SatelliteConnect!

Best Practices for Satellite Network Operators, Regulators, and Service Providers & Integrators

INDEX

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Section 1:The need for Broadband

1.1 Connectivity is the Revolution

In the 21st Century, broadband connectivity is the revolution that is positively impacting the lives of billions of people. Like the 20th century revolution of electricity and the 19th century revolution of railways before it, broadband connectivity relies on a large network to be rolled out, whether terrestrial, air-borne, space-borne or a combination of technologies, in order for the benefits of affordable, adequate and sustainable connectivity to be available to all.

1.2 Nearly half of the world's population are not connected

Of an estimated global population of 7.3 billion people, approximately 4.2[1] billion do not have access to the benefits of affordable, adequate broadband internet. Over 90% of the world's unconnected people live in developing countries, primarily in South Asia (1.4 billion in 2014), East Asia and the Pacific (1.2 billion), and Sub-Saharan Africa (800 million).[2]

1.3 Broadband as the global enabling factor

In its July 2016 statement, "**Ensuring that No One is Left Behind**", The UN Broadband Commission for Sustainable Development stated that we "*affirm our sincere conviction and belief in the vital role of broadband in building and transforming our economies and societies, and achieving the Sustainable Development Goals (SDGs) agreed by world leaders in September 2015. Today, 4.2 billion people (or 57% of the world's population) are offline for a wide range of reasons, but often also because the necessary connectivity is not present or not affordable. Information and Communication Technologies (ICTs) are vital enablers of the three pillars of sustainable development: economic development, social development and environmental protection*".[3] The statement went on to explain how broadband helps to meet the SDG's and made the following points, which are summarized as follows:

- **Broadband can drive economic growth, prosperity and sustainability**. Significant research demonstrates that broadband connectivity can add to the Gross Domestic Product (GDP) of countries; help create innovation and new jobs in new products and services, advance financial inclusion, and improve labour, agricultural productivity and energy efficiency.

- **Broadband can help address basic needs**. In developing countries, broadband can help meet the basic needs of food, water and energy. Information and Communications Technology (ICT) infrastructure can help improve the supply chain and distribute food more efficiently and effectively, avoiding wastage. Broadband infrastructure is the cornerstone to build smarter and more resilient cities connected to the global marketplace. Sensors are being used to monitor wells, water usage and irrigation methods to use water more efficiently and improve water supply. Smart grids are helping improve energy supply and usage and reduce carbon footprints. Broadband can, and should, be used not just for cutting-edge applications in industrialized countries, but to meet basic needs in developing countries, where people's needs are greatest.

[1] http://www.broadbandcommission.org/Documents/publications/HLPF-July2016.pdf

[2] https://fbnewsroomus.files.wordpress.com/2016/02/state-of-connectivity-2015-2016-02-21-final.pdf

[3] The Broadband Commission was launched in May 2010 by the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), and comprises government leaders from around the world along with top industry leaders and representatives of international agencies, and organizations concerned with development. http://www.broadbandcommission.org/Documents/publications/HLPF-July2016.pdf

- **Broadband can help lift people out of poverty by delivering education**. In developing countries broadband infrastructure can be used to facilitate access to health services and to deliver distance education, lifelong learning and education for refugees and displaced persons. People must be empowered to transform information into knowledge for lifelong learning and digital skills, reflecting linguistic and cultural diversity. It is vital to enable and facilitate creation of relevant broadband-enabled content, applications and services which people can access in their own local languages. Integrating ICTs into education and learning processes can help ensure that online learning is available, accessible and inclusive.

- **Broadband can improve health services and relief efforts**. The world is witnessing a revolution in health care driven by access to broadband connectivity. Doctors, nurses, health care providers and researchers are able to leverage connected devices to provide expertise and even treatment from the largest hospital to the most remote village. Connectivity allows health care providers in rural areas to draw upon global databases, knowledge and teaching to provide access to healthcare. Big Data and the Internet of Things (IoT) have a significant potential to improve the organization and coordination of humanitarian solutions and relief efforts, and improve data analysis and policy-making.

