

**SATELLITE ROUNDTABLE**

**Michael Elwood-Smith – CEO  
NetworkAdvantage  
Corporation Ltd**

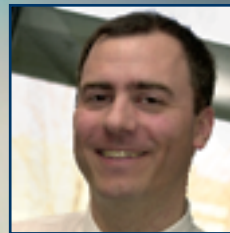
Leading the NetworkAdvantage team Michael's professional career encompasses senior positions in multimedia, cable television and telecom sectors, including Director Applications Engineering, Scientific Atlanta Europe (UK). He holds an EE Bachelors degree (Hons) from University of Canterbury, New Zealand, MIEE, CEng.



**NETWORK**

**Patrick Agnieray – Director of  
Marketing – Alcatel Space**

Patrick graduated in Physical Engineering and specialised in Telecommunications and Aerospace Systems. He also holds an MBA from Toulouse University. Patrick is in charge of the assessment of the market for satellite applications, as well as of the definition of the satellite solutions to answer that market. Prior to that, he was in charge of marketing for Alcatel Earth Stations. He has launched DVB-RCS and IP over satellite developments within Alcatel Space.



**ALCATEL SPACE**

**Giora Reish – Marketing  
Executive – Gilat**

Giora has been a marketing executive with Gilat Satellite Networks since 1995 and currently serves as Associate VP, Sales and Marketing, for Asia. In that capacity he is responsible for all sales and marketing activities in the region, management of regional offices and development of the company's support structure.



**GILAT**

**Warren Hardy – Managing  
Director Optus Wholesale &  
Satellite (Singtel)**

Warren Hardy was appointed Managing Director, Optus Wholesale & Satellite in March 2003. The Wholesale & Satellite business unit is one of four core units within Optus. The unit is responsible for delivering voice, data and IP (Internet Protocol) solutions to target national wholesale and satellite markets. Warren is also responsible for SingTel's international business unit; he heads both SingTel and Optus satellite operations.



**SINGTEL**

**Peter Jackson – Chief  
Executive Officer – Asia  
Satellite Telecommunications  
Company Limited**

Peter has over 20 years' experience in the telecommunications field. Following his training with British Telecom, Peter joined Cable & Wireless in 1970. He has worked in Dominica and BVI in the Caribbean, the United Arab Emirates in the Middle East, Macau and China. In 1989, he was appointed Regional Marketing Manager for the Bermuda, Caribbean and Atlantic region.



**ASIASAT**

**Ashley Fernandes – Regional  
Vice President, Asia Pacific  
Sales- Data, Carrier & Internet  
Business Unit**

Ashley is responsible for leading and managing Intelsat's international DC&I sales team for the Asia Pacific region. The position is based in Singapore and includes responsibility for managing all customer relationships, sales support activities and the achievement of specific revenue, profitability and growth objectives for the region. Ashley received his Bachelor of Arts degree from the University of New South Wales in Sydney, Australia.



**INTELSAT**

**ROUNDTABLE**

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### CHAIRMAN

David Hartshorn is Secretary General of the Global VSAT Forum (GVF), the London-based non-profit international association of the VSAT industry. He has worked in the satellite communications industry for over 15 years, serving in offices based in North and Southeast Asia, North America and Western Europe.

**David Hartshorn: Whether they are small, medium or large – and whether they are in urban or rural areas – enterprises with requirements for cost-effective telecommunications are increasingly opting for hybrid solutions that draw upon the relative strengths of satellite, GSM, Wi-Fi, Wi-Max, fibre optic and other telecom tools. What are the implications for the satellite industry?**

**Patrick Agnieray:** This customer demand is of course global within the telecommunications industry. As part of the Alcatel telecommunications group, Alcatel Space is designing its offer to address that trend, for example by integrating different transport solutions into one solution, such as satellite+ WiFi or satellite+ GSM/GPRS/3G. However, this trend relates not only to fixed-mobile convergence for example, but also to applications convergence. Alcatel Space is therefore offering an integrated solution for its customers, enabling Managed Communication Services.

**Michael Elwood-Smith:** The satellite industry is responding by introducing IP transmission capability to better support hybrid solutions. However, it is also becoming increasingly important to ensure interoperability and integration of management systems so that seamless services over hybrid networks are provided.

