3 July 2009

Alison Kelly
Secretary
Select Committee on the National Broadband Network
PO Box 6100,
Parliament House
Canberra ACT 2600 Australia

Senate Select Committee on the National Broadband Network

Dear Ms. Kelly,

Thank you for your letter to our Chief Executive Officer, Mr. David McGlade dated 15 June 2009. Intelsat very much appreciates the opportunity to provide a submission to the Senate Select Committee inquiry into the establishment of a National Broadband Network.

As way of introduction, Intelsat is the world's leading commercial satellite communications services provider, and the largest provider of fixed-satellite services ("FSS") worldwide. Intelsat delivers advanced transmission access for information and entertainment to some of the world's leading media and network companies, multinational corporations, Internet service providers, and government organizations around the world. Every year we help millions of people stay connected to the things they care about – and providing access to broadband is at the forefront of this activity.

Intelsat's submission to the Senate Select Committee is attached. Intelsat is very supportive of the Australian government initiative to implement broadband service on a national basis. The economic and social benefits of such a capability are well documented.

Intelsat believes that satellite can play a significant role in the NBN infrastructure. Today, around the world, we facilitate the provision of broadband connections to enterprise customers as well as to individual broadband subscribers.

Intelsat would be pleased to appear before the committee at your convenience to provide further information regarding our submission and to also address any further questions or points of clarification that may be required by the committee members.

Yours Sincerely,

David Ball
Regional Vice President Asia-Pacific

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Intelsat Submission to the Senate Select Committee on the National Broadband Network

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Intelsat Submission to Senate Select Committee
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INTRODUCTION

Intelsat is pleased to provide this submission to the Senate Select Committee on the National Broadband Network.

Intelsat owns and operates an extensive fleet of geostationary communications satellites that span the globe. Our satellite fleet is utilised by our customers not only to bring broadband services directly to end user consumers, but also to carry video services around the globe, to connect enterprise networks, and to serve the military and other requirements of numerous governments, including the Commonwealth of Australia.

As Intelsat's expertise and experience lie within the satellite arena, our submission to the Senate Select Committee addresses the satellite-related issues of the NBN implementation. This submission does not address the terrestrial FTTP component of the NBN.

Satellite technologies are ideally suited to provide broadband services, especially to the more rural and remote areas. Satellite services are rapidly deployable, highly reliable, and cost-effective. Satellite services provide instant infrastructure, independent of distance or terrain. By their nature, satellite networks pass 100% of homes from day one of establishment of the network.

ABOUT INTELSAT

Intelsat is the world's leading provider of fixed satellite services (FSS). The company's customers include leading telecommunications companies, multinational corporations, Internet service providers, media broadcasters and government/military organisations. Intelsat's revenues in 2008 were approximately A$ 3B (US$ 2.4B). The company supplies voice, data and video connectivity in over 200 countries and territories for over 1,800 customers.

Intelsat is headquartered in Pembroke, Bermuda, with major operations in Washington, D.C., Atlanta, Georgia, and London, UK. Globally, Intelsat also has offices in Australia, Brazil, China, France, Germany, Hong Kong, India, Japan, Singapore, South Africa and the United Arab Emirates.

Intelsat and its predecessor organisations have been providing global satellite services since the mid-1960s. The first global television transmission of the Olympics was via an Intelsat satellite in 1968, and Intelsat has been instrumental in coverage of every Olympics since then, including Sydney in 2004 and Beijing in 2008.

Intelsat has long been, and remains today, the largest provider of FSS worldwide, and it is the leading provider of these services to each of the media, network services and telecom and government customer sectors. It provides these services via 50 owned satellites worldwide, covering 99% of the world's populated regions.

Intelsat is building for the future. Intelsat expects to launch 11 satellites between now and the end of 2012, five of which will provide new or replacement capacity in the Asia-Pacific region. Notably, of these 11 satellites, two will bring additional Ku-band capacity to Australia in 2011 and 2012.

Intelsat's services comprise:

- Capacity services: flexible, diverse satellite coverage and capacity options for point-to-point or point-to-multipoint services.

- GlobalConnex℠ managed services: a portfolio of global, integrated satellite and terrestrial network managed services to meet broadband, trunking and media requirements worldwide.

- Specialised services: Value-added and specialised services including disaster recovery, customer premise equipment programs, co-location services and consulting and technical management including support to satellite companies, organisations and governments.

