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Emmanuel Adugu

Kwasi Boateng

D. Flournoy

Eric Gavua

Wencelous Kaswoswe

See next page for additional authors

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Overview: Politics and Technology Converge: Case Studies on the Effects of Regulatory Reform on VSAT Adoption in Developing Countries

Authors

Emmanuel Adugu, Kwasi Boateng, D. Flournoy, Eric Gavua, Wencilous Kaswoswe, and Miao Zhang

**Politics and Technology Converge: Case Studies on the Effects
of Regulatory Reform on VSAT Adoption in Developing
Countries**

By

**Emmanuel Adugu, Kwasi Boateng, Don Flournoy, Eric Gavua,
Wencelous Kaswoswe and Miao Ziang**

December 12, 2003

A: INTRODUCTION

Developing countries are actively implementing satellite data networks, and have undertaken policy reforms to facilitate such networks. This research examines how regulatory changes have resulted in the removal of barriers relating to the deployment of access technologies and growth in connectivity, especially in VSAT installations for low cost Internet access. In addition, this research seeks to identify the socio-economic impact of emerging data network applications in government, business, health and education. In some cases, government offices have been the driver of change; in other cases, businesses have been the ones to initiate and press these developments forward.

As data applications have come of age over the last 15 years, satellite technologies that support data networks have become more robust, more flexible and less costly. VSAT technologies, having been used for years to complement terrestrial business networks, have now caught on for global delivery of interactive video, Internet and multimedia services. Internet distribution is already a major revenue stream for the commercial satellite industry.¹

This study focuses on the communications policy, regulatory environment and industry performance of four countries: Brazil, China, India and Israel. Although the study began with the goal of gathering information that African decision-makers could use in the successful deployment of VSAT networks in African countries, this research will be instructive for other countries as well.

Criteria for Selecting the Case Study Countries

The case study countries will each: 1) have a satellite communication industry sub-sector; 2) possess more than one telecommunications and media service providers; 3) have embarked upon communication policy and regulatory reforms; 4) have per capita Gross

¹ David Hartshorn and Anina Selve. VSATs: Linking the Last 1000 Miles. *Sustainable Developments International*. Retrieved on 9 November 2003 from <http://www.sustdev.org/journals/edition.01/download/01.147.pdf>.

Domestic Product purchasing power parity between \$2,000- \$10,000 or above; 5) have industrial production growth rates of not less than one and a half percent; and 6) they will have entered into cooperative agreements for data exchange.

The per capita Gross Domestic Product (GDP) purchasing power parity for the countries chosen for the study are: Ghana - \$ 2,100 (2002), Israel - \$20,000 (2001), Brazil - \$7,400 (2000), China - \$4,300 (2001) and India - \$2,500 (2001).²

This report is organized as follows:

A: INTRODUCTION

B: VSAT TECHNOLOGY

C: COUNTRY CASE STUDIES

D: LESSONS FOR AFRICA

E: CONCLUSION

² Country Profiles, LexisNexis Academic Universe. Retrieved on 20 October 2003 from <http://web.lexis-nexis.com/universe>

B: VSAT TECHNOLOGY

VSAT stands for “Very Small Aperture Terminal” and refers to receive/transmit terminals installed at dispersed sites connecting to a central hub via satellite using small (0.6 to 3.8 meter) diameter antenna dishes. VSAT technology represents a cost effective solution for users seeking an independent communications network connecting a large number of geographically dispersed sites. VSAT networks offer value-added satellite-based services capable of supporting LAN, Internet and



other data services, as well as voice/fax communications. VSATS can provide fast, dependable public and private network communications solutions.

Until now, these systems operate in the Ku-band and C-band frequencies. Ku-band based networks are used primarily in Europe and North America and utilize the smaller sizes of VSAT antennas. C-band is used extensively in Asia, Africa and Latin America but requires a larger antenna. Ka-band VSAT implementation is in the offing and promises

higher capacity transport and even smaller terminals.

VSAT network configurations can be point-to-point, point-to-multipoint or on demand networks. These systems can connect many sites or just a few. As prices have come down, network reach via satellite coverage has gone up. Some VSAT networks now comprise as many as several hundred or even thousands of sites.³

C: COUNTRY CASE STUDIES

1. GHANA

Background

Access to communication technologies is a problem for many people in Ghana, especially for the poor. For example, there were 1.82 telephones per 100 people in 2001.⁴ As in most developing countries, there is a long waiting list for new telephone services and waiting times could be up to a year. International Telecommunications Union (ITU) statistics show that in 2001, there were 235 Internet hosts in Ghana, and a computer density of 0.33.⁵ In spite of these low numbers, there has

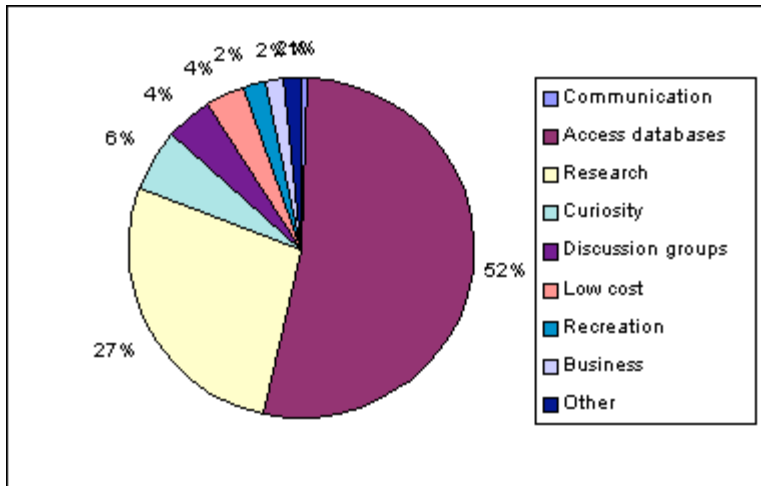
³ The above description of the way VSAT technology works was retrieved from: http://www.qpcomm.com/vsat_info.html on November 24, 2003.

⁴ International Telecommunications Union, http://www.itu.int/ITU-D/ict/statistics/at_glance/basic01.pdf.

⁵ ITU World Telecommunication Development Report 2002: Reinventing Telecoms- World Telecommunications Indicators. pA-66.

been a phenomenal growth in Internet use since its genesis in Ghana.⁶ Of course, its growth pattern is skewed towards the regional centers.

A 1997⁷ survey revealed that the Internet is used in Ghana for various purposes as illustrated below.



The findings showed that 38.4% of subscribers cited communication as the main reason for using the Internet. This was followed by the ability to access databases (32.9%) and research (16.6%).⁸

Given the fact that access to the Internet in Ghana is largely limited to cities, especially Accra, the capital city, the exchange of knowledge via the Internet is also confined to the cities. This limited access to

⁶ Ghana: Rapid Growth in Internet use despite cost constraints. Retrieved from http://www.afrol.com/News2001/gha003_internet_growth.htm. on December 12, 2003.

⁷ Quaynor, N., Tevie, W., Bulley, A, (1997).Expansion of the Internet Backbone in Ghana. Retrieved from: http://www.isoc.org/inet97/proceedings/E5/E5_2.HTM on December 12, 2003.

⁸ Expansion of the Internet Backbone in Ghana. Retrieved from: http://www.isoc.org/inet97/proceedings/E5/E5_2.HTM on December 12, 2003.

information slows development in business, governance and education.

There is no doubt that Ghana follows the pattern of other poor telecommunications infrastructure countries.

To drastically change this state of affairs to meet the growing demand for Internet access requires deployment of low cost communication technologies. It is in that regard that satellite technology becomes useful.

The construction of a satellite earth station at Kuntunse in the Eastern region of Ghana in 1981, and related communication reforms in the early 1990s marked a dramatic shift towards greater use of satellite communications technologies. Satellite earth stations and connecting equipment were installed by private and state entities dramatically increasing, voice, data and video services. Today, Ghana operates a fairly open communication industry, having privatized some institutions, and encouraging both domestic and foreign investors to participate in building communication businesses. This has resulted in the establishment of firms providing variety of voice, video and data services to meet the growing demand.