Each telecoms network type has its own benefits. In particular, satellite's advantage of cost being independent of distance (within the satellite footprint) and its ability to guarantee bandwidth makes satellite an ideal backbone for an international pan-Asian-Pacific network for advanced services such as the developing Public Switched Videophone Network (PSVN).

In the case of hybrid solutions like the PSVN, a switched managed satellite backbone network that is flexible and scalable is required.

Most importantly, the management platform needs to be adaptable for integration to legacy networks such as ISDN (to reach existing populations of video conference units), to Broadband IP networks and also accommodate developing networks, such as 3G mobile.

Hybrid networking solutions can enable new services, bringing value-added applications to satellite, growing satellite bandwidth usage and providing more cost-effective communications solutions to enterprises.

**Ashley Fernandes:** This trend presents a new growth opportunity for the satellite industry. Intelsat, in fact, has been successful in leveraging these new demands for hybrid services over the last few years and has used this as an opportunity to offset declining revenues for our core carrier services. In the third quarter of this year, our hybrid managed service offerings such as GXS and OVS, posted a sequential quarterly growth rate of 20 per cent. This is on top of double digit growth for the early part of the year.

Within Asia, we have seen strong demand for GSM backhaul services as well as for hybrid fibre and satellite Internet and video backhaul services. We believe that WiFi and WiMax could be an opportunity for the satellite industry in Asia, particularly for rural telephony and Internet solutions. We believe that hybrid services will increasingly be in demand, particularly by emerging operators and believe that this will be an increasing opportunity for satellite in Asia.

**Giora Reish:** We see the integration of technologies as mandatory in order to instigate further development within the VSAT industry. The use of complementary technologies is indeed tied in strongly in the ability to increase the number of users of satellite connectivity.

Specifically, in regard to GSM, Gilat has recently introduced an integrated solution, Sky-Abis, that significantly

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reduces operational costs incurred by cellular operators by up to 80 per cent. Due to this, the GSM over satellite solution is both profitable and efficient. In addition, once installed, the platform can be used as a backup for disaster recovery situations.

**Warren Hardy:** These trends translate into new market potentials for us in the satellite industry – we have already seen a number of mobile operators taking up satellite capacity for their GSM mobile trunking in Asia. We are also performing several trials with Wi-Fi and Wi-max technology to serve small isolated communities in the Australian outback. We see the implementation of the new technology and the role that satellite contributes as a complimentary access service to further strengthen satellite's advantage for enterprises with such hybrid solutions.

**Peter Jackson:** For most telecommunication point-to-point services, a terrestrial solution, where available, is normally the first choice. However, where satellites are extremely cost effective is in the distribution of common information or content to multiple sites and these can be for Broadband services or mobile Broadband such as 3G that will offer customers live video of events or news. Satellites will deliver such content directly to the mobile cell sites thus saving considerable terrestrial capacity. We see video content being delivered by satellite in the formats that are suitable for the size of the viewing screen; mobile, one person monitors, 16 x 9 large screen televisions or cinema, each will need different format or editing versions.

**David Hartshorn: Billions of Euros worth of telecom budgets now support humanitarian and development efforts throughout emerging regions. Given the inherent ability of satellite-based solutions to reach almost anywhere, does the Development sector represent an important vertical market for VSAT-based and mobile-satellite services?**

**Patrick Agnieray:** Such telecommunications services supporting sustainable development are of course highly necessary. They

depend very heavily however on institutional policy to deploy such services, whether by funding deployment, regulating universal service, or enabling commercial services deployment overall. Alcatel Space has the technology ready to answer most of those needs, by developing lower cost telecommunication technologies, using satellites together with other terrestrial technologies. The so-called 'Development sector', by the way, is not necessarily a vertical market per se, since it obviously should integrate with the rest of the network. Markets are different though depending on the maturity of the country's telecommunications market: in more mature markets, operators have to be 'convinced' to address regions left out by terrestrial means, since CAPEX can be used to do more of the same or to invest into a satellite-based business case; usually, satellite services operators are small enough to have difficulty in reaching the markets directly, and therefore have to go through a sales channel. In less mature markets, uncovered regions are numerous and satellite represents a means to access quickly very valuable areas, business wise, as well as to cover the rest of the country. Another point to take into account is that one solution does not fit all worldwide requirements. That is why Alcatel Space provides uncovered regions markets with adapted solutions, whether for voice-first services like with Rascom in Africa or with GSM backhaul, or for voice and data like GPRS backhaul or VoIP over satellite IP access, or even for multimedia with e-Learning, e-Medicine or other e-Applications solutions based on IP satellite Broadband access.