Intelsat's activities in Australia include:

- In-country presence with customer support engineering, sales directors and the Regional Vice President for Asia-Pacific located at Intelsat's office in Sydney;

- Dedicated Ku payload over Australia on the existing IS-8 satellite, expanding with the IS-19 satellite which is currently under construction and is scheduled for launch in 2012;

- Additional Ku-band capacity offering coverage of Eastern Australia will be provided on the IS-18 satellite which is presently under construction and will be launched in 2011;

- Intelsat has held an Australian carrier licence (Intelsat Asia Carrier Services Inc.) since deregulation in 1997;

- Trusted and long-term provider of satellite based services to the Australian Department of Defence and the Department of Foreign Affairs and Trade;

- Intelsat is constructing a satellite which will carry an ultra-high frequency (UHF) payload which will be owned by the Australian Defence Force (ADF). The hosted UHF payload project will provide an enhanced tactical communications capability for ADF assets operating in the Indian Ocean Region. The hosted payload approach results in an extremely cost-effective capability for the ADF in comparison to the cost of a dedicated satellite.

In addition to its core FSS business, Intelsat has more than 25% ownership in WildBlue Communications, dating back to 2003. Intelsat recently invested additional equity to fund expansion of this rapidly growing business. WildBlue provides a high-speed Internet service

via satellite in North America; the company owns and operates a Ka-band multi-spot beam satellite and provides a retail service to consumers. WildBlue is believed to be the largest provider of Ka-band satellite-delivered broadband in the world.

Intelsat's Chief Executive Officer and Executive Vice President, Business Development and General Counsel, sit on the WildBlue Board and, as the only satellite industry investors, are extremely active in company governance. Over the years, Intelsat has proven invaluable in guiding the company and reducing technological and operational risk. Intelsat also operates one of the major gateways for the WildBlue Ka-band system from one of our teleports located in the United States.

TERMS OF REFERENCE

The Select Committee on the National Broadband Network has been established to inquire into:

a. The Government's decision to establish a company to build and operate a National Broadband Network (NBN) to:

i. connect 90 per cent of all Australian homes, schools and workplaces with optical fibre to the premise (FTTP) to enable broadband services with speeds of 100 megabits per second;

ii. connect all other premises in Australia with next generation wireless and satellite technologies to deliver broadband speeds of 12 megabits per second or more;

ii. directly support up to 25,000 local jobs every year, on average, over the eight year life of the project.

b. the implications of the NBN for consumers and taxpayers in terms of:
i. service availability, choice and costs,

ii. competition in telecommunications and broadband services, and

iii. likely consequences for national productivity, investment, economic growth, cost of living and social capital.

Overview

Intelsat supports the Government's decision to establish a company to build and operate a National Broadband Network.

The NBN specifies that FTTP technology will be used to provide 90% of Australian premises with broadband at speeds up to 100 Mbps. The NBN will address the remaining 10% of the Australian premises using wireless and satellite technologies at speeds of 12 Mbps.

Today, Intelsat is a major provider of broadband services via satellite to Internet Service Providers, enterprise users and residential broadband consumers in many parts of the world.

There are two main areas where satellite will be able to make a significant contribution to the NBN:

- The provision of NBN services directly to end consumers located in remote, rural and semi-rural settings; and

- The use of satellite to backhaul Internet content to wireless systems installed in distant townships and regional centres.

Intelsat does not operate a retail consumer business but rather is a provider of communications infrastructure to telecommunications carriers. Intelsat advocates that the NBN be established as an "open architecture" infrastructure capability for Australia, with the premise of open access to the NBN for multiple retail service providers and multiple ground system technology providers.

In an ideal implementation, the satellite service element of the NBN would see competing consumer service providers leverage in-orbit infrastructure assets with different ground segment equipment to provide service to consumers and enterprise level customers. The element of ground-based competition for broadband consumers will be key to the success of the NBN – service providers can offer differing broadband capabilities, different contention rates on services to arrive at varying price points and capabilities to enable consumer's to have a choice of broadband service offerings, download limits, etc.