- **Broadband can be used to monitor climate change and planetary processes**. Satellite imagery and monitoring can be and is used to track and assess phenomena such as changes in ocean temperature, deforestation, thinning of the polar ice caps, animal migration, and land use. Building up time series data on all these matters can complement scientific research and track developments in these processes, including the impact of changes in policy.

- **Broadband networks are vital for achieving the Sustainable Development Goals (SDGs)**. Digital inclusion is of paramount importance to ensure that no one, and no society, is left behind. This must include a special focus on bridging the digital gender divide, to empower every girl and woman through new technologies.

  We are witnessing a second renaissance, a digital revolution, driven by broadband, but its promise can only be achieved if connectivity for all is made a reality. The statement from the UN Broadband Commission for Sustainable Development finished with the following quote: "*Let us grasp this vital opportunity to strive for a world where every citizen can potentially experience the opportunities and benefits of universal, affordable and inclusive access and connectivity to ICTs. We urge you to enhance the policy environment to enable and facilitate deployment of broadband infrastructure and harness the potential that the effective collaboration among the governments, private sector and other stakeholders could deliver in connecting the world with broadband and develop relevant content and skills as a top priority for economic growth and social digital inclusion, so broadband can help facilitate and accelerate the achievement of the SDGs.*"

1.4 Satellite-an important part of the solution

The provision of broadband connectivity relies upon many competing and complementary technologies. An effective service requires a balanced blend of terrestrial mobile, fixed wireless, cable, fiber and satellite to meet the needs of urban, exurban and rural areas. Satellite is a complementary broadband technology which serves a number of important purposes. It can connect areas that are hard to reach by terrestrial wireless, cable and fiber given the exigencies of terrain and distance or given an uneconomically viable demography. It can also provide connectivity between terrestrial wireless and cable and fiber networks where gaps occur due to terrain, distance or demographic factors and can also provide important backhaul functions. As satellite, by its nature, has near global coverage and is highly resilient, it is also a vital part of responding to natural disaster and emergencies where quick and flexible bandwidth resources are required.

1.5 Why SatelliteConnect!?

Achieving connected communities is a critical part of the goal of making the benefits of broadband available to the remaining 4.2 billion people and thereby to help meet the UN Sustainable Development Goals. The mission of the Satellite Connect initiative is to provide satellite network operators regulators and service providers & integrators around the world with information about how satellite broadband can help to close the digital divide accompanied by the best practices and tools necessary to bring this about so that all governments can enable their citizens, their economies, and their nations to prosper.

1.6 Best practices for Connected Communities

The entire world is experiencing the broadband revolution, yet the exponential technology driving this is changing faster than the regulations that guide and control it. This, in turn, is preventing communities from becoming connected as fast as they may otherwise be. The team of experts involved in the Satellite Connect initiative have first-hand experience of the challenges that need to be overcome in order for the power of these technologies to be leveraged so as to help accelerate closing the digital divide. A key purpose of this initiative is to provide a set of best practices for satellite network operators, regulators and service providers & integrators. Satellite Connect is a resource of these best practices to date.

Section 2:The role of Satellite Broadband

2.1 Satellite is an integral part of the global broadband solution

October 4, 2017 marks the 60th anniversary of the launch of Sputnik in 1957. Since then, communications technologies have improved at a rapid pace and satellite is no exception. Satellites today serve as the critical global communications backbone for the world. New satellite based broadband services are changing the way broadband is delivered in many environments ranging from rural and urban areas to inflight and shipping connectivity. Satellite coupled with terrestrial services is now an integral part of the global broadband solution.