**Michael Elwood-Smith:** Satellite is a natural choice and often the first step in providing communications to developing areas. However, while large capital investments may be made today, these budgets are not always available in the future. It is equally important that operational costs are considered and capital spending also focused on containing these.

For satellite services, the highest operational cost is typically satellite

bandwidth. With efficient satellite service management, bandwidth can be used more optimally, while being available when needed, minimising operational costs.

Service providers offering large bandwidth applications such as Internet service backbone links and cellular phone network backhaul benefit by optimising the size of the bandwidth pipe (and cost) according to their bandwidth requirement.

**Ashley Fernandes:** The development sector could become an important vertical market for VSAT-based and mobile-satellite services, but there are still a few issues to be worked out before this becomes a viable market opportunity. Even though there are apparently "billions of Euros worth of telecom budgets available to support humanitarian and development efforts throughout emerging regions", there are still quite a few issues involving how these funds are distributed, how the networks are set up and maintained, as well as questions particularly regarding procurement of the capacity required to support the efforts (there are nations that solely use domestic providers). The selection, procurement, maintenance and support of the capacity also often provide unique challenges for development sector opportunities. If some of these issues could be worked out, then yes, this could become an important vertical for the satellite sector.

**Warren Hardy:** Definitely, we see this as a critical growth sector shown by our continuous effort providing Interactive Distance Learning through VSAT-based services in Australia and exploring the possibility of providing these services to China, India, Philippines and regions. Due to the inherent ability of satellite to reach any location, it is fast becoming the only alternative means for education providers to transform educational opportunities in remote areas.

**Peter Jackson:** Yes, if governments are going to be successful in stopping the drift of population from the rural areas they will have to ensure that the required infrastructure is in place. Satellites can play a significant role in providing communication and entertainment services to these areas. The usual question raised when such

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schemes are proposed for these areas is on the ability of the residents and businesses to pay. Governments therefore have either to ensure that everyone earns a wage similar to that of the urban area, something that is obviously self-defeating when trying to have labour intensive industries located in these areas, or subsidise the services that are provided. In privatised businesses such as the telecommunications industry, how such subsidies are paid is always a challenge, but if governments wish to develop these areas they cannot wait until terrestrial services are available.

**Giora Reish:** Obviously satellite communications is a major technology to address these projects, particularly in countries where other alternatives do not necessarily exist or are unavailable.

**David Hartshorn: Similarly, what about the Emergency Management market? To what extent are fixed and mobile satellite telecommunications being applied for users in the Emergency Management Community, whether it's network solutions for public services or business-continuity requirements?**

**Ashley Fernandes:** The Emergency Management market is another market that is hard to predict in terms of market opportunity for fixed and mobile satellite services. A significant number of public service disaster related organisations (such as FEMA in the United States) already use mobile and fixed satellite communications for telecom connectivity during natural disasters. Demand from these types of entities is often usage based and therefore, it is difficult to predict. Satellite phones, SNG and other on-demand data services are often the most important tools to this group.

Intelsat is working with UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) to identify suitable satellite solutions for Emergency Responses and Disaster Recovery in the region. Satellite is increasingly being looked at by other public service organisation, including for national security. Budget, however, became a significant issue for these groups.

For business-continuity requirements, satellite is often considered as a strong option. However, these services are generally usage-based only, and therefore, demand is often stronger for equipment than for actual satellite bandwidth.

**Peter Jackson:** VSAT networks are being used extensively for such applications and such usage will increase as better preparations are put in place. Governments have an obligation to ensure that such systems are established before they are needed or they risk having to answer to the public in the event of an emergency as the public are very much aware that such systems are available, they only have to see a live TV broadcast being sent out from a vehicle mounted system to realise the capability of a modern satellite.