Satellite communication has emerged as a preferred means of Internet connectivity. This is evident in the fact that leading Internet

Service Providers (ISPs) such as Network Computer Systems (NCS), Tinfo and Busy Internet now use a satellite link to World Wide Web which bypasses the public switched telephone network. Busy Internet boasts that it is the fastest broadband service in Ghana. A look at Busy Internet operation will illustrate how VSAT as a form of satellite communication can help unleash the full potential of Ghana's communications industry through a combination of innovative technologies, good business practices and sensible regulatory policies.

Busy Internet VSAT Connectivity

Ghana's Busy Internet connects directly to the Internet backbone in the US through a C-band satellite using Very Small Aperture Terminal (VSAT). C-band like the L, Ku and Ka bands are satellite frequencies designated by the International Telecommunication Union for the distribution of voice, data and video communication signals. The C-band frequency spans between 4/6 GHz and is used to support telephony, broadcast, cable TV and other business communication services.⁹ VSAT satellite space segment providers offer three types of satellite beams: spot, hemispheric and global. Spot beams are currently available in both Ku-Band (12-16 GHz) and C-band (4-6 GHz). Spot beams are generally

⁹ Lin, C. (2000). Satellite communications. In (Eds) August E. Grant & Jennifer Harman Meadows. *Communications Technology Update*. Boston, Massachusetts: Focal Press, pp-247-256.

high power, thus allowing smaller antenna dishes to be used at remote sites. Hemispheric and Global beams have a much larger footprint and weaker signal strength.¹⁰ These frequencies are noted for their fairly good resistance to rain attenuation and suitability for the tropical climate of Ghana and parts of Africa that experience seasonal heavy rainfall.

Busy Internet is a joint venture between Ghanaian and American investors to create state of the art technology incubators across Africa. This laudable venture uses terrestrial infrastructure, satellite connectivity and rapid power services to generate new jobs, businesses, services and products related to IT across Africa.¹¹ Busy Internet subscribes to the Echoband IP Planet satellite communications platform to bring Internet services to its customers. Ecoband,¹² is an Israeli reseller of satellite communications services using a constellation of North American based satellites with footprints covering the whole of Africa. IP Planet is part of the Eurocom Group, Israel's largest privately held communications company.¹³

¹⁰ Maral, G. (1995) as cited in Jackson, M.E. et al, (2002), Real-time GPS data transition using VSAT technology, *GPS Solutions*, Vol. 5, No 4, pp. 10-11. .

¹¹ Busy Internet Opens In Ghana and Looks to Open Elsewhere in Africa. Retrieved from <http://www.balancing-act-africa.com/news/back/balancing> on December 12, 2003.

¹² Ecoband is a joint Ghanaian and European venture.

¹³ IP Planet, Company Profile brochure, 2002.

The VSAT networks¹⁴ offered by Ecoband guarantees ISPs bandwidth at speeds ranging from 64Kbps to 48Mbps, with the possibility of providing for “burst capacity” when necessary.¹⁵ After three years of hosting Internet and other multimedia services as a local Internet Cafe, Busy Internet has expanded its role. It is now offering personalize Internet service direct to home and business premises. According to Mark Davis, the CEO of Busy Internet, September 2003 marked the beginning of the installation of VSAT satellite dishes for businesses.

Davis indicated that

“One of the things we have realized is that people do respect Busy Internet, they like the brand.... To capitalize on that we can move into other kinds of businesses...We are doing it very cautiously...it will be very small and much focused. It will be high quality service for a limited number of customers. And that is how we are moving on with these new licenses and new technologies and trying to grow our revenue base and our services.”¹⁶

¹⁴ Maral, G. (1995) as cited in Jackson, M.E. et al, (2002), Real-time GPS data transition using VSAT technology, *GPS Solutions*, Vol. 5, No 4, pp. 10.

¹⁵ Features and Benefits: <http://ecoband.net>

¹⁶ Excerpts from an interview Kwasi Boateng had with Mark Davis on 19 August 2003 in Accra Ghana. Boateng is a PhD student at Ohio University conducting research for his dissertation.

Prior to September 2003, Busy Internet's traditional services to



A section of the Cyber café at Busy Internet's business center in Accra. Source: <http://busyinternet.com>

Ghanaians had been its 100 PC Cyber Café and 24 hour digital copy centre. The provision of

ISP services direct to the premises of customers is a diversification of its operations.

The company charged ₵5000.00 (US \$0.58) for 30 minutes browsing or use of a computer terminal at the cafe center, the estimated charge for its new Internet services to be delivered to the premises of customers is yet to be determined.

The greatest challenge facing most ISPs and especially the cyber cafes is regulation in terms of licensing and annual fees charged by the NCA (National Communication Authority), the regulatory agency in Ghana.

Davis indicated that the NCA has difficulty understanding “the implications of certain technologies and how to regulate them. For example a VSAT will cost you \$8,000 or \$4,000, and unfortunately that is the only way you can get connectivity in the rural areas in Ghana. No small cyber café can afford this... [and the cost of] a big license fee. They will have to understand that, and I am sure they will be sympathetic.

These satellite dishes are no longer \$30,000 and restricted to big corporations.”¹⁷

Concerns of VSAT Operators

VSAT operators in Ghana feel constrained by the licensing and government fees required of them. From the satellite operators point of view, local regulators and those who make policy are



Busy Internet building in Accra which also houses Ecoband Networks the resale agent of IP Planet. Source: <http://busyinternet.com>

not sensitive to the amount of money that must be invested to make these technologies available. Add-on fees and charges could be reduced. Alexander Sulzberger of Ecoband explained the problem in this case. He said

“reaching the remote areas and smaller regional capitals by satellite is still a big hurdle. We have a license fee for VSAT communications that is quite expensive. We pay roughly about \$10,000 to \$12,000 in the first year to apply for and obtain our license and then we have an annual site fee of about \$4,000 which is prohibitively expensive, if you add these to the cost of VSAT equipment, installation fee, and the bandwidth charges”¹⁸

¹⁷Kwasi Boateng, 19 August 2003.

¹⁸ Kwasi Boateng, 4 August 2003.

According to Sulzberger, a small link for a rural community communications center requires equipment costing between \$5,000 and \$10,000, and then there are service charges of about \$500.

Kwasi Boateng¹⁹ indicated that:

1) VSAT operators in Ghana would like to see the NCA and the Ministry of Communications differentiating between big, medium and small size operators. Given that the traffic capacity of satellite dishes vary depending on their bandwidth, the licenses, and annual fees charged on them could be made to reflect such differences. Government imposed costs are a major draw back in the attempt to provide Internet services to Ghanaian and other African communities.

2) The deployment of such services requires a huge capital investment in equipment and in installation. Attention needs to be focused on providing incentives to those entities and individuals willing to commit their resources to bringing new media and communications services to the country. The discussion on incentives has mostly been focused on tax incentives, but other forms of incentives could be considered. For instance, creating Designated Market Areas (DMA) for

¹⁹ Kwasi Boateng. Satellite Communication in Ghana-Challenges and Prospects. A paper included in Issue No.7, The Online Journal of Space Communication, January, 2004.

service providers to assure them of a fair share of the market and allowing Internet service providers to offer VoIP (Voice over Internet Protocol) which could help diversify their streams of revenue.

3) The NCA and the Ministry of Communication need to decide on VoIP. Voice over Internet is an attractive option for Internet users because of the lower cost. VoIP is a potential incentive for VSAT operators, who are currently limited to data service. Having government offices better understand the capabilities of VSAT satellite communications for economic and social developments is crucial to the expansion of communication infrastructure throughout Africa.