Satellite Frequency Bands

In the following sections, reference is made to certain commonly used satellite frequency bands. To assist readers who are less familiar with satellite technology, the following descriptions of each band are provided for convenience:

- C-band services operate in the 4 & 6 GHz bands and cover wide geographic areas. C-band offers reliable service in higher rain-rate environments however, the disadvantage of C-band is the requirement for relatively larger antennas compared to those needed to provide equivalent services in Ku-band or Ka-band. A typical C-band satellite beam would cover the entire Asia-Pacific region. C-band satellites and services are in common use throughout the world today.

- Ku-band services operate in the 12 and 14 GHz bands and the coverage areas are smaller than those provided at C-band. Ku-band services can operate into smaller antennas than would be needed for an equivalent C-band service however, Ku-band services can be affected by rainfade and this factor must be taken into account during system and network design. A typical Ku-band beam would cover all of Australia. Ku-band satellites and services are in common use throughout the world today.

- Ka-band services operate in the 20 and 30 GHz bands and typically operate in spotbeams which are 200-300 km in diameter. The overall Ka-band payload consists of multiple spotbeams which are configured to provide contiguous coverage of a specific service area. A benefit of Ka-band payloads is that the frequency spectrum can be re-used multiple times across the coverage area, thus increasing the total amount of throughput that can be achieved from the payload in comparison to a traditional Ku-band design. Just as with Ku-band services, Ka-band services are also susceptible to rainfade and this factor must be taken in to account during system and network design. Commercial Ka-band services have recently commenced operation in several regions in the world – notably WildBlue in the United States is the largest Ka-band service provider today.

Network Architecture Considerations – Direct to Consumer

Intelsat believes that the direct-to-consumer user base for the satellite NBN can be broadly broken into two groups based on geographic location:

- The first group consists of those users who are in extremely isolated and remote locations which are well away from regional centres and metropolitan areas.

- The second, larger, user group is located in rural and semi-rural areas around regional cities and metropolitan areas. In a metropolitan and regional setting, satellite can efficiently and effectively fill-in gaps in the FTTP and wireless network thus avoiding the creation of blackspots in the NBN coverage.

Two classes of user can be expected in each of the above groups:

- home subscribers, who need a 'standard' retail broadband offering; and

- enterprise subscribers or heavy users, who may need a more robust service offering (i.e. higher speed upload capability, larger monthly download limit, etc).

Intelsat anticipates that two different classes of ground segment equipment may be needed to provide service to the different classes of users. The enterprise (or heavy user) will likely require equipment with enhanced performance in comparison to a standard internet user.

Given the population and the target data rate for the NBN, Intelsat believes that the direct-to-consumer element of the satellite NBN will require two multi-spotbeam Ka-band satellite payloads to serve the Australian geography. These advanced payloads would deliver service into multiple high power spotbeams providing contiguous coverage across the desired service area:

- High power spotbeams enhance overall network efficiency and facilitate higher throughput rates with smaller antenna systems.

- The spotbeam design is needed in order to allow the frequency spectrum to be re-used in multiple locations across Australia.

- Frequency re-use is needed in order to provide the overall throughput that will be needed to meet the demands of the population of users.

Further analysis is needed to determine the optimum satellite configuration for the direct-to-consumer satellite NBN. Factors to be considered include the spotbeam configuration, specific geographic areas to be covered and the location and number of hub stations. The NBN Implementation Study will need to examine these issues in detail to be able to determine the actual throughput that needs to be provided from the Ka-band payloads.

Truly remote users (e.g. isolated homesteads located in the Simpson Desert or across the Nullarbor Plain) could be served using traditional Ku-band satellites which provide coverage of broader geographic areas. It would be uneconomical and wasteful of satellite resources to design the advanced multi-spotbeam payloads to provide coverage of these truly remote locations.

The stated NBN target of 12 Mbps to the consumer is a challenging design criteria. Satellite broadband networks in existence today provide much lower speeds to end-users. However, recent advancements in ground systems technology will facilitate the provision of higher speed services.

Broadband access platforms are shared by a large number of users. In designing these systems, it is assumed that not all users are active simultaneously. In addition, the level of activity per user will also fluctuate over time. By their nature, just as with terrestrial consumer internet services, satellite delivered consumer internet services are shared amongst a number of individual users. A key consideration in the overall system design is the level of oversubscription of the shared service – oversubscriptions in the order of 50:1 (or greater) are not uncommon in such designs. During periods of low user activity, those active users will experience a faster internet service than they may experience during peak periods.