**Warren Hardy:** Bush fires can cause crisis situations in Australia each year. Optus regularly assists in providing mobile data and voice communications to state and federal emergency service departments. Help is provided in the form of mobile VSAT trailers, called 'Optus SatFly' that enables VOIP, videoconferencing and Broadband service access. Optus also has a mobile satellite phone system, MobileSat that can operate in a 'closed user group' configuration. This effectively means that the service acts as 'press-to-talk' service and compliments the standard HF radio system used by emergency services. The obvious benefit of satellite phones is having ubiquity of coverage, which is vital to our emergency service people on the ground.

**Michael Elwood-Smith:** For some time, satellite has been used to provide emergency recovery or business continuity when landline communications fail. However the satellite links are typically manually set up, for example, after a telephone call to the satellite service provider is made to allocate bandwidth and transmission frequencies. This is slow, cumbersome and subject to error, and the service provider is anxious to free up the bandwidth again, in case another emergency occurs.

Some operators, such as CyberNet a leading telecoms service provider in Pakistan, require backup protection for

their landline links to meet customer service obligations. With customer Service Level Agreements measuring network availability, every second between network failure and restoration of service is very important.

CyberNet commissioned a satellite management system integrated with their transmission network to automatically establish a satellite link (within a few seconds). Bandwidth is assigned from a 'pool' under priority control and returned to the 'pool' when normal landline communication resumes.

Using a distinct satellite control channel for management communications provides flexibility to back up links of any size supported by the satellite transmission equipment, and avoids the inherent problem of terrestrial-based management systems; that when the landline circuit fails, communication to the remote control element is also often lost, just when needed to provide recovery.

With bandwidth requirements of enterprises and service providers continuing to increase, tools are now available to provide efficient and automated restoration of service over satellite for circuits from a few Kbps to more than 45 Mbps. Service providers are planning new enhanced and cost-effective disaster recovery and business continuity 'insurance' services for enterprises and public service organisations.

**Giora Reish:** There is a lot riding on a network. From real-time transactions to bandwidth-intensive content downloads, the ability to reliably communicate information 99.9 per cent of the time to all locations, is essential in today's network-dependent economy. The unfortunate fact, however, is that terrestrial networks are vulnerable to prolonged communication outages due to uncontrollable situations, such as a crisis or general malfunctioning of equipment.

An effective solution is one based on a satellite network, where the technology used is completely independent of the facilities and infrastructure of the terrestrial network. This solution has the added advantage of being able to supplement the existing network by providing

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access to remote locations where terrestrial infrastructure is unavailable. VSAT technology is of definite benefit to emergency markets as it is able to complement other technologies that may fail or shut down. The demand here for a wireless network to serve as a back-up solution makes satellite communication indeed a viable solution for this market.

**Patrick Agnieray:** The market for business continuity has always been one for satellite solutions. And the risk management market for satellite has enlarged: risk management services are being deployed for public service or civil security reasons, throughout the world. Alcatel Space has been providing, for the last year, satellite solutions for risk management to the National Fire Administration in Taiwan, linking nationwide sites, an e-Learning solution for the French Fire Administration, enabling the training of a volunteer population with a high turn-over to the fireman workmanship, as well as tele-medicine solutions providing medical assistance and monitoring to elderly or disabled people. More and more, governments are deploying dual-use solutions, and these usually involve satellite.

**David Hartshorn: Project finance is always a key question when prioritising emerging markets. How does project finance vary in developed and developing countries?**

**Patrick Agnieray:** There are lots of ways to achieve Project Finance, and that has not been an issue for Alcatel Space.

**Ashley Fernandes:** Risks associated with the procurement, ownership and management of the equipment, as well as the space segment, obviously demand a higher risk/return hurdle making project financing more complex in developing markets. Protected markets also deliver unique challenges, particularly where government actions are unpredictable. The support of an international organisation can streamline projects but often cannot establish 'equivalence' for similar projects in developed markets.