NCA and Regulatory Challenges

The regulatory environment of the communications industry in Ghana has played a significant role in the establishment of communications service providers like Busy Internet, Ecoband, NCS and Tin-Ifa. Describing the Internet industry in Ghana, Echoband CEO Alexander Sulzberger pointed out that,

“Ghana is in a unique position if you look at the surrounding West African countries. In Ghana it was from the beginning the private sector that developed the Internet business [and] not so much the government

owned Telecom as it is in the Francophone countries where the PTT is the biggest ISP.”²⁰

From this statement, it is evident that private initiatives and regulatory reforms have driven the development of the Internet industry.

The political and economic changes that took place in Ghana between 1992 and 1996 have helped create a communications industry driven by private investment initiatives. It has become easier for communications firms to register and operate as service providers in Ghana and there are claims that obtaining a VSAT license in Ghana is now a simpler process than in many other African countries. Consequently, satellite communications networks have been able to provide alternatives to the congested POTS networks operated by the former PTT, Ghana Telecom, and Westel, its competitor after the reform. Multichoice (TV and video), and Spacefon (voice) are two of the successful private firms using satellite platforms to deliver Pay-TV and mobile services to Ghanaian customers.

According to Kwasi Boateng, communications development in Ghana has reached the point where further regulatory reform is needed to ensure expansion of the industry. It has become evident that terrestrial

²⁰Kwasi Boateng, 4 August 2003.

networks cannot be the sole source for communication services. Satellite and wireless connectivity must complement existing telecommunication networks. The bandwidths of T1 (1.54 Mb/s) lines are rapidly becoming insufficient to meet the demand and T1 lines do not go everywhere.

Although Ghana Telecom is a partner to the SAT 3²¹ fiber optic cable project in Africa, Ghana currently lacks the nationwide cable infrastructure to deliver Internet and other networked services to home and businesses premises. Bernard Forson Jnr, the deputy director general of NCA, had this to say on the issue,

“If roads are being built, why cables can’t be put under the roads? Railroads are being built, why cannot railroads have cables under the railroad? Buildings are being built, why cannot they [be required to follow] certain communications codes and have positions on top...for ports for data communications services? The whole building could be mandated or coded to have a certain amount of infrastructure running through it so we can start building local exchange entities. You can have one building well set, the land belongs to government, and the building belongs to private sector, mandate [d] by law to allow collocation. That will allow multiple

²¹ SAT 3 is a South African and Portuguese initiative, involving about 42 other African countries that have invested in the laying of fiber optic cables around Africa aimed at linking Africa to the global information grid through Portugal. A similar project that started earlier, Africa One, was a failurer.

players to come in and compete on the service site.”²² Building effective communications networks in Ghana requires planning and regulatory guidelines. Forson’s statement is a testimony to this fact.

For new technologies to bring economic growth, the regulatory mechanism will have to be streamlined in Ghana. According to Boateng, a big constraint for ISPs is the existence of rules that prevent VSAT operators from providing value added services like VoIP. He emphasized that to enable industry players to plan, negotiate and implement business strategies, the NCA should take the lead in addressing the following issues.

- 1) The creation of Designated Market Areas (DMAs). Ghana is still considered one big market even though communications businesses are concentrated in cities like Accra, Kumasi and Takoradi. Service providers focus their attention on these cities, and new players all seek to break into these urban markets. Dividing Ghana up into DMAs will give the licensing agency a way to encourage service providers to select areas of operations where competition is less. Should the Ghanaian market be divided into sectors, the regulatory agency could offer incentives to

²² Kwasi Boateng, 8 August 2003.

VSAT operators and others to deploy in the underserved and rural communities.

2) The NCA should work to promote “dynamic competition” as opposed to “static competition” within the industry.²³ Dynamic competition allows competing technologies and new products to challenge the old ones and, if they are really better to replace them. Understanding this reality will enable operators using VSAT and other satellite technologies to compete effectively with protected former telecommunications monopoly operator.

3) Together with the Ministry of Communication, the NCA should define Ghana Telecom’s status either as an ordinary operator or as a common carrier. The role of other telecommunications entities in Ghana should be categorized so as to determine their obligations roles as content and service providers.

4) Guidelines related to standardization, interconnections, arbitration and negotiations should be drafted and made public. Such rules eliminate much of the bureaucracy and the unfavorable business relations that exist between the big and smaller operators.

²³ Dyson, E., Gilder, G., Keyworth, G., & Toffler, A. (1994, August). *Cyberspace and the American Dream: A Magna Carta of the Knowledge Age*. Washington, D.C.: Progress and Freedom Foundation.

Notable Applications of VSAT in Ghana

GS Telecom with offices in Accra, Lagos, Port Harcourt, Abuja, Maputo and Dar es Salaam, and engineers in the United Kingdom, South Africa, Cameroon and Zimbabwe ²⁴ has installed a VSAT system for Ashanti Gold Fields to provide telephone and data connectivity to its mines at Damang and Tarkwa. The VSATs at Tarkwa (Gold Fields Tarkwa), Damang (Abosso Goldfields Ltd) and Accra are all connected to GS Telecom's Internet hub at Teleglobe in Montreal. The VSAT hub in Accra includes an Andrew 3.7M antenna, Paradise Datacom P300 modems, Codan transceiver and Alcatel Bandwidth Manager.

Another important case is a \$10m investment deploying a VSAT-based telephone network around the country by the Ghana National Petroleum Corporation (GNPC), the African Communications Group and Western Wireless (Cambridge Mass, US). The satellite contractor in charge was Israel-based Gilat with the GNPC having a 20-year exclusivity license.

2. CHINA

²⁴ GS Telecom Installs VSAT for Gold Fields Ghana Head Office. January 25, 2003. Retrieved on 9 November 2003 from http://www.gstelecom.net/news/03_jan25_goldfields.shtml

Telecommunications Regulation in China:

When China joined the World Trade Organization (WTO) in December 2001, major changes were made in China's regulatory system. Becoming a most favored nation required it to grant service suppliers of WTO treatment equal to the best treatment given her by WTO member countries. China's regulatory system was also required to be more transparent. This meant the country was expected to publish all internal regulations relating to trade in services, no later than their effective date. China was obliged to ensure that its monopoly service supplier activities were consistent with the General Agreement on Trade in Services (GATS). Further, China was required to have a mechanism for dispute resolution to ensure administrative review and appeal procedures when disagreements arose in connection with market access or national treatment.

It is important to note that China's strategy in joining the WTO has been to liberalize and not privatize. Liberalization is the opening up of an industry by encouraging non-government participation in the industry, and it usually involves the expansion of the number of participants or competitors in an established market without necessarily selling out to private businesses. Normally, privatization refers to the direct transfer of ownership and control to private firms or individuals.

China was also expected to have an administrative mechanism to deal with antitrust issues with policies to prevent major suppliers from engaging in anti-competitive practices. China was obliged to have an independent regulator to ensure that telecommunications regulatory authorities were separated from, and not accountable to, any supplier of basic telecommunications services. Also, China was to ensure fair allocation of resources by providing timely and non-discriminatory allocation and use of limited telecommunications resources, such as bandwidth, frequencies and rights of way.

In 1998, China created a telecommunications regulator independent from the telecommunications industry. It did so by merging selected functions of the Ministry of Post and Telecommunications (MPT), the Ministry of Electronics Industry, and the Ministry of Radio, Film and Television into a super telecommunications regulatory authority: the Ministry of Information Industry (MII). China liberalized its telecommunications market in 1999 at the time the MII began divesting China Telecom of some of its assets, resulting in the creation of four companies, each responsible for a different telecommunications sector. The entities were China Mobile, China Unicom, China Satellite and China

Telecom. As a follow up, the MII adopted the following operational policies to ensure a vibrant telecommunications industry:

- Full competition in the domain of value-added telecommunication and information services;
- Ordered competition in the domain of satellite and wireless mobile telecommunication services, and
- limited competition in the domain of basic telephony services.²⁵

The result was the creation of a competitive telecommunication market. The MII encouraged further market competition through its licensing system, and an unsymmetrical regulatory approach that supported the weak and restricted the strong. Two more network operators were allowed entry into the service provider market: China Netcom Corporation (CNC) and China Railway Communications Corporation (CRC).²⁶

According to the China Internet Network Information Center, China's online population was 45.8 million by the end of June 2002, an increase of 12.1 million or 35.9% over the previous six months. Given

²⁵ Liang Xiongjian and Zhang Jing. A Summary of Telecommunications Reform in China China. *Global Communications Newsletter*. October 2001
<http://www.comsoc.org/pubs/gcn/gcn1001.html>

²⁶ Liang Xiongjian and Zhang Jing. A Summary of Telecommunications Reform in China. *Global Communications Newsletter*. October 2001
<http://www.comsoc.org/pubs/gcn/gcn1001.html>

these growth statistics, the government's prediction of 70 million Internet users by 2005 appears within reach.