2.2 The satellite industry paradigm is changing

The satellite industry is undergoing an unprecedented period of material change. Driven by new technologies, lower costs and increased competition focused on developing unprecedented capacity and service provision. After significant sector consolidation there is now increased competition from new entrants and capabilities; lower prices and more flexible terms are expected to result. There are five main causes for this change of paradigm:

2.2.1. New satellite technologies

The sector is witnessing a revolution in the cost, quality and coverage of broadband on a global scale. The introduction of High Throughput Satellites (HTS) in Geostationary Orbit (GSO) coupled with new constellations of non-GSO satellite systems is resulting in lower costs per bit and faster, better quality, real-time broadband services. For example, an HTS has more than 10 times the bandwidth compared to a normal satellite by targeting specific locations with 'spots' or 'beams' rather than providing blanket coverage. This means that, where HTS coverage can be offered, the cost of the bandwidth can be reduced significantly compared to 'wide beam' satellite broadband, but HTS is not suitable for every user especially those looking for wide area coverage. HTS can therefore supply a granulated and low cost solution to certain types of customers in specific locations covered by the HTS 'spots'. Efficient use of multicasting and caching technologies further improve the scalability and cost competitiveness of satellite solutions, in particular in the light of the growing video content on the Internet.

An important part of the cost of delivering satellite bandwidth is the ground-based terminal for receiving signals. With changes in both spectrum and technology these have over the years decreased materially in size and cost while increasing in power. The most recent VSATs (very small aperture terminals) can cost less than $300 compared to some as high as $10,000 a decade ago and, in some cases, assuming appropriate terminal design and sufficiently simplified installation procedures and tools, can be self-installed. Whist this greatly reduces the barrier to ownership, there is still much to do in producing universal communications standards so as to help reduce capital and operating costs and encourage transferability between service providers.

2.2.2. Satellite connectivity and resilience has improved materially

Advances in technology have meant that some of the factors that traditionally affect satellite delivery quality such as rain fade (where rain, snow or ice weaken the radio signal), are able to be addressed resulting in a dramatically improved service. While there is a long way to go to achieve consistent standards across the world, quality standards of connectivity and resilience have greatly improved. In North America, for example, a 2016 Federal Communications Commission study[4] on US broadband providers showed that a satellite

[4] https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2016

provider outperformed the DSL, Fiber and cable operators in delivering advertised speeds. While it did not outperform in all categories, it is indicative of the progress being made.

2.2.3. Competition in the Launch Services Market

The cost of launching satellites into space has always been an important cost consideration for the industry. The $10m X Prize for the first non-government organization to launch a reusable manned spacecraft into space twice within two weeks, which was won in 2004, created a new momentum in launch services. A new breed of entrepreneurial investor entered the market focused on developing reliable, affordable and reusable launch vehicles targeting lower launch and associated costs. Coupled with technological advances resulting in the lower cost of satellites themselves and advancements in satellite broadband, the sector is witnessing a revolution in the quality and cost of the provision of satellite broadband around the world.

2.2.4. Global media is increasing demand for broadband

The Internet is increasingly creating global access to markets and, in turn, is driving economic opportunity. New global media companies such as Amazon, Facebook and Google, with their related interest in broadband as the main means of communicating with their audiences, have brought an increased focus on satellite as an important part of a global reach solution. Attracted by the opportunities, global investors, such as Softbank are spurring further investment and innovation.

2.2.5. Satellite services are becoming more competitive

As part of the global broadband infrastructure, satellite is a competitive platform and in some cases the only cost effective means for reaching people, and is a complementary service to terrestrial mobile, fixed wireless, traditional copper wireline services such as DSL (Digital Subscriber Line) and optical fiber. With advances in technology, reductions in cost and increases in the quality of connectivity and resilience, there are some areas where satellite broadband is becoming price competitive with, for example, some DSL services that operate at slower speeds than fiber.

Evidence is beginning to emerge in developing countries of lower prices for satellite bandwidth, albeit at speeds that may not be viable in major world cities. For example, a recently launched service in Sub-Saharan Africa, leveraging the benefits of HTS, is offering individuals and organizations plans varying from a 10GB monthly volume limit (through to unlimited) and download speeds of up to 20 Mbps. Package pricing starts at 30 USD depending upon the plan and country. Equipment and installation cost a few hundreds of U.S. dollars, depending on the distributors and the countries, and can be installed in as little as 2.5 hours.

Given that the ITU estimates that only 7% of fixed broadband connections in less developed countries (LDC's) are advertised at speeds of 10Mbps and above[5], this type of satellite based broadband service has the potential to make a material contribution to connectivity in the LDC's.