**Peter Jackson:** The availability to

raise funds in any market these days is dependent on the expected returns and the viability of the project. This is a change from a few years ago when funding for anything related to communications or the Internet was almost a given. We are starting to see projects providing remote communications being donor funded but we have a long way to go.

**Giora Reish:** The economic situation plays a major role mainly in the private sector. In general though, the need for financing in developing countries can be evident at a more common rate than that of already developed regions.

**Warren Hardy:** The Australian Government recognises the need for investment in telecommunication infrastructure. Australia operates under a Universal Service Obligation, in which the incumbent telco has to provide equity of telco services to remote and rural Australia. The Australian Government has invested over AUS\$1 billion in improving telecommunications services over the past 10 years – part of which has gone to the satellite industry in providing voice and Broadband Internet services. The job is not complete and all Governments need to recognise that investment must be long term with continued cash injections for improvements and new technology.

**David Hartshorn: Is it possible to leverage oil wealth to finance satellite projects?**

**Ashley Fernandes:** It is still generally necessary to seek-out a broad customer base to make appropriate returns. Although it may be possible to leverage oil wealth, a more prudent approach is to develop products and services that best serve the opportunities and sell them across a broad base (rather than potentially limit opportunities to a funding consortium).

**Warren Hardy:** It is possible but that is a decision for the large companies involved in exploration and delivery; and the policies of countries in which the oil is produced. Essentially, it is really a matter of providing a sound business case. Most of the rich oil exploratory companies might be keen to finance satellite projects as they are

one of the biggest users of this form of communication means which are used in their oil rigs and fields.

**Giora Reish:** This is certainly an option. However, at the end of the day, it is entirely a government decision, as well as one of prioritisation.

**Patrick Agnieray:** Satellite projects don't necessarily rely specifically on wealth in a particular sector. They still have to answer a service demand! It does exist in oil-producing countries also, and Alcatel Space is there.

**David Hartshorn: Are public-private partnerships realistic? To what extent is donor funding or investment funding considered as options?**

**Michael Elwood-Smith:** Education is one area where governments have a duty to improve standards. Satellite is an ideal distribution platform for distance learning in developing countries that lack terrestrial communications, providing both 'one way' content delivery and potential for 'two way' interaction. The payback on improving education standards may take a decade or more to materialise, far too long for commercial entities to wait, but well within the long term planning strategies for governments. Here is one area where governments need to be sold on the long-term benefits for their own people and persuaded to make the necessary investments with the commercial sector.

**Patrick Agnieray:** Public-Private Partnerships have appeared in the picture in the early 80s in the US and the UK and are a widespread form of public service management in the field of health, transport, IT and education. They have also developed in the space sector recently and seven satellite programmes were reported to be undertaken under a PPP in 2003 : TerraSar in Germany with EADS, RapidEye in Germany with RapidEye AG, SpainSat in Spain with Hisdesat, Xstar in Spain with Loral, Skynet 5 in UK with Paradigm, Galileo in Europe, QZS in Japan. It is a good way for public authorities to answer their growing need for satellite services in a period of budget stability.

**Ashley Fernandes:** It really depends

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on the structure, the market, and covenants that may constrain coverage, service parameters and pricing – individual cases may deliver attractive business models.

**Giora Reish:** Although the public sector has become more aware of and has recognised the benefit of cooperation with the private sector, actual partnerships of such still remains far ahead.

**Warren Hardy:** Government funding is key to rolling out the telecommunication infrastructure. In Australia, funding programs such as the National Communications Fund encouraged partnership between government agencies and private enterprise to invest in new infrastructures and services to the Education and Health sectors. The funding has been successful and should stand out as an example to the world on what can be achieved with public-private partnerships.

**David Hartshorn:** It is now widely recognised that access to information and knowledge through affordable communications represents a significant opportunity for social and economic development. Addressing deficiencies in access to low-cost communication services is therefore now regarded as an urgent imperative. Practically speaking, does this represent an opportunity for the satellite industry?

**Patrick Agnieray:** Satellite has a hard time being considered as low cost as terrestrial. Alcatel Space has nevertheless worked out its customers' robust business cases for satellite-solutions usage. This is possible thanks also to the technology developments and investments that Alcatel Space has been doing in that domain, for example with the DSL in the sky concept.