The spread of data communications has been a significant development in the Chinese market. In late 1993, nine "value-added" service segments, including radio paging, 450 MHz and 800 MHz mobile radio services, and VSAT network operations were opened. In 1996, China constructed three data communications backbones. These were ChinaPac (China Public Packet Switching Data Network), a packet-switched data network; ChinaDDN, a nationwide digital data network; and the Golden Bridge Network, a VSAT-based data communications backbone.²⁷

By 2002, China had permitted private ownership within joint ventures for value-added services, such as among providers of paging services, Internet services and Internet content in the cities of Beijing, Shanghai and Guangzhou. Later these opportunities were extended to 14 other cities, namely Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Nanjing, Ningbo, Qingdao, Shenyang, Shenzhen, Taiyuan, Wuhan, Xiamen and Xian. By the end of 2003, all geographic limitations constraining

²⁷ China's Telecom Market: Change and Competition. *New Telecom Quarterly*. Retrieved on 24 October 2003 from http://www.tfi.com/pubs/ntq/articles/view/96Q1_A1.pdf

ownership in the telecommunications industry were expected to be eliminated.²⁸

VSAT Applications in China

China's establishment of a domestic satellite-based public communication network, with more than 70,000 satellite telephone channels, helped to solve the problem of communication in remote areas. At the same time, VSAT communication services were developing very rapidly. There are now in China 30 domestic VSAT communication service providers and 15,000 small station users, including over 6,300 two-way users. Some 80 specialized communication networks have been established by such departments as finance, meteorology, transportation, oil, water resources, civil aviation, power, public health, education and the media with over 10,000 VSAT systems covering the whole of China.

Since China opened its VSAT educational TV broadcasting services, more than 30 million people have received technical, secondary school and college education and continuing education through it. And a broadband multimedia transmission network has been established on the

²⁸ Country Commerce China, Economist Intelligence Unit. Retrieved on 13 October 2003 from: <http://db.eiu.com/reports.asp?valname=ITDCNE&deliverykey=ITCN>

satellite direct broadcasting (DBS) platform to provide comprehensive remote education and information technology services.²⁹

VSAT Regulation in China

In line with the commitments it made to enter the World Trade Organization, in April 2002 the Chinese government updated its regulatory framework for sectors in which foreign investment is encouraged. China's Foreign Investment Catalogue was revised at the same time to increase the number of sectors in the "encouraged" category and decrease those in the "restricted" category.³⁰

Business Services: China's Civil Aviation Administration has installed a VSAT network as part of its data communication network upgrade that now covers 120 cities. The goal is to modernize China's airline reservation system; the network also carries voice traffic for the agency.³¹ China's biggest maker of tobacco products, Yunnan Provincial Tobacco, installed a

²⁹ Information Office of the State Council of the People's Republic of China. November 2000. China's Space Activities. First Edition 2000. Retrieved on 24 October 2003 from http://www.alfabravocharlie.com/anno_2001/pdf/febbraio_2001/China_Space_Activities.pdf

³⁰ Country Commerce China .Regulatory/market alerts--China February 2003 Retrieved on 21 October 2003 from:

http://db.eiu.com/report_full.asp?valname=ITDCNE&title=Country+Commerce+China

³¹ Briefs. Communications News, August 1993, Academic Search Premier.

\$16 million VSAT network to link more than 2,200 manufacturing, distribution and retail locations throughout China.³²

Jitong Network Communications (now Netcom after a merger deal in June 2003)³³ is a satellite network operator that was established in 1994 by the Ministry of Electronic Industries for the primary purpose of providing Internet protocol telephone and broadband network services.³⁴ Jitong was the organization that constructed the Golden Bridge Network, a VSAT-based ISDN backbone, investing \$11.8 million (RMB 100 million) in the network over the 1994-1997 period. The Golden Bridge is interconnected to the national (MPT) data networks supporting a variety of datacom services, including e-mail and electronic data interchange (EDI), at speeds ranging from 144 Kbps to 2 Mbps. The overall plan is to deploy VSATs technologies to interconnect state and private information networks nationwide. This network connects users to the Internet via satellite.³⁵

³² Wide area networks: Briefs Communications News; November 1995, Academic Search Premier. Retrieved on the 21 October 2003 from:

<http://search.epnet.com/direct.asp?an=9512147621&db=aph>

³³ Jitong Communications. Retrieved on 1 November 2003 from

<http://www.chinanex.com/company/operator/jitong.htm>

³⁴ http://www.lw.com/resource/Publications/_pdf/pub269.pdf

³⁵ China's Telecom Market: Change and Competition. New Telecom Quarterly. Retrieved on 24 October 2003 from http://www.tfi.com/pubs/ntq/articles/view/96Q1_A1.pdf

Social and Political Services: Very likely, the Central China Television University has more students than the rest of the world's distance-learners put together. Its estimated population ranges between 1 million and 2 million.³⁶

Shanghai Telemedicinet initiated a Telemedicine Project network in September 2001. It is an IP-based two-way satellite multimedia network linking 200 hospitals throughout China. The first phase of the project connected 20 sites with a hub in Shanghai. The network carries video and data traffic that makes medical expertise resident in China's major medical centers accessible to remote medical facilities throughout the country. Medical personnel are able to perform distant review of patient records, x-rays and charts and participate in tele-video consultation and diagnosis via this new network. The telemedicinet network makes possible a high degree of interaction among dispersed staff by way of remote-to-remote video communications.³⁷

3. INDIA

³⁶ Faraway thoughts. Economist; January 7, 1995, Academic Search Premier: Retrieved on 21 October 2003 from:

<http://search.epnet.com/direct.asp?an=9501117732&db=aph>

³⁷VIPERSAT Networks Announces China Telemedicine Project

<http://www.vipersat.com/news/2001/09042001-telemedicine.pdf>

Telecommunications Regulation in India

India is another example of a developing country that has made significant strides in telecommunications reform. Even though these reforms must be rated as partial, when compared with those of more developed countries, the changes have nevertheless resulted in measurable gains in access to and use of satellites in solution to communication problems.

India's VSAT regulatory reforms date back to 1994 when the service was first opened to private sector participation and Closed User Groups (CUG) were given licenses. The CUG was a category of business relationships in which the producers of goods were permitted to freely interact with their traders and agents by means of satellite data networks. Following this initial move were a series of other progressive changes that helped to achieve and sustain industry growth in India. Some of these changes are noted below.

Licensing: In line with the need to keep licensing fees as low as possible, the Department of Telecommunications in 2001 switched from a licensing fee regime to a revenue sharing regime for VSAT installations. Under the licensing fee regime, each service provider had paid Rs 50,000 per

terminal per annum, considered to be the highest rates in the world at the time. When shifting to a revenue sharing approach the rate was reduced to 10% of gross revenue. This amounted to Rs 10,000 – 13,000 plus an additional 3-4% of the gross revenue that each provider paid to the Wireless Planning Council, the caretaker body for spectrum usage, the amount depending on configuration.³⁸ Furthermore, licenses were granted on a non-exclusive basis and they could run for a period of 20 years, extendable one time by 10 years.