These oversubscription design assumptions enable the service provider to offer an affordable service that meets the requirements of the users. Especially in remote and rural areas, access to an always-on broadband service is potentially more important than whether the service hits a particular speed benchmark. Depending on the type of end user (enterprise, small business, residential, mobile users, etc.) data rates starting from a few hundred kbps might be sufficient – at least in the initial phases of the NBN rollout.

The NBN Implementation Study will need to consider a wide range of issues relating to satellite delivery direct-to-consumers. These issues include, but should not be limited to:

- dimensioning the satellite NBN user community in terms of number of users and the upload and download data speeds needed per user;
- analysis of quality of service requirements for different user groups – i.e. different categories of home users and enterprise users;
- determining appropriate oversubscription ratios;
- system design and cost estimates for the space segment and hub earth station resources needed for the project; and
- cost estimates for the supply and installation of end-user consumer and enterprise premise equipment.

As part of its core business activities, Intelsat designs and procures satellites and contracts for satellite launch services. Intelsat then operates the satellite in-orbit throughout its economic lifecycle. Intelsat has extensive experience in the design and implementation of the space segment and of the ground segment elements of satellite communication systems.

Given this expertise and experience, Intelsat is extremely well placed to assist in further development of the direct-to-consumer element of the NBN implementation.

Network Architecture Considerations – Backhaul to Wireless systems

In addition to the delivery of service directly to consumers, satellite can be readily utilised for the backhaul of internet content. Satellite internet trunks can be used to feed wireless points-of-presence (POPs) in remote locations – when configured correctly and in areas of flat terrain, these wireless POPs can reach users many kilometers from the base station location. This could be an effective implementation for reaching communities where 50-100 users might be expected. Wireless technology relies on line-of-sight between the user's premise and the base station – in some locations the terrain will limit the geographic coverage of each wireless POP.

Intelsat is already engaged in the provision of satellite delivered internet trunks in many countries around the world and believes that satellite delivered internet trunking is an applicable backhaul technology for elements of the NBN infrastructure. In contrast to the direct-to-consumer services discussed above, internet trunking is typically done in either C-band or Ku-band frequencies and with dedicated high bandwidth links.

The use of satellite to provide backhaul links to wireless systems in remote locations in Australia would facilitate the faster roll-out of broadband services to the Australian population. Satellite is a terrain and distance insensitive technology. Satellite delivered internet trunks could be used to quickly establish wireless POPs for regional towns where fibre backhaul will ultimately be provided. Satellite can facilitate the 'leapfrogging' of implementation schedules by allowing an interim service to be established in regional centres while the installation of the backhaul fibre takes place.

Intelsat has vast experience in the trunking of internet via satellite and would be pleased to provide further information on this aspect of the NBN implementation.

Frequency Spectrum Considerations

In order to provide the broadband satellite services referred to above, or any other satellite services including but not limited to corporate network services, emergency services, telemedicine, etc., it is crucial that Australia keep in mind the importance that frequency management plays in satellite services, in particular when allocating and managing frequency assignments.

Intelsat has the largest number of Ku-band orbital locations of any company in the world. Intelsat has also worked closely with Australian authorities on Ka-band slot matters, and

stands ready to facilitate ITU filings and intersystem coordination to ensure the availability of adequate Ka-band spectrum for the NBN.

With the growing desire to deploy new and emerging terrestrial wireless access services in frequency bands traditionally used by satellite services, satellite services are increasingly facing harmful interference from these new systems, as well as redeployments to other frequency bands. In addition, the current discussions in Australia regarding the physical relocation of satellite antennas currently installed on customer premises throughout the country to "satellite parks" has generated great concern in the satellite industry, in particular because one of the main advantages of satellite services -- namely, being able to provide the service directly to the customer premise – may be severely curtailed.

We note that Intelsat, both directly via its subsidiary Intelsat Asia Carrier Services Inc. as well as via industry associations such as the Australian Space Industry Chamber of Commerce (ASICC), the Global VSAT Forum (GVF) and the Cable & Satellite Broadcasting Association of Asia (CASBAA), has provided input into consultations conducted by the Australian Communications and Media Authority (ACMA) and the Department of Broadband, Communications and the Digital Economy (DBCDE) on these issues of importance to the satellite industry.

Intelsat stands ready to participate in all aspects of the Senate Select Inquiry and also in the NBN Implementation Study.