moment we are seeing a substantial rollout of the services that we are very familiar with — so, no, not many "new killer apps" are surfacing. What I am more excited about is that we are seeing the execution of plans that we have been talking about for years within the industry. Markets that were on the verge of launching DTH platforms (such as Korea) have done so very successfully with Skylife, and other markets seem to be on the threshold of similar commercial DTH launches. Similarly, in the broadband sphere, applications such as distance education, telemedicine and nationwide lottery services have gone from conception and design to full-blown execution.

Q. Is AAP planning another satellite for the Asian market?

A. Our decision on AAP-2 as with all other key decisions are driven with the intent to maximize shareholder value. The plans are in place, however the business drivers need to be calibrated with the changing market conditions. If the business case presents itself, I am sure that the Board of AAP would look favorably on such a decision. At the moment, our focus remains on executing the business plans for AAP-1. SM



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Presented by the Global VSAT Forum

Asia-Pacific Broadband Satellite Markets 2003

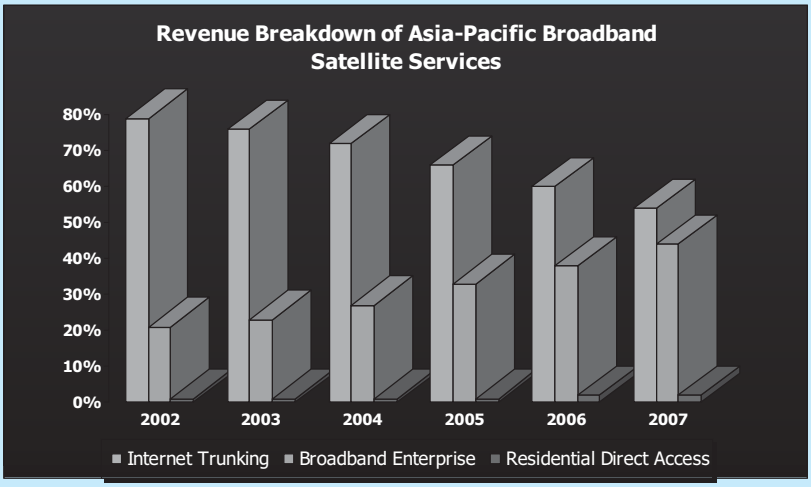
By David Hartshorn
Secretary General, GVF
with Jose del Rosario
Senior Analyst & Regional Director for the Asia Pacific, Northern Sky Research

Asia-Pacific satellite broadband retail revenues will increasingly outstrip wholesale revenues between now and 2007, and the satellite broadband enterprise business will continue to rise as Internet trunking declines. These were among key findings of a new report conducted by a consultant GVF Member, Northern Sky Research.

Entitled "Asia-Pacific Broadband Satellite Markets 2003", the report outlines three distinct segments in the Asia Pacific broadband services market. These include:

- ISP Backbone and Trunking
- Enterprise Broadband Services
- Residential Direct Internet Access

In terms of the revenue breakout for specific business units, the market is expected to shift from Internet trunking to broadband enterprise services over time. In the developed countries of the region (Japan, Korea, Hong Kong, Taiwan, and Singapore), Internet trunking services for ISP links have largely been abandoned in favor of fiber



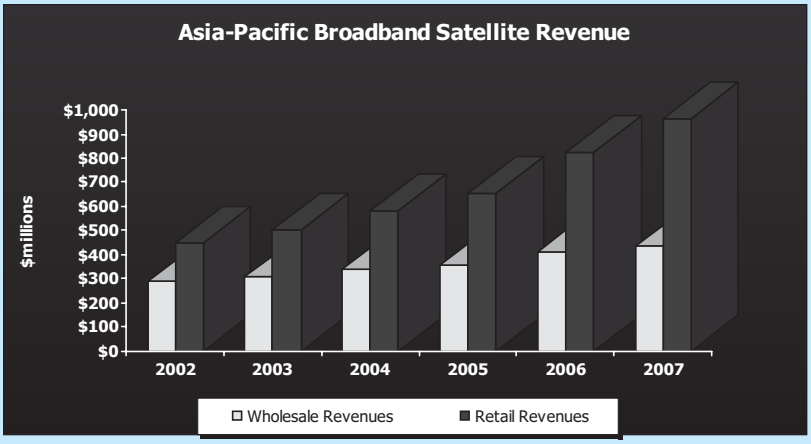
Source: Northern Sky Research

trunking. Although the region's topography necessitates the need for satellite links, price points inhibit adoption and use of satellite platforms for cash-strapped developing countries. Residential direct Internet access services are not expected to account for a large percentage of revenues. High price points compared to terrestrial technologies and slow development of the Internet in rural and remote areas largely stifle demand for these services.

