APPENDIX 2

Canadian Satellite Capacity and Services Plan

(IC Licence No. 2)

APPLICANT: Telesat Canada

Pursuant to Canada Gazette Notice DGRB-001-06, Telesat is pleased to provide the following Canadian Satellite Capacity and Services Plan for its proposed 17 GHz satellite, BSS3, at the 72.5°WL orbital location.

Introduction

As part of each application, applicants are to provide a stand-alone Canadian Satellite Capacity and Services Plan which will be posted on Industry Canada’s website for public comment. These plans are to include:

- a description of the consultation undertaken with Canadian satellite users in the development of the plan
- the requirements for capacity and services being addressed
- the amount and characteristics of the satellite capacity that will be available to the Canadian market over the lifetime of the satellite project
- a description of the mechanisms or processes the applicant will use to make capacity and services available to Canadian satellite users

To address anticipated intermediate and longer term demand requirements in the Canadian BSS neighbourhood, Telesat is proposing the phased launch, in 2012, 2014 and 2016, of three 17 GHz satellites, into the 86.5°, 82° and 72.5° WL orbital positions. An overview of Telesat’s plan involving BSS3 at 72.5°WL follows.
A Description of the Consultation Undertaken

Shortly after Industry Canada issued the *Call for Applications to Licence Satellite Orbital Positions* in July of this year, Telesat contacted its Canadian Broadcasting, Business and Government customers, informing them of this event and requesting a follow-up meeting to discuss the *Call* in more detail and their long-term satellite requirements in all frequency bands addressed in the *Call*. Various Canadian industry groups and associations (e.g., CSUA, Canadian Association of Broadcasters (CAB), and Canadian Cable System Alliance (CCSA)) were contacted at the same time for the same basic purpose. Telesat also reviewed the Canadian Satellite User Registration List posted on Industry Canada’s website in response to the *Call* to make sure that all parties on that list were directly contacted in regard to their capacity requirements as well.

At the preliminary meetings that were held with these satellite service users and industry associations, the primary focus was on recent developments in the industry (including details of the *Call*), key issues facing the industry or likely to arise in the foreseeable future, and the customers’ anticipated medium and long-term capacity needs and growth requirements. Telesat intentionally avoided discussing in detail any specific capacity expansion plans of its own at these meetings. Indeed, at the time of these initial meetings, Telesat had no firm plan as to precisely how many, or which authorizations it should apply for in response to the *Call*. For Telesat, the primary intent of these meetings was to get a better understanding of where its customers thought the industry was heading and what capacity, at what frequency bands, they might need to meet these challenges and growth opportunities. The CSUA assisted in this information gathering and exchange process by issuing a memo to potential applicants providing “broad gauge estimates” concerning the collective demand requirements of its members.

With this better understanding of customers’ requirements, Telesat then formulated its preliminary plan for which positions would best meet its customers’ anticipated requirements and what would be required to implement this plan (e.g., financing, customer commitments, basic satellite design, etc.).

In subsequent meetings with individual customers who expressed an interest in further discussions, Telesat presented details on its preliminary plan that were relevant to that particular customer. Telesat did this to ensure that it was on track to fully address that customer’s specific requirements, or to revise or fine-tune the plan as appropriate.
With more specific plans on the table, Telesat and the customer were also in a better position to explore the level of commitment the customer was prepared to make at this time to make the proposed plan a reality. Telesat also had subsequent discussions regarding its overall satellite plans with the CSUA.

Based on the customer information provided in these discussions, Telesat’s own analysis of future broadcasting industry capacity requirements, and the level of commitment received from prospective customers, Telesat then finalized its plans for the authorizations requested in response to the Call.