Although there are still many advances in technology, regulation and commerce required before this type of service can become ubiquitous, there is tangible evidence of advances in satellite broadband delivery which bodes well for the prospects of helping to meet the UN's Sustainable Development Goals by making more affordable, adequate and sustainable connectivity available to all.

[5] http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf

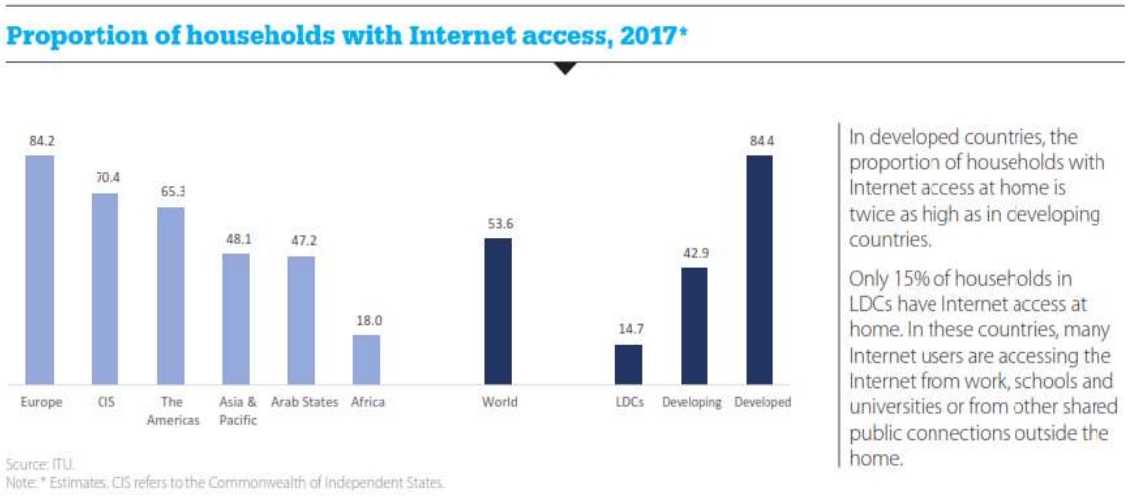
Section 3:Satellite-an essential part of a successful ICT strategy

3.1 Introduction

Satellite based broadband is becoming an increasingly important part of helping to reduce the digital divide, especially in Asia, Sub-Saharan Africa and the developing world generally (as well as in underserved parts of the developed world). There are strategically important steps that governments, funders, the satellite industry and NGO's operating in the humanitarian sector can take to help promote Connected Communities as part of a considered and coordinated Information and Communications Technology (ICT) strategy.

3.2 The Digital Divide

In its July 2016 "**Ensuring that No One is Left Behind**" statement (quoted at the beginning of this paper), the UN Broadband Commission for Sustainable Development made clear the importance of closing the digital divide. Recent statistics illustrate how clear the divide is:



LDC: Less Developed Countries. The majority of LDCs are in Sub-Saharan Africa.[6]
Source: ICT Facts and Figures, 2017[7].

[6] http://www.itu.int/en/ITU-D/LDCs/Pages/Who-are-the-LDCs.aspx

[7] http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

3.3 Optimizing the Satellite solution

3.3.1. The 'Time to Market' benefit

Any ICT strategy must recognize the strengths of each of the broadband delivery technologies. Satellites, for example, are able to provide very rapid connectivity, irrespective of distance, and an ability to leapfrog ahead of other delivery technologies such as cable, fiber or terrestrial wireless which have a material 'time to market' aspect. This leapfrog effect allows universal service to be delivered within a reasonable time-frame and is especially relevant to locations where the demographics and terrain mean that traditional cable, fiber and terrestrial wireless communications structures are uneconomic.