The government has been the key to development of the Internet and of broadband usage in Asia. The success of Korea highlights this fact, and important lessons can be drawn from the Korean experience. Key policies and initiatives learned in Korea can be exported to developing countries that are currently instituting programs not just to catch up with their more prosperous neighbors, but to use the Information and Communication Technologies (ICT) sector as a catalyst for overall economic growth, development and poverty alleviation.

The United Nations Development Programme (UNDP) has stated that "ICTs have repeatedly demonstrated their potential for alleviating poverty in developing countries. In many instances, impoverished people have experi-

Market Intelligence



Source: Northern Sky Research

enced benefits in the form of increased income; better health care; improved education and training; access to job opportunities; engagement with government services; contacts with family and friends; enterprise development opportunities; increased agricultural productivity, and so

The wholesale market, meanwhile, is expected to exhibit a relatively low compound annual growth rate (CAGR) as satellite services begin to progressively lose out to fiber for trunking needs. The region, which is currently experiencing overcapacity, will also add price pressure such that wholesale transponder costs will likely continue to decline over time. As such, retail margins are expected to widen as operational costs from the service providers decline. Margins are also expected to improve as premium broadband enterprise services begin to impact the overall market more extensively.

In the Asia Pacific, the take up rate of satellite-based broadband services has been extremely low compared to terrestrial alternatives. However, satellite technology can play a vital role in the region since topographical challenges will limit the amount of terrestrial buildout if governments and multilateral agencies hope to bridge the Digital Divide within a reasonable length of time.

Satellite technology, which is currently high-priced when compared to terrestrial alternatives, will remain a niche solution if price offerings do not continue to decline. Only governments and multilateral agencies will take the initiative to deploy high-priced satellite services since they have high price elasticity of demand. The full potential of the corporate and residential market will continue to be stifled with the current price offerings since these entities have low price demand elasticity.

As a summary point, if the lessons drawn from Korea and the price offerings of new satellite services being rolled out in Asia can be applied to a given country as a development tool, satellite-based broadband services have a high chance of succeeding in a relatively short period of time. SM

For more information about GVF, go to www.gvf.org and to obtain the complete Asia-Pacific Broadband Satellite Markets Report go to http://www.northernskyresearch.com/reports/APBBSAT/index.html

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INDUSTRY NEWS

Continued from p. 5

more diffused and we now longer have to have a single satellite provider distributing and trying to maintain a market from a single point in Europe. Thirdly, by partnering with companies like Tiscali, which has a sophisticated Europe-wide structure, we can really attack the market more efficiently in cost terms. For them it is a marginal business, carried on top of their existing business and not a stand-alone business with all the costs associated with that. The signing with Tiscali is a key advantage for us. They already have a billing relationship with their 7 or 8 million customers." SM

Preparing for "Acquis"

Continued from p.17

collapse of the Soviet Union were decrepit. Moreover, most of the growth in telephony in the region has been accounted for by mobile. Fixed PSTN growth has lnow largely ceased. Whilst we do not have the statistics to back the statement up, we suspect that much of the demand for VSATs in the 1990s was for point-to-point links for ISPs.

Estonia is, perhaps, the best illustration of how communications in the more progressive parts of central and eastern Europe have successfully transformed from chronic backwardness into an almost response to meet European Union policy objectives needed to gain EU Membership.