**Ashley Fernandes:** There is an opportunity for satellite to serve these populations in rural areas as satellite is often a critical piece of the network infrastructure to provide connectivity to remote areas in developing countries. Obtaining financing, however, for some of these projects still remains an issue.

Government funding (the USA and Australia provide good examples) for rural-service targeting federal funding can serve to stimulate demand and build scale.

**Michael Elwood-Smith:** In many instances, satellite enables access to areas where communications with any other transmission network are uneconomical. While individual satellite phones can be quite an expensive service, satellite used as the backhaul of a cellular phone service or as the gateway to a wireless local loop IP network can prove very cost-effective.

Satellite gateways can be a great way of providing a platform for a range of services including Internet access, low cost voice communication, distance education and video conferencing – particularly where bandwidth is managed efficiently.

With mobile phones growing at a faster rate than fixed telephone lines in developing countries, satellite is well placed to provide economic and bandwidth efficient backhaul communications to mobile base stations located in remote towns and villages.

**Giora Reish:** It is an opportunity for the satellite industry providing that there is integration with other technologies. This in effect can reduce the cost of the last mile of connectivity.

**Warren Hardy:** Yes, to a certain extent. The cost of providing satellite solutions compared to fibre or landlines has drastically reduced over the past five to ten years due to capacity over-supply. This created practical opportunities for low-cost access communication to benefit social and economic development. Satellite may not be able to compete with terrestrial-based services in many countries. However, in countries where the coverage of terrestrial services is limited, satellite is a natural communication option. Governments should assist with funding and subsidies to promote equitable and affordable communications in regional and remote areas.

**Peter Jackson:** Satellites could bring communications and entertainment to every village and town and the difference it would bring to those areas would be significant but, as I said

before, it is all dependent on the ability to pay to use the services once they are available. The opportunity to just bring information and education to these locations via the Internet and television is not a technical issue any more but just funding.

**David Hartshorn:** Access to low-cost telecom services is often inhibited – and in some cases prevented – by protectionist policies and regulations. Many national policies – particularly in developing countries – still restrict the delivery of services through private systems. What is being done about it?

**Patrick Agnieray:** Alcatel Space clearly supports all the efforts of the GVF in that area, being an active member. We also have a world-class regulatory team that helps customers, public and private, to implement the benefits of satellite solutions.

**Ashley Fernandes:** Deregulation and liberalisation is a long, drawn out process, particularly in developing nations with lower GDP or highly protectionist policies. That said, there are several avenues that are being pursued to overcome some of these issues, including lobbying by industry organisations, such as the Global VSAT forum and US-ASEAN Business Council. Other means of addressing this are through ascension by some of the countries to global organisations, such as the WTO. In China, for instance, we have seen some changes due to their requirements for admission to the WTO. As access to these services becomes more commonplace (through government or other means), there is greater potential for the introduction of private systems.

**Giora Reish:** A constant pressure by the private service provider is to ease government regulations. Progress in achieving such can be seen in some countries, however, in others, this is not as evident. Yet, we still intend and hope to see in the coming years an evident success in this regard.

**Peter Jackson:** Unfortunately, not enough. For various reasons we still see restrictions in place and governments and donor agencies never seem to be able to get their act

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together to provide these services but still not allowing private groups to enter the market.

**Warren Hardy:** This is a pressing issue faced by every satellite operator. Optus can work closely with the government or incumbents of developing countries to create projects mutually beneficial to all parties involved.

**David Hartshorn: Public access provision in under-served areas is a key government satellite application in an increasing number of countries. Plans are underway, for example, to include national and local intranet and rural public-access points where communities can obtain access to IT, the Internet and information on government programmes. Is this trend as relevant in the developed regions as it is in the developing ones?**

**Patrick Agnieray:** In Europe, universal Broadband access has been considered as a public policy opportunity, but was finally not adopted. Nevertheless, public authorities worldwide are conscious of the importance of deploying such services. It is done according to different cultural environments, with the help of public, public-private or fully-private actors, in all regions of the world.