An example of such 'leapfrogging' can be seen in the ITU defined 'Less Developed Countries' (LDCs) which include the majority of Sub-Saharan African countries.[8] The 2017 'ICT Facts and Figures' report estimates that LDC fixed broadband (defined by the ITU as being 256kb/s or greater) penetration remains at below 2% of the population and has grown at a compound average growth rate (CAGR) of 35% per anum since 2012. It also estimates that 22% of the LDC population have mobile broadband subscriptions which have grown, during the same period, at a CAGR of over 50% showing how mobile is 'leapfrogging' fixed broadband.[9] The report also noted that in the period 2013-2016, mobile broadband prices decreased by more than 50% (as a percentage of Goss National Income Per Capita) making it more affordable than fixed broadband.

With advances in satellite technology, the introduction of new services and continuing reductions in the cost of satellite broadband services, satellite is well placed both as a complement to other technologies and also as a potential 'leapfrogging' alternative (in certain areas) that offers governments the opportunity to implement broadband solutions very rapidly irrespective of demography, distance and terrain.

3.3.2. The cost benefit

The principal capital and operating costs of acquiring, launching, maintaining and replacing the core satellite operating infrastructure are met by the satellite network operators rather than their customers. Consequently the cost to governments of satellite broadband is relatively low and is, in effect, restricted to purchasing or leasing consumer premises equipment and subscribing for services.

Governments have to balance the long-term investment return and job creation benefits of developing their own traditional cable, fiber and terrestrial wireless communications networks with the speed to market and low investment requirement that satellite communications offer. This ability of satellite to deliver almost immediate connectivity with little or no capital or operating cost is very important in considering long-term ICT policies especially where resources are scarce.

3.3.3. Complementary networks

Satellite broadband is an adaptable and complementary communications solution. Satellite is used to deliver broadband services to areas where cable, fiber and terrestrial wireless solutions are not available (in both developing and developed nations), to help connect other fixed and wireless broadband networks in areas where satellite is the most economically viable solution and also provide

[8] http://www.itu.int/en/ITU-D/LDCs/Pages/Who-are-the-LDCs.aspx

[9] http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

important backhaul services. With its global coverage, ease of access and mobile receivers, satellite broadband is also an integral part of any global or humanitarian disaster management solution.

The USA and Europe are examples of the use of a broad range of network solutions. They are among the group of countries with the highest percentage of households with internet access in the world.[10] This is achieved using a combination of satellite, terrestrial wireless, cable, fiber and 'line of sight' microwave technologies. For example, in certain rural portions of the United States, satellite broadband is the only effective way to receive high-speed broadband services, as there is no competing terrestrial infrastructure. The fact that satellite is an integral part of the solution in relatively mature broadband markets is illustrated, in turn, by the fact that the USA and Europe are also amongst the largest global markets for Satellite broadband.[11]

In considering developing ICT strategy for developing countries therefore, due consideration must be given to the use, where appropriate, of all types of networks. Population density, terrain, distance and relative capital and operating costs will obviously play an important role in deciding the balance of any combination of broadband technologies. Any ICT policy should take account of every broadband delivery technology and not, for example, exclude the relatively volume limited services such as terrestrial wireless and satellite, although the advent of 5G and HTS are changing the 'volume limitation' aspect.

Based on the ITU statistics regarding broadband in the LDCs referred to in Paragraph 3.1 above, it will take many years, much investment and an approach involving complementary broadband technologies to help close the digital divide in the LDCs. The Broadband Commission for Sustainable Development estimates that it will cost US$450 billion to provide the next 1.5 billion people with Internet access.[12] Satellite has an important role to play, especially in the LDCs and given improvements in satellite service quality and reductions in cost, satellite should be well be placed to make a material contribution.

3.3.4. VSATs and NMS

Ground based terminals such as VSATs for receiving satellite signals and related network management system (NMS) technologies are an important cost element in any ICT strategy that uses satellite. The GVF (Global VSAT Forum) estimates that there are more than 1,000,000 fixed earth stations and 500,000 mobile terminals in use in the world.[13] The VSAT technologies are now in their third generation, are far smaller, can achieve speeds of 100Mb download and 20Mb upload, cost less than US $300 and some can, with appropriate training, be self-installed within a few hours.

An informed ICT strategy would seek to encourage standardized, well-supported hardware and software solutions that are as technology and service provider neutral as possible thereby increasing flexibility, leveraging economies of scale and reducing training and support costs.