3. The adoption of European rather than US standards, particularly, so far, in the GSM mobile phone marketplace.

4. The spill-over effect of the success of European standards.

Since 2000, all Estonian ISPs have been using fibre rather than satellite to connect to backbone. The market for VSATs in Estonia is highly liberalized but the take-up has been minimal. Only two VSAT operators were licensed during the 1990s when there was clearly a need for quick-fix modern communications. A number of ISPs used satellite connections to backbone until 2000; such terminals would have been categorized as VSATs but the

Continued next page

Hungarian TV Channels on Satellite

Channel	Satellite	Comments
Budapest TV	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria
Filmmuzeum (1)	Amos 1 at 4º West	Uplinked by Antenna Hungaria
Halozat TV	Amos 1 at 4º West	Free to air
HBO Hungary	Amos 1 at 4º West	PowerVu, uplinked by HBO Hungary
Hir TV	Amos 1 at 4º West	Free to Air, believed to be uplinked by Antenna Hungaria (7)
ITV Hungary	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria (8)
Magyar ATV (1)	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria
Minimax	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria (8)
MusicMax	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria (8)
Nickelodeon Hungary	Amos 1 at 4º West	PowerVu, uplinked by HBO Hungary?
Satelit	Amos 1 at 4º West	Mediaguard, uplinked by Antenna Hungaria (6)
Spektum TV Hungary (1)	Amos 1 at 4º West	Mediaguard/PowerVu?, uplinked by Antenna Hungaria
Viva+ (Z Plus)	Amos 1 at 4º West	PowerVu, believed to be uplinked by HBO Hungary
Animal Planet Hungary (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Avante Hungary (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Cartoon Network (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Club Central Europe (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Discovery Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Duna TV (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Eurosport Hungary (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Extreme Sports Hungary (3)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Filmmuzeum (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Fox Kids Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Hallmark Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
HBO Hungary (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Magyar 2 (M2) (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Magyar ATV (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
National Geographic Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Reality TV Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Spektrum International (S) (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Sport 1 Hungary (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Travel Channel Hungary (2)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
VH-1 Classic Hungary	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Viasat 3 (1)	Astra 1G at 19.2º East	Cryptoworks, uplinked by UPC
Minimax Hungary	Eutelsat W3 at 7º East	FTA
Magyar 2	Hot Bird	PAL, FTA
Caspionet	Hot Bird 2 at 13º East	FTA, Uplinked by Antenna Hungaria (4)
Tunis 7	Hot Bird 2 at 13º East	Uplinked by Antenna Hungaria (5)
Duna TV	Hot Bird 3 at 13º East	FTA, uplinked by Antenna Hungaria
Caspionet	Hot Bird 3? At 13º East	FTA, uplinked by Antenna Hungaria
Gay TV	Hot Bird 3? At 13º East	FTA, uplinked by Antenna Hungaria
PTV Prime	Hot Bird 3? At 13º East	FTA, uplinked by Antenna Hungaria
TV7	Hot Bird 3? At 13º East	FTA, uplinked by Antenna Hungaria
Duna TV	Hot Bird 4 at 13º East	PAL, FTA
Eurosport Hungary	Hot Bird 5 at 13º East	MCVI
National Geographic Hungary (2)	Hot Bird at 13º East	Mediaguard/Cryptoworks
National Geographic Hungary (2)	Sirius 2 at 5º East	PowerVu, uplinked by NTL
Viasat 3	Sirius 2 at 5º East	Viasat/Viaccess, uplinked from Sweden?
Romantica Hungary	Sirius 2 at 5º East	Cryptoworks
Avante Hungary	Telstar 12 at 15º West	Cryptoworks
Byu TV (2)	Telstar 12 at 15º West	
Reality TV Hungary	Telstar 12 at 15º West	Cryptoworks
Sport 1 Hungary	Telstar 12 at 15º West	Cryptoworks, uplink not known

Notes:All channels listed are digital unless stated otherwise. The list of UPC Direct channels on Astra 1g is as at 3rd December 2002. HBO has a transponder on AMOS-1 for its CEE film service. Our understanding is that the lease ended in 2002 so presumably has now been renewed. Antenna Hungaria is understood to have backup agreements with Deutsche Telekom and British Telecom in the event of failure of its earth station. (1) Indicates that this channel is transmitted only in Hungarian. SES says that Animal Planet is transmitted in both Hungarian and Polish (2) In Hungarian and English (3) In English only? This channel is a JV between the Extreme Group and UPC. (4) This is the Kazakhstan public service broadcast channel, launched on satellite in late 2002. (5) This is a Tunisian TV channel. (6) Service appears to have dropped from Amos 1 in December 2002. (7) This is a new right-wing news channel. (8) Understood to use the same channel on Amos 1.

DATA: DTT Consulting

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links have long ceased operation. Anecdotal evidence suggests that the installed base of VSATs is small.