Spectrum and use of Foreign Satellites: For many years, India followed a highly restrictive policy in terms of spectrum regulation and use of foreign satellites. Prior to 2001, the VSAT industry was made to rely solely on an indigenous constellation of satellites, using INSAT's extended C-band for commercial transmission capacity. Being restricted to INSAT equipment led to serious capacity shortages, with its attendant negative impact on growth of data communications. Realizing the effect on VSAT providers, the new Telecommunications Policy of 1999 made provision for the usage of Ku-band, which took effect in 2001.

³⁸ VSAT sector presses for reforms to stay afloat, Yahoo. Retrieved 15th October 2003 from: <http://www.expresscomputeronline.com/20030616/newsan3.shtml>

As an added measure, the government of India further allowed access to foreign satellites.³⁹ This latter reform seems to have benefited mostly Internet service providers and broadcasters, however. Whereas the government allowed these users to negotiate directly with foreign satellite companies for capacity, VSAT providers had to rely on the Department of Space to negotiate on their behalf. This prompted the VSAT industry to petition for a more Open Sky Policy that would allow them also to negotiate independently, a matter that is still under consideration.⁴⁰

Increased Bandwidth: Improving transmission speed is another matter addressed on behalf of the VSAT sector. From initial speeds of 64 Kbps in 1994, data rates that hardly promoted the usage of terminals to their optimal level, the industry was allowed to increase network delivery speeds to 512 Kbps.⁴¹ On the advice of industry members, the Association of VSAT Providers in India is currently pushing for still higher

³⁹ International Telecommunications Union, Telecommunication Development Bureau ITU-D Study Groups. Draft Report on Satellite Regulation in Developing Countries. Document 1/079-E14, July 2003.

⁴⁰ VSAT sector presses for reforms to stay afloat Yahoo. Retrieved 15th October 2003 from: <http://www.expresscomputeronline.com/20030616/newsan3.shtml>

⁴¹ The Tribune, Online Edition, August 20, 2000. Retrieved 12th October 2003 from: <http://www.tribuneindia.com/2000/20000820/biz.htm>

speeds on the grounds that most of the equipment and software in which they are investing has higher speed capacities. According to A. Junja, CEO of Bharti Broadband, a VSAT provider in India, increasing speeds would enable more efficient data transfer and translate into cost savings for users.⁴²

VSAT Applications in India:

Internet Use: One indicator of the positive impact of VSAT regulatory reforms on the lives of Indians is their increased use of computers for personal services. Significant increases in Internet use were recorded immediately after the government started its VSAT sector reforms. From Table 1, one can notice a progressive expansion in both the use of Internet and the availability of personal computers to Indians after 1994 when the government became more accommodating to the VSAT sector. It is true that several other factors were in play in the same time frame that helped to stimulate this growth, but liberalization of the rules facilitating infrastructure investments and making communications services available to the broader public had an observable effect on Internet use.

⁴² Satellite communication soars over terrestrial links, Financial Express, September 17, 2002, LexisNexis. Retrieved from: <http://www.lexis-nexis.com/universe/document>

Table 1: Internet Users and Personal Computers in India (1992-2000)

Year	Estimated Internet users	Availability of PCs
1992	1 000	410 000
1993	2 000	560 000
1994	10 000	800 000
1995	250 000	1 200 000
1996	450 000	1 500 000
1997	700 000	2 000 000
1998	1 400 000	2 700 000
1999	2 800 000	3 300 000
2000	5 000 000	4 600 000

Source: Yearbook of Statistics, 1991- 2000, ITU

Though there was a tremendous growth in the number of Internet users and availability of PCs over the years, the actual numbers of Internet users in India is just a negligible fraction of the total population. For example, according to the ITU 2002 World Telecommunications Development Report, Internet users per 10,000 inhabitants were only 68 while the number of PCs per 10,000 inhabitants was only 58. It is obvious that the number of Internet users are greater than the number of PCs available. This discrepancy may have now been made even worse by the

impressive growth in Internet users in 2002 to 159 per 10,000 population. In the long term, VSAT adoption may be hampered by the slow growth in personal computers on which to receive the Internet.

Rural Connectivity: The reforms embarked upon in India from the mid-1990s facilitated the initiation of numerous VSAT based rural connectivity projects. Three most significant of the projects are as follows:

Warana Wired Village Project. The National Informatics Centre in association with the state government launched in 1998 a project to provide agricultural, medical, and education information to villagers by establishing networked "facilitation booths" in 70 villages. The project relied on high-speed VSAT to make Internet access available to its co-operative societies. All the villages had computer kiosks that were linked to a central network, and training centers were opened in six villages to impart computer education to rural youth and provide access to the Internet.⁴³

The project is ongoing and continues to provide farmers with access to essential information. The network lists prices of farm produce

⁴³ Avina Lobo, Maharashtra: In tune with the times? India News. June 30, 2001 Retrieved 18th October, 2003 from: <http://www.zdnetindia.com/news/features/stories/28711.html>

in the region's agricultural markets (to help farmers decide what to plant or where to sell their produce), and offers a daily weather forecast.

Efforts are underway to duplicate the Warana experiment in other parts of the country.

Gyandoot Agricultural Project: Launched in January 2000, the Gyandoot Project involves the installation of a low-cost rural intranet covering 20 village information kiosks offering access to such services as pricing information on agricultural produce, copies of land records, online registration of applications and public grievance redress. These services are offered at nominal rates ranging from Rs5 to Rs25.⁴⁴

Karnataka Telemedicine Project: Launched in 2002 under the auspices of the Indian Space Research Organization, this project connects Narayana Hrudayalaya, a super specialty hospital for heart care in Bangalore, with Chamarajanagar District Hospital and Vivekananda Memorial Hospital, an NGO run health unit at Saragur in HD Kote Taluk for telemedicine facilitation. The tele-medicine offering consists of customized medical software integrated with computer hardware, along with diagnostic instruments connected via VSATs at each of the three locations. This service enables the medical records of patients to be sent to Specialist

⁴⁴ *ibid*

Doctors, who in-turn study and provide diagnosis and treatment during videoconferences with those on the patient's end.⁴⁵ This demonstration project has greatly reduced the burden on rural patients who would have to travel over long distances to consult specialists.

Business: The favorable regulatory climate has greatly expanded the number and variety of VSAT applications emerging within commercial sectors. The result is that more and more businesses are relying on VSATs to respond to the needs of their customers. Prominent among such entities are manufacturing and infrastructure companies, bank-affiliated credit card companies and stock exchanges.⁴⁶

According to Joyjit Chatterji, General Manager, Sales and Marketing at Comsat Max, a leading VSAT service provider in India, banks in India have been quick to install ATM machines using VSATs for connectivity.⁴⁷ This has allowed banks to come closer to their customers without having to open branches everywhere. An example is the State Bank of India that

⁴⁵ Inauguration of Karnataka Telemedicine Project, Space Daily. April 21, 2002, Retrieved 18th October, 2003 from: <http://www.spacer.com/news/vsat-02g.html>

⁴⁶ Satellite Communication soars over terrestrial links, Business Industry News. September 2002. Retrieved 18th October, 2003 from:

http://www.responservice.com/archives/sep2002_issue2/business/industry.htm

⁴⁷ VSAT Service Providers Beam the Right Signal, Express Computer. 2nd September, 2002, Retrieved 18th September 2003 from:

<http://www.http:www.expresscomputeronline.com/20020902/indtrend1.shtml>

implemented a 600-site broadband satellite communications network, considered to be one of the largest deployments of ATMs using VSATs. Through VSATs, the National Stock Exchange of India has been able to set up access terminals in many parts of the country, including remote towns. Its network of 3,000 VSATs is thought to be among the largest in Asia.⁴⁸

Governance: With the Y2000 passing of India's Information Technology Act, many departments of Indian state government are now relying on VSAT-based Internet connectivity to provide quick and quality services to citizens. The result is that more people in India are now using the Internet to transact their affairs with government offices, instead of having to be there personally. As of 2002, the number of Indians using Internet for accessing government services and products as a percentage of the total number of Internet users increased from 22% the previous year to 31%.⁴⁹

Basic government services provided via Internet include (i) registration formalities for land, marriage, birth & death, (ii) information

⁴⁸ *ibid*

⁴⁹ Manas Bhattacharya, IES Deputy Director General (Finance), Telecom Sector in India: Vision 2020, Department of Telecommunications, Ministry of Communications and Information Technology, Background Paper submitted to the Committee on India: Vision 2020, 2002. Retrieved 22nd September 2003 from: http://planningcommission.nic.in/plans/planrel/bkppap2020/1_bg2020.doc

and downloading application forms, and (iii) lodging complaints. Thus, VSAT-based Internet connectivity makes for a more responsive government, ensures that necessary information is more widely available and readily accessible, time is saved by users, frustrations are lessened and greater opportunity is given for users to communicate their needs to those in charge.