3.3.5. Leveraging 'tariffing' and 'caching'

Tariffing structures generally reflect market forces with higher rates during the day and lower (and sometimes 'free') rates at night when businesses are typically not on-line. This differential can be leveraged for the benefit of the community especially if combined with computer caching technologies. Using education as an example, school and colleges (in areas where broadband facilities are very limited and cost a material issue) can install computer caching facilities enabling the desired educational materials to be downloaded and saved overnight with the teachers and student able to

[10] http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf
[11] http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_RegulationBroadbandSatellite.pdf
[12] http://www.broadbandcommission.org/Documents/publications/HLPF-July2016.pdf
[13] https://www.itu.int/net/wsis/docs/pcip/misc/gvf.pdf

access the materials during the day by 'surfing the cache' in simulation of 'surfing the web'. This is a very efficient leverage permitting optimization of resources.

3.4 Optimizing Regulation

Since Sputnik 1 was launched sixty years ago, about 6,600 satellites from more than 40 countries have been launched. There are an estimated 2,000 communications satellites in orbit.[14]

Historically, communications satellites were funded and operated by governments, but commercial satellites have been in-service for over the last 50 years. With the advent of commercial communications operators came the need for appropriate regulation. In the space segment, regulation principally focuses on licensing for the use of specific radio frequencies and also for landing rights. Regulation of the earth segment principally focuses on licensing network operators and service providers and also on licensing earth stations and terminals to receive the satellite signals.

3.4.1. Regulatory goals

If a significant goal of regulatory policy is to help close the digital divide, regulators should also focus on the elimination of unnecessary regulations that inhibit the use of satellite services to provide communications on an open and competitive basis.

The GVF (Global VSAT Forum) conducted a survey of the policies and regulatory conditions applied to satellite services in almost every country of the world.[15] The survey revealed an increasing recognition by regulatory agencies that "*less is more*." In other words, many policy makers and regulators now recognize that imposing less regulatory requirements results in more access to essential communications and also serves as an important means of enhancing competitiveness.

The survey also noted that 146 governments have endorsed the World Trade Organization's ("**WTO's**") General Agreement on Trade in Services ("**GATS**"), which along with its Fourth Protocol on Basic Telecommunications Services provide for pro-competitive, market opening measures for both fixed, mobile and Satellite communications solutions.

3.4.2. Key aspects of a successful regulatory policy:

(a) **Technology-neutral regulations.** Modern telecommunications use a range of different technologies including terrestrial wireless, wireline and satellite networks. In order to facilitate fair competition between these technologies, regulators must make their regulations, licensing requirements and regulatory fees technically neutral. For example, an Internet service provider (ISP) would ideally be able to select either a terrestrial (wireless or wireline) or satellite system architecture to build its network, based solely on the relative costs and benefits of each available technology.

(b) **Regulatory transparency.** Another important principle is the need for countries to employ transparency in telecommunications regulation. A significant number of regulators publish their laws and regulations on satellite licensing and permits. This transparency has reduced the time and cost of acquiring licenses and helped to promote regulatory harmonization. However, it is imperative that all regulators do this in an easy to find and read format.

(c) **Access to spectrum.** Radiocommunications spectrum remains a scarce resource despite the ability of technology to access higher frequency bands and to enable greater sharing between services. As demand for broadband connectivity, including higher speeds and capacity, continues to increase, it is critical that access to additional spectrum be made available on a

[14] https://www.britannica.com/technology/satellite-communication

[15] http://www.ratel.rs/upload/documents/javne_rasprave/GVF%20Satellite%20Policy%20Guidelines%202009.pdf

technology neutral basis. It is also critical that policy makers resist the temptation to provide access to the scarce spectrum resource solely on economic grounds and take into account demand, economics, use and other important factors. Failure to do so will likely result in certain communications technologies obtaining access to spectrum at the expense of other services that serve critical needs. For example, it is imperative that governments balance access to ensure that technologies that serve densely and more remote communications needs both have access to adequate spectrum.