**Michael Elwood-Smith:** Public access service provision to the Internet in developed countries is available in a range of locations, perhaps most commonly in community service facilities such as public libraries. In addition to accessible private Internet access points, there are also bureau services for specialist services such as video conferencing.

While these services in developed countries are not frequently provided via satellite, integration of satellite communications with terrestrial fibre and wireless networks does allow efficient and cost-effective networking to developing regions.

For example, videophone and video conferencing have long been restricted to corporate boardrooms and a few private bureaus. Initiatives such as the Public Switched Videophone Network referenced earlier involve establishing

videophones in publicly accessible locations, such as airports, hotel lobbies and public buildings, to provide low cost video communications both within country and internationally to other countries. Face to face video communication helps bridge cultural differences, improves understanding and is a very effective tool to reduce the distance between developed and developing regions.

**Ashley Fernandes:** This trend is still relevant in many of the developed regions as even within many of the developed countries there is a digital divide between various classes of individuals. In the US, for instance, there has been a strong push to provide Internet connectivity to libraries and schools, where individuals will have equal access to IT and the Internet. We believe that this will be a trend in other nations too.

**Warren Hardy:** Yes, it is every government's obligation to provide equality of service for all. For example, both Canada and Australia operate a Universal Services Obligation.

**Peter Jackson:** In developed countries for many years businesses have been encouraged to locate in remote areas or areas abandoned by industry as the local natural resources that they were exploiting were depleted or became uneconomical to access. These areas were often well provided with road, rail and power services but telecommunications was often only just adequate for voice, and cable television not as needed as terrestrial systems provided only a reasonable amount of channels. When sophisticated or high speed communications were required these areas were an obvious choice for satellite connections. In developing countries such areas were never contemplated and new business development had to stay in or very near large towns where infrastructure was available, it was easier to move people than provide roads and rail links to remote areas; the urbanisation process had begun. Today in developed countries we see a demand for satellite services in remote areas from affluent people or enterprises but in developing countries affluent people or enterprises, the only ones who can afford it, are located in towns.

Unfortunately in developing countries it is likely that the only demand in the remote areas will come from such government provided public access stations and they will not be enough in any one area to be viable even for a spot beam satellite to provide economically. They may end up being served from a traditional satellite using a country beam to meet the very limited demand.

**David Hartshorn: A wide range of enterprises are seizing upon Voice over Internet Protocol (VoIP) which increases the capacity of telephone networks by compressing and routing calls, typically for 50 per cent of the cost of traditional switched services, and often offering 'carrier-grade' reliability. Do satellite services have a role to play in this regard?**

**Peter Jackson:** Between the first switching point and the last switching point, a well multiplexed digital circuit switched connection is not that much more expensive than a packet switched prioritised voice grade packet switched connection, and with the cost of fibre connections continuously reducing the difference is becoming even smaller. The real reason VoIP is so much cheaper is that traditional telephone companies have to pay 'accounting rate' charges to the destination system and they are set at very high levels. The instinctive reaction is to just propose to abandon or significantly reduce the accounting rates however, these incoming revenues are, in some instances, the only way telephone systems can afford to develop and even maintain their networks. The long-term answer is probably to significantly increase the charge for using the last mile which both circuit switched and IP traffic is routed. IP should still be able to be cheaper by offering a lower quality service but the difference would not be so noticeable. Once a higher rate for using the last mile of the terrestrial connection was in place, satellite offering low data rate return links would provide competition to terrestrial for certain services.

**Giora Reish:** Satellite services allow for both VoIP as well as native switching voice to be transferred. As a manufacturer of VSAT technology, we

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are sensitive to achieving efficiency. In the past, there was a hefty expense involved in switching to VoIP due to space segment costs. However, as a leader in providing voice traffic over satellite, Gilat has been able to eliminate this difference by allowing for switching voice as well as VOIP within the same utilization of space segment. This allows customers the ability to choose between VOIP and switching voice without paying the additional cost related to space segment.

**Michael Elwood-Smith:** While 'carrier-grade' reliability may be achieved, end-users are also concerned with 'carrier-grade' quality. This is often dependent upon the bandwidth of the IP network, and is an area that satellite networks can excel - establishing guaranteed bandwidth backbone communications links.