VSAT Service Providers in India.

In 2003, 11 companies were registered to provide VSAT services in the Indian market.⁵⁰ Table 2 indicates who these service providers are and their subscriber base as of June 2003. It is evident from Table 2 that Hughes Escorts Communications Ltd., HCL Comnet and Comsat Max constituted the three leading VSAT service providers in the market.

Table 2: VSAT Service Provider Subscriber Base (2003)

Rank	Service Provider	March 30, 2003	June 30, 2003	Percentage (%) of Market Share in June 2003
1	Hughes	4992	5456	29.65
2	HCL Comnet	3022	3987	21.67

⁵⁰ The Indian Telecom Services Performance Indicators April-June 2003, Telecom Regulatory Authority of India. Retrieved 22nd September 2003 from: <http://www.trai.gov.in>.

3	Comsat Max	3493	3668	19.94
4	Bharti BT	3047	3252	17.68
5	Essel Shyam	1997	1579	8.58
6	Telstra Vishesh	134	158	0.86
7	RPG Satellite Communications	103	96	0.52
8	HFCL	67	67	0.36
9	Tata Services	58	58	0.32
10	ITI	53	53	0.29
11	GNFC	22	24	0.13
	Total	161988	18398	

Source: <http://www.trai.gov.in>

4. BRAZIL

Telecommunication Regulation in Brazil

Brazil is a large country with very diverse geography. Its terrestrial networks have not always been able to provide the highest quality of service to all who needed it. If information is critical to development, then information and communications technologies as a means of accessing, processing, and sharing information are links in the chain of that

development.⁵¹ It is in this respect that VSAT deployment became necessary in Brazil. VSAT networks provide rapid, reliable satellite transmission of data, voice, and video to an unlimited number of geographically dispersed sites or from these sites to a specified point. A favorable telecommunications regulatory environment was also necessary to make this happen.

In the 1990s, timely organization-wide communication in Brazil was nearly impossible because of the lack of reliable terrestrial telephone infrastructure in many areas of the country. Besides that, lack of appropriate telecommunications technologies was hindering the operations of organizations utilizing a standard dial-up telecommunications network to transfer information and update customer files. Line reliability was insufficient for volume data transfer and had long been a vexing issue in many locations. Cost of line installations was high and timetables for installations could be up to four years. It was difficult to communicate in real time with high reliability and reasonable cost. There was the need to change the dynamics of the telecommunications system. VSAT was chosen as a solution.

⁵¹ Hudson, Heather E. *When Telephones Reach the Village*, Norwood, NJ: 1984; Hudson Heather E. *Economic and Social Benefits of Rural Telecommunications: A Report to the World Bank*, Washington, D.C.: World Bank, 1995; Saunders, Robert, Jeremy Warford, and Bjorn Wellenius. *Telecommunications and Economic Development*, 2nd edition. Baltimore: John's Hopkins University Press, 1994

VSAT Applications in Brazil

The VSAT technology enjoys widespread application in Brazil especially within business sectors. Two cases among the many successful stories on the use of VSAT solution are presented here.

Banco do Brazil: In the 1990s, with a growing regional economy bringing greater competition, top executives at Banco do Brazil realized that a new communication network was needed. The decision was made to invest in VSATs as the best IT solution available. Within two years, some 2,000 Banco do Brasil branches were connected to the corporate WAN, many for the first time. The VSAT communication link provided each location with fast and reliable data. Savings related to network charges and internal management costs added up to millions of dollars per month. The Bank was able to serve nearly three times the number of customers with 40% fewer employees, enhancing profitability.

The implementation of the VSAT network helped to automate data gathering, giving Banco do Brasil the opportunity to redeploy employees to other tasks. The Bank also had the idea to use the VSAT network for distance learning programs to reduce costs and allow for more timely

training of employees at all branches. As a result of moving to satellite interconnection, Banco do Brasil is now a multi-national banking powerhouse with more than 13 million customers served by nearly 7,600 branches throughout Brazil and other countries in South and Central America, as well as in the U.S., Europe and Asia.⁵²

GM do Brasil: GMB is an auto manufacturer selling vehicles in Brazil via a network of 460 dealerships spread throughout an area almost as large as the U.S., with many storefronts in remote areas surrounded by challenging terrain. Good communication is critical for the success of this business especially in very competitive environments. GMB adopted a satellite telecommunications solution from Hughes Network Systems that it named GM Connect. The in-house VSAT network provided instant and cost-effective connectivity anywhere within the country, simply by installing a small terminal on site. GM Connect has helped the company to modernize, implementing a number of programs and applications that

⁵² With Satellite Technology, Banco do Brazil Gains Communications Capabilities. Hughes Network Systems. June 1, 2001, www.hns.com.

would have been impossible without a broadband network and high speed Internet/intranet access.⁵³

StarBand Latin America: Star One, Universo Online (UOL) and Gilat Satellite Networks Ltd.'s StarBand of Latin America have entered into an agreement to provide Brazil's first consumer, two-way broadband Internet service. Under the agreement, StarBand will serve as a wholesale provider of VSAT satellite communications equipment and operations support for the service. In addition to the hub and advanced technical services, the company will provide 3,700 VSAT terminals to Star One for the market launch.⁵⁴ Broadband Internet access will also be offered to residential and small/home office (SOHO) users across Brazil. Consumers are expected to be able to connect to the Internet at browsing speeds up to 10 times higher than normal modem speeds available.⁵⁵

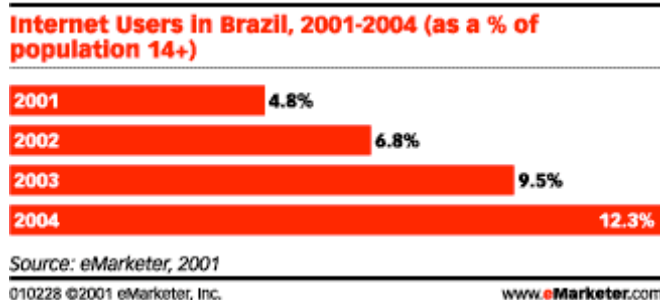
Internet-Brazil: Brazil's 6.1 million Internet users represent 40% of the total for Latin American. Up to 27.4 million users were estimated by the

⁵³ GM do Brasil taps into the Power of Broadband, Hughes Network Systems, June 1, 2001, www.hns.com

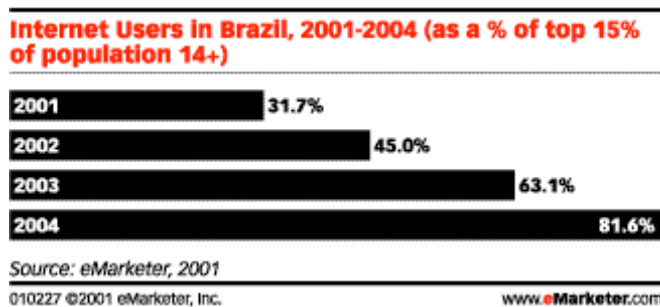
⁵⁴ Brazilians Get Two-Way Satellite Connection to the Internet. Space Daily. May 14, 2001. Retrieved from <http://www.spacer.com/news/vsat-01e.html> on November 4, 2003.