(d) **Spectrum management.** Regulation of satellite and other radio communications services is necessary to manage scarce spectrum resources although most satellite services do not share spectrum in the same frequency band with other radio communications services. In such cases, no reason exists for regulators to place any restrictions on satellite networks that have been licensed by other countries and have completed spectrum coordination through the International Telecommunications Union (ITU). Regulators should only impose licensing and, where appropriate, spectrum coordination requirements on satellite networks that are based in their country.

These same principles should be applied to owners and operators of satellite earth stations. To the extent that the VSATs are communicating using satellites (either domestic or foreign) that have completed the ITU spectrum coordination process, no spectrum related regulation should be required for these satellite earth station operations.

(e) **A competitive domestic and cross-border market.** This requires a legal and regulatory structure that does not discriminate in favor of existing service providers, or otherwise limit the number of independent satellite service providers. Cross border competition is also very important in providing consumers with access to a broader range of technologies and service options. The GATS, for example, require WTO Members to treat companies from other WTO Members the same as they treat their own companies and to accord them with Most Favored Nation ("MFN") status.

(f) **Licensing and Harmonization.** In regulating the design and configuration of satellite transmission equipment, regulators should not duplicate the regulatory efforts of other countries, or force 'type approval' requirements on imports of equipment that has been approved and certified by other countries or by recognized international certification bodies. Traditionally, most governments have required each VSAT or mobile satellite terminal to be licensed individually (in addition to requiring a network operator's license). However, with global standards, such requirements should be eliminated, which will result in reduced costs and delay to market.

(g) **Blanket Licensing.** Recently, the approach to regulating VSATs through "blanket licensing"-has been successfully implemented in a number of countries. With this form of regulation, VSATs are configured based upon technical criteria (power level, frequency etc) that eliminate the risk of unreasonable interference. A single blanket license can be issued covering a very large number of VSAT terminals. These approaches have worked well for the regulator, for the industry, and for end users, wherever it has been applied. This approach should be more widely adopted.

Section 4:Best Practices for Connected Communities

In order to enable the connectivity of communities around the globe, satellite network operators, regulators, and service providers & integrators must work together to achieve the result of having all communities around the globe connected to cost-effective, high-speed broadband.

4.1 The goals of Connected Communities are:

- Enabling the 100% availability of broadband communications services, everywhere
- Providing consumers, business, governments, hospitals, schools and others access to broadband services, wherever they are located
- Stimulating the development of jobs and the local economy by increased access to broadband services
- Increasing educational skills, access to health care and e-government to local communities

4.2 In order to achieve these goals, we urge regulators, satellite network operators and service providers & integrators to take the following actions:

4.2.1. Regulators

- Adopt technology neutral regulations that enable competition among platforms, including for spectrum, universal service and interconnection
- Eliminate requirements that limit market access to domestic service providers and specific types of satellite equipment
- Adopt and publish clear and transparent licensing requirements
- Adopt blanket licensing for satellite user terminals
- Adopt and publish cost-based licensing fees
- Adopt cost-based cross-border customs charges
- Adopt globally harmonized equipment standards
- Work with regulators and communities to ensure that there are minimal regulatory burdens for an operator to install needed terrestrial infrastructure and the deployment of VSATs and other user terminal equipment
- Develop education and training programs for consumers and businesses in local communities to educate them about the benefits of broadband

4.2.2. **Satellite Network Operators and Service Providers & Integrators**

- Develop partnerships with local communities to educate and train consumers, governments and businesses about the benefits of satellite broadband including:
    - the best way to provide affordable broadband services to specific locations including the use of complementary broadband technologies such as Wi-Fi
    - the use of transparent pricing and service tiers designed to meet the needs of local communities
    - the benefits of low or no cost off-peak tariffs and the use of computer caching to store data downloaded during those periods
- Provide transparent and clear information regarding services, prices, speed, data limits and other relevant factors to consumers
- Utilize, to the extent economically and technically feasible, local installers and technicians to deploy and maintain services

Awards

Pacific Telecommunications Council - Innovation Award

OFFICIAL SELECTION
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Endorsements

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