However, a cost-efficient IP satellite network with guaranteed bandwidth does require management so that bandwidth is provided 'on demand' as the network traffic increases, or decreases. Bandwidth can be optimised by redistributing bandwidth to other parts of the network. Satellite communications have the natural advantage of crossing several time-zones. Bandwidth can be managed across the network to optimise bandwidth efficiency while serving peak calling times in service areas so they do not overlap.

Managed bandwidth satellite transmission gateways can provide a very efficient, flexible and cost-effective platform for switching VoIP traffic, while maintaining both 'carrier grade' reliability and Quality of Service, further increasing the role of satellite services.

**Ashley Fernandes:** Satellite does have a role to play in VoIP delivery, particularly in the provision of backhaul services. In several countries, VoIP is used as a means of circumventing the incumbent. Thus, the competing company does not always have access to terrestrial and submarine fibre connections. Thus, satellites (and VSATs) are an important piece of the infrastructure to provide these services.

**Warren Hardy:** Definitely, satellite is a communications channel similar to

submarine cables in carrying VoIP traffic, however, satellite has the ability to get to remote areas where cable can't reach. VoIP services have already been running over satellite networks for a significant period. It is an accepted form of communication and will grow as market take-up increases. Many countries are currently debating regulation in the VoIP industry - questions which will determine the size of the market in future.

**Patrick Agnieray:** As I mentioned earlier, VoIP is sometimes the best solution for voice access for rural telecommunications. On top of that, VoIP is now also a good solution for voice trunking.

**David Hartshorn: Traditionally, users of satellite-based telecom services were large- and medium-sized enterprises. As small cyber cafés are increasingly established, many are adding Internet access to their services, even in remote towns where it is a long-distance call to the nearest Internet dial-up access point. Are satellite-based services now seen as the technology of choice in serving such applications?**

**Patrick Agnieray:** Such developments depend highly on the way the market is served by an operator. The success of satellite for enterprise services or for TV services was also based on an installer base and good service provision. Cyber cafes are certainly an opportunity for satellite but the technology is here just an enabler, the service provider also has to be there. Such satellite service providers already exist throughout the world and they know their markets. Alcatel Space is there to provide them with the right technology as we have done for Toptry in China.

**Ashley Fernandes:** Satellite is one of the technologies that is being used to provide connectivity to Internet cafes in remote towns. Wireless is also often used for last mile connectivity to the cyber café, although satellite is often employed for backhaul.

**Warren Hardy:** No, but we have seen such trends especially in Indonesia and Philippines where Optus deployed our DVB-IP (Digital Video Broadcasting

Over Internet Protocol) satellite solutions to bridge this gap of using long-distance calls to the nearest dial-up access points. Satellite technology is considered a complimentary access method for Internet application but will never be the first choice if terrestrial connectivity is available. Satellite's strength will always be in the remote and rural environment outside of the enterprise customer who wants a standard platform and a standard SLA for delivery of their service.

**Peter Jackson:** The real issue is the reducing cost and increased capability of providing a broadband connection over a terrestrial link. The electronic equipment required to provide a Digital Subscriber Line (DSL) or an Asymmetrical Digital Subscriber Line (ADSL) continues to reduce in cost and with new remote extension equipment is offering increasingly longer loop length capability. In some systems this is being negated by poor quality line plant but the demand is forcing systems to upgrade and re-train their staff. Thus with the present charging rates in place satellites will always be a more expensive option for a large percentage of the population and so satellites, even spot beam dedicated satellites, can only be competitive for very remote locations.

**Giora Reish:** With large Internet-savvy populations and expanding economies, there is a rapidly growing demand for broadband connectivity. VSATs create an affordable, immediate infrastructure that provides connectivity across communities and remote population centres.

As Gilat is the world leader in providing satellite communications to rural areas, we indeed see a potential market in cyber cafés. The increasing demand for Internet cafés in remote areas that seek internet and voice applications is on the rise. Satellite communications address this niche well as a satellite-based network can provide both applications and in a faster deployment time compared to that of other technologies. The increasing demand for high throughput for Internet and voice eliminate other wireless technology solutions and rather strengthens satellite technology as the most viable option. □