⁵⁵ Gilat Delivers Broadband to Brazil. 2nd Quarter, 2001, Retrieved Nov. 23, 2003 from: <http://www.gvf.org/solutions/studies/index.cfm?fuseaction=more&check=52&row=7>

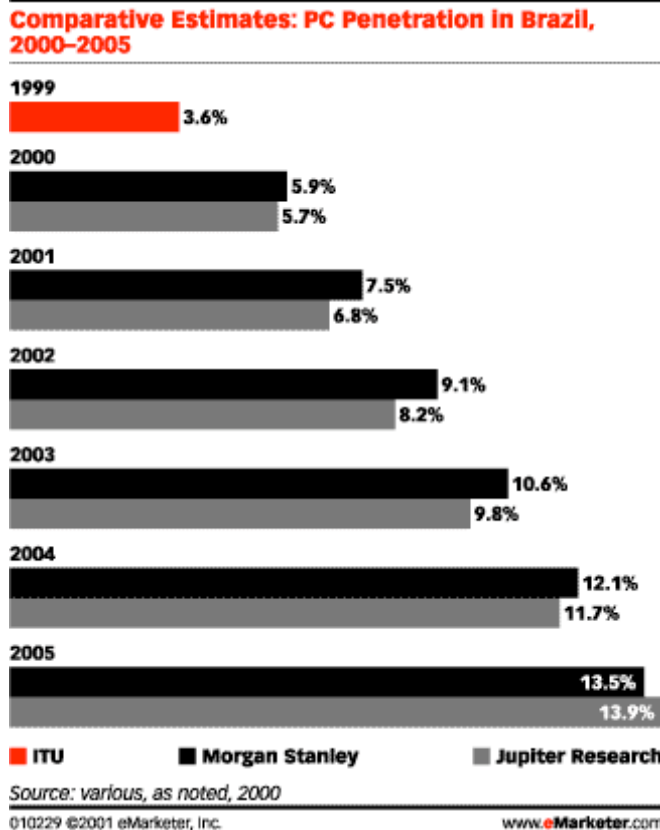
end of 2003. The following diagrams show the trend in Internet use in Brazil.



Source: Brazil Internet Research, 2001.



Source: Brazil Internet Research, 2001.



Source: Brazil Internet Research, 2001.

It is worth noting that despite a difficult domestic and global economy, the sales of VSAT systems and services in Brazil remained relatively buoyant throughout 2003.⁵⁶ This can be attributed to the characteristics of the VSAT technology that enables it to meet the basic infrastructure needs of business in this large country, but the technology itself could only be made available under a favorable regulatory climate in Brazil.

⁵⁶ Growth in VSAT Sales in Brazil. April 2003, www.telecommagazine.com. Retrieved on November 4, 2003.

VSAT Regulation in Brazil

Governments traditionally require that each individual VSAT terminal be licensed in addition to the requirement that the network operator have a license. Prior to 1998, when the Brazilian government began telecommunications deregulation, telecom equipment provider VICOM, formally known as Victori Communications, was unable to provide communications services direct to Brazilian organizations due to government regulations. VIACOM sold equipment and provided satellite installation, systems integration, and technical support services to customers installing company-run dedicated networks.

In 1998, VICOM received a license to offer satellite communication services directly to the customer. The company was allowed to enter the market place as a shared-hub services provider. VICOM's was convinced that entering the satellite services market would make VSATs attractive to a wider pool of potential customers. The relaxing of regulation allowed VICOM to attract customers from all segments of the Brazilian economy. VICOM found that a wide range of industries from retail to agribusiness to utility companies were interested in adding a VSAT component to their corporate WANs.

Deregulation of the Brazilian telecommunications market has a history that goes back some years. PanAmSat was able to secure approval to operate its PAS satellite in Brazil from ANATEL, the government agency that regulates Brazilian telecommunications services, at a time when most countries were committed by international treaty to use INTELSAT as their exclusive satellite services provider.

Regulatory clearance to provide commercial service on the PAS-9 Ku-band payload in 2003 was a big opportunity for the delivery of video, data and Internet services across the country. PAS-9 will offer Brazil broadband VSAT applications to serve its growing telecommunications market.⁵⁷ The regulatory changes have prompted additional investments in the communications sector. Brazil's Communications Ministry awarded a \$23 million contract to Gilat Satellite Networks Ltd. to provide two-way satellite Internet service to 3,200 sites nationwide. The satellite communications network will help to bridge the country's wide digital divide.⁵⁸

⁵⁷ PanAmSat Receives Authorization to Operate PAS-9 in Brazil, March 25, 2003, PanAmSat Press Release, Retrieved on December 12, 2003 from: <http://www.panamsat.com/news/pressview.asp?article=1300>

⁵⁸ Gilat Helps Brazil To Communicate With 3,200 VSAT Internet Nodes, Oct 29, 2002, SpaceDaily, Retrieved December 12, 2003 from: <http://www.spacedaily.com/news/vsat-02r.html>

Regulatory criteria affecting VSAT communications are largely based on the ITU Radio and Mercosol Resolutions, adopted by ANATEL in February 1999. Following these guidelines, reception-only terminals do not need a license. But to initiate and deliver services for in-country reception an authorization is required by ANATEL. The satellite used must also be authorized to operate in Brasil. For temporary use, for a maximum period of 45 days, the request to ANATEL must be made 15 days in advance addressed to the Radiofrequency and Fiscalization Superintendence with information about location, frequencies, power, gain and so on. Earth stations must be under the jurisdiction of an Authorized Service Provider. The license term is 15 years, renewable once.⁵⁹

Immediately following the granting of a Multimedia Communications Service license by ANATEL, Hughes Network Systems, the world's leading provider of broadband satellite solutions, launched its DirectWay broadband satellite services in Brazil. Through a newly formed subsidiary, Hughes Telecom Americas, located in Sao Paulo, DirectWay services are being marketed to both large and small enterprises, including finance, utilities, retail outlets, automotive, agribusiness, mining, government

⁵⁹VSAT Criteria. CITEL, Inter-American Telecommunication Commission. Retrieved from http://www.citel.oas.org/pcc3_old/vsat/vsat_brasil.asp.

agencies, schools, Internet/Application Service Providers, kiosks, gas stations and convenience stores.⁶⁰

Hughes Telecom Americas can offer these enterprises high-speed connectivity regardless of location. The VSAT solution allows them to deploy such applications as Internet/intranet access, interactive training and distance learning, e-commerce services, Voice over IP (VoIP), corporate video and audio broadcasting, IP multicasting and video advertising/point-of-sale television.⁶¹

Telespazio Brasil, a leading provider of network communications services in Latin America, has selected PanAmSat's PAS-1R Atlantic Ocean Region satellite to support a variety of applications throughout the region. For example, financial institutions will rely on its VSAT network for long-distance transactions and inventory control.⁶²

5. ISRAEL

Telecommunications Regulation in Israel

⁶⁰ Hughes Network Systems Launches DirectWay Broadband by Satellite Service in Brazil; Always on, Highly Available, Scalable, Two-Way Solution, Newswire Association, Inc. May 22, 2003

⁶¹ Ibid.

⁶² PanAmSat Expands In Brazil through Multi-Year Agreement with Telespazio. PAS-1R Satellite Will Support Telespazio's VSAT Services Throughout Latin America Retrieved from <http://www.panamsat.com/news/pressview.asp?Article=1285> on November 13, 2003.

The state of Israel has transformed itself from a government-dominated, monopoly-oriented market into one that it describes as competitive, customer-focused and technology-driven.

One of the most developed industries in Israel is telecommunications. The communication sector over the past two decades led the country in a push to open its market to competition. Modernization has been possible by following a path of corporatization, liberalization and re-regulation with the controlled introduction of new operators and services.⁶³ Among the sectors opened to competition was the field of satellite communications.