There basically are no satellite service providers in Estonia. NSAB has built a regional teleport in Riga serving all three Baltic countries but no use of it appears to be made by Estonian television broadcasters – at least for full time TV channels. The Estonian public service broadcaster has a Eutelsat two-way station used for EBU transmissions.

As far as we are aware, Eetsi Telfon does not have its own Intelsat or Eutelsat terminals for international PSTN traffic. Estonia did not join Eutelsat until the late 1990s and appears to have made no use of Eutelsat's TDMA PSTN network. Indeed, as far as we are aware, Eesti Telefon has no satellite infrastructure at all. Until the start of 2001 Eesti Telefon had a monopoly on international switched fixed voice services connected to the PSTN. In 2000 Eesti Telefon completed construction of a national TV programme digital distribution network based on ATM/MPEG-2/DVB standards.

Slovakia is another modest market. The demand for satellite capacity for Slovak originated satellite TV channels is tiny and looks likely to remain so. There is no domestic pay-TV bouquet. Multi-channel television is dominated by analogue cable although DTH reception is popular. We estimate that the demand for satellite capacity for Slovak TV channels is no more than two transponders.

As is the case with the Czech Republic, Slovakia is basically still analogue country. DVB-T is difficult to implement because the public service broadcaster is under very severe financial pressure. Slovakia does not make use of satellites for international PSTN traffic. Its conventional VSAT sector is small and stagnant.

In the medium term, we believe that there is probably a market for satellite capacity in distributing Slovak terrestrial TV into foreign markets, notably the USA. DVB-T may also require satellite capacity as the main terrestrial channels do not provide universal coverage and may be unable to do so in a DVB-T regime. Broadband satellite access is likely to find a niche market. DSL is currently the only serious option for the SME sector but is very limited. Cable modem services are just as limited and it doesn't help that the dominant cable operator, UPC, is financially challenged.

Slovakia is said to be the backward bit of the former Czechoslovakia. It split off from the latter in the Velvet Divorce of 1993, taking with it an economic base over-reliant on declining heavy industries. It subsequently developed a reputation for crude, nationalistic politics and an unreformed economy. This is another Central European country that has dropped the use of satellites to connect ISPs to backbone, the last link in use for this application was one provided by Loral Orion (Cyberstar) which we last identified in use in early 2001. This link was used by the ISP Slovanet and was, in early 2001, one-way. In early 2001 we identified that there were 41 operational ISPs. The number has now dropped considerably, down to 22 in March 2003.

The VSAT sector in Slovakia is both small and mature, with virtually no growth in the installed base between 1998 and 2001. Incidentally, the figures also suggest that there are very few uplink stations for PSTN or video services. They seem to suggest no more that eight. The two dominant VSAT operators in Slovakia are Telenor Slovakia and GiTy Slovakia.

Slovakia is late in introducing DSL services. Slovak Telecom began offering DSL on an experimental basis in mid-2002 but full launch of DSL services have been held up by regulatory issues. Testing has now restarted in Bratislava and commercial launch of service is expected sometime in the first half of 2003. Nor is broadband over cable common. UPC announced in February 2003 that it was launching a pilot service some time later in the year but this would only be available in Bratislava's old town. It had only received its licence to do so earlier in February.

Slovak Telecom does not have its own Intelsat or Intersputnik earth stations used for PSTN. There are two full satellite service providers in Slovakia – Telenor Slovakia and Slovak Link. In addition, GiTy Slovakia provides VSAT services. Loral Skynet (as Loral Orion) was represented in Slovakia by a company called Isys. However, it appears to have primarily been providing satellite links through Loral Cyberstar connecting ISPs to backbone. That market has disappeared. Slovak Link is the Slovakian equivalent of Czech Link.

As a satellite service provider, it has a single earth terminal uplinking to Eurobird 1 (also used by Czech Link) but is an altogether more recent operation – launched in 2002. As at March 2003 it uplinked four TV channels and six radio channels. Cryptoworks conditional access is used. The four channel TV package is intermittently available for public reception but, in practice the bouquet is intended for distribution of services to cable headends and transmitters. Decoder cards are only available for use in Slovakia. The earth station is located in Bratislava using Eutelsat's Eurobird.

For each of these countries, and the others, which have also signed the EU accession documents, they have already happily completed Phase 1 of the EU's harmonisation process. Now comes the hard work of making their complete transition into full Europeans, including open borders, plus complete liberalisation of their telecoms and broadcasting sectors. SM