In 1999, there was a major structural rebalancing of the regulated tariffs. The objective was to reduce cross subsidies inherent in the government-controlled system and make the tariffs more transparent. In 2001, the Knesset enacted the Communications Act, a pro-competition legislation.⁶⁴ These regulatory changes were necessitated by Israel's participation in the WTO (World Trade Organization) telecommunications services negotiations, where it committed itself, as a signatory to the GATS multilateral agreement, to an open, competitive and transparent telecommunications industry.

⁶³ Information Society Regulatory Developments in Israel, Master Report, April 2000

⁶⁴ Neil Gandal, "New Horizons: Telecommunications Policy in Israel in the 21st Century", Unpublished paper for the Pinhas Sapir Center for Development, September 2002.

The pro-competition regulatory changes in Israel have made the country's telecommunications industry attractive to foreign investors. Several multinational telecommunication companies have invested in the Israeli market, including Bell South, Sprint, Deutsche Telecom, France Telecom, Telecom Italia, and Hutchison-Hong-Kong. Other multinationals including Motorola, Intel, Alcatel, Ericsson, America Online, Cisco, Lucent, IBM, Compaq, Nortel, 3-Com and ADC have invested in Israeli high-tech companies or operate their own R&D and/or manufacturing facilities in Israel.⁶⁵

Satellite communications is an area in which Israel has been actively involved. Israel launched its own geostationary satellite Amos-1 in 1996.⁶⁶ Amos-1 was designed and built by Israel's prime contractor and satellite integrator, Israel Aircraft Industries (IAI). It carries seven Ku-band transponders, and is used primarily for direct-to-home television broadcasting, video distribution and VSAT services. A second satellite, the Gurwin-II TechSAT, was launched in July 1998. The Gurwin-II provides communications, remote sensing and research services.

⁶⁵ Telecommunications Industry in Israel, Ministry of Communication,. http://www.moc.gov.il/new/documents/telecom1_in_israel_11.00.pdf

⁶⁶ Telecommunications Industry in Israel. Ministry of Communications. August 2002. http://www.moc.gov.il/new/documents/lect_5.9.02.ppt

Gilat Satellite Networks is Israel's principal service provider and Earth system developer. Gilat is competitive in designing and selling Earth terminal equipment, particularly VSATs.

VSAT Service Providers

There are four major companies that provide satellite communications services in Israel. These are Gilat Satellite Networks providing interactive broadband data services, R.R. Satellite Communications providing satellite services for television and radio, Shiron Satellite Communications providing two-way multimedia and communications and Stellar Satellite Communications providing data communications for GPS, vehicle tracking and fleet management.⁶⁷

Gilat Satellite Networks is a world leader in VSAT satellite communication systems providing end-to-end enterprise networking and rural telephony solutions to customers across the globe.⁶⁸

VSAT Applications

⁶⁷ Telecommunications Companies in Israel, Israel Science and Technology Homepage, retrieved December 12, 2003 from: www.science.co.il/Telecom-Companies.asp

⁶⁸ www.gilat.com

Business: Israeli banks, fast food chains, retail operators, and hotels are utilizing VSAT technologies for voice and data communications, database updates and replications, financial management and corporate training. Some Israeli corporations are using VSATS for backup systems and disaster recovery.⁶⁹

Military: One beneficiary of VSAT technologies has been the Israeli military. Information and communication technologies are changing the way military conflicts are conducted. Satellite-based VSAT technology is providing military commanders with improved command, control and communications capabilities vital to support military operations. The advantage of this technology for the military is that a wide range of diverse communications solutions can be deployed quickly and economically.

VSAT technologies provide a secured network of voice and broadband data services for command and control. The development of portable VSAT terminals has enabled the military to carry reception/transmission equipment into the field.

⁶⁹ Ibid.

Internet: Israel is a leader in developing Internet applications and products, for which Israeli companies have earned an international reputation. The Internet in Israel currently has more than one million users, 30,000 domains, 800,000 dial-up and 5,000 direct-connect customers. Thirty percent of households and 60 percent of businesses use the Internet. They are served by four major and about 30 smaller Internet service providers who utilize the VSAT technology for high-speed connection.

Cross-border Communication

Demand for VSAT applications such as Internet, telemedicine, distance learning, banking, multimedia and paging is increasing throughout the Middle East region. These applications require a more liberalized regulatory environment. The market demand for VSAT technology has encouraged Middle Eastern satellite provider Arabsat to establish VSAT standards on compatible platforms to facilitate cross-boundary linkages.⁷⁰

A major hurdle to market access in the Middle East is strict regulation. Most traffic is controlled by government-owned VSAT

⁷⁰ David Hartshorn. The Global VSAT Forum Launches Global Campaign to Advocate Use of Satellite-Based Network Solutions.
<http://www.gvf.org/solutions/index.cfm?fuseaction=sbi1>

networks. Private transborder traffic is rare, and private VSAT ownership is scarce.⁷¹

D: LESSONS FOR AFRICA

The country case studies illustrate the influence of regulatory reforms on the deployment of satellite technologies. It is worth noting that irrespective of GDP levels in these countries, VSATS have an important role to play in social and economic development. Developed countries like the U.S. with high GDPs allowed blanket licensing of VSATS long ago and seeing the benefits in business, government, health, education and other sectors. It can also be observed that developing countries like India with low GDPs that are increasingly undergoing policy reforms in favor of VSAT adoption are seeing substantial benefits from their use.

Technological advances tend to be hampered when regulatory regimes do not favor them. The country case studies show that this is exactly the case with VSAT technologies. The key to VSAT adoption has been an environment fostering economic growth accompanied by supportive regulation. This research raises important questions for developing countries, especially those countries in Africa whose governments have

⁷¹ Ibid.

required that each VSAT terminal be licensed in addition to the licensing of network operators.

In Africa, high tariffs for international companies operating in-country or across national boundaries will continue to hamper growth in the VSAT market, thus slowing economic growth as well. There is a need to streamline VSAT licensing and reconsider the role of tariffs as a way to stimulate local economies and provide for easier information exchange. This is something that can be done among African countries that will have a chance at enhancing socio-economic development.

The diverse terrain of Africa coupled with the unreliable and high cost of telephone infrastructure pushes planners to think about alternatives. In many cases, the satellite solution is the only alternative for getting interactive communication out to an almost unlimited number of geographically dispersed sites or from these sites to other locations. VSAT technologies become necessary given the tremendous demand for Internet access, multimedia programming and other essential services by businesses, educational institutions, government agencies and non-governmental organizations.

The deployment of the VSAT technology can facilitate the growing climate of democratization in Africa. As the case in India reveals, positive

VSAT sector reforms can also pave the way for e-governance. This will increase participation by civil society and make governance more effective and efficient.

With respect to business, the experience of each of the case study countries, especially the Brazilian experience, shows that a favorable regulatory climate can have a positive impact on commercial development. Entrepreneurs and investors in Africa often are hampered by the lack of reliable and affordable telecommunications services.⁷² Policies that encourage investment in satellite-based telecommunications can help to overcome these limitations.

African countries often have the bulk of their populations living in rural areas where terrestrial telephone lines are scarce or unavailable. India has faced this situation. Prudent VSAT regulatory reforms and government initiatives have led to several major demonstration programs in which satellites are used to connect rural populations to major city centers. The multiplier effect of these initiatives is the growth of such rural businesses as Internet cafes and telecenters. This can go a long way in helping to breach the information gap between rural and urban folk in Africa.

⁷² Mgombelo, H. and Werner, M. (1997). (Eds). Telecommunication for Business in Africa. IOS Press.

E: CONCLUSION

Bringing VSAT services to the developing world can be greatly facilitated through policy reforms. The country case studies illustrate the extent to which government offices can play an important role in opening the door to telecommunications development. China and India are each good examples. In strong private-sector economies like Brazil and Israel, private enterprises play a larger role. When government and business work together, the positive results are obvious.