It was during these customer consultations that Bell ExpressVu voiced a strong interest in using the 17 GHz BSS frequencies in this neighbourhood, to expand and augment its existing BSS business. Telesat and Bell ExpressVu subsequently reached an agreement under which Bell ExpressVu will provide exclusive support to Telesat in its efforts to secure 17 GHz BSS authorizations in this Canadian broadcasting satellite neighbourhood. The two companies will continue to work closely to conclude and implement capacity arrangements that will fully address Bell ExpressVu’s long term BSS requirements in this neighbourhood.

**B Requirements for 17 GHz BSS Capacity and Service at the 72.5°WL Position**

The 91.1° and 82°WL orbital positions currently constitute Canada’s core BSS neighbourhood, and this neighbourhood will soon be expanded to include the 72.7°WL position. Telesat launched Canada’s first BSS satellite, Nimiq 1, into the 91.1°WL position in May 1999, with all capacity on the satellite sold to Bell ExpressVu. Shortly thereafter, Bell ExpressVu’s existing DTH service was migrated from an Anik E (FSS) platform to the Nimiq 1 (12 GHz BSS) platform. With the phenomenal growth of this service it soon became apparent that a single BSS satellite would not be enough to satisfy this customer’s capacity requirements. It was also recognized that a single BSS satellite left this customer – and its approximately one-million Canadian end-user subscribers at that time – in an extremely vulnerable position in the event of a satellite failure or malfunction. To address these critical service expansion and emergency back-up and restoration requirements, Telesat launched a second 12 GHz BSS satellite, Nimiq 2, in December 2002. Nimiq 2 is currently in operation at the 82°WL position with all capacity again taken by Bell ExpressVu.
Nimiq 2 suffered a partial failure shortly after going into commercial service and as a result can no longer operate using the full complement of 32 BSS frequencies in the 12 GHz BSS band available at its orbital location. This prompted Telesat to acquire two spare in-orbit 12 GHz BSS satellites from a U.S. service provider. These satellites were re-named Nimiq 3 and 4i, with the former currently co-located with Nimiq 2 at 82°WL and the latter co-located with Nimiq 1 at the 91.1°WL position. These additional satellites currently allow Bell ExpressVu to use almost all of the BSS frequencies available at each of these locations (with some transponders operated in high power mode to enhance the service capacity), and provide in-orbit, on-station emergency back-up and restoration capabilities for this customer’s service.

The Bell ExpressVu DTH service carried by Telesat’s four Nimiq satellites at these two orbital positions now consists of several hundred programming channels (including some 30 HDTV services), delivered to a customer base now approaching 1.8 million Canadian subscribers. A large number of cable television companies located all across Canada also rely on delivery of these programming signals to their headends as part of Bell ExpressVu’s satellite relay distribution undertaking (SRDU) service.

With virtually all of the 12 GHz BSS capacity at the 91.1° and 82°WL positions now being used, Canadian interest in this band at the 72.7°WL position is growing. Telesat currently operates DTV 1 on an interim basis at this position to provide DTH service into the U.S. by an American service provider, and will be launching a new 12 GHz BSS satellite, Nimiq 5, into this position near the end of the decade. Bell ExpressVu recently committed to taking all capacity on Nimiq 5, and has also indicated an interest in gaining access to capacity at this position on an interim satellite until the new satellite is available.¹

The 72.7°WL position will therefore become an integral part of the Canadian BSS neighbourhood. Further capacity expansion in this neighbourhood will therefore require the development of other suitable frequency bands. The ideal candidate for this expansion in this BSS neighbourhood is the 17 GHz BSS band, as evidenced by the strong interest shown by Bell ExpressVu.

¹ See Comments of Bell Canada re Broadcasting Public Notice CRTC 2006-72, 1 September 2006, at ¶ 36.
Demand Drivers

A variety of factors and industry developments are fuelling the demand for significant new BSS capacity. New technologies, for example, are fundamentally changing the way people watch television and enhancing their viewing experience, giving rise to the expectation among consumers that they can have access to an ever growing number of these services ‘any time, any place and on any device’ they find to be most convenient at the moment.

For instance, new mobile phones and other portable devices are being developed that allow people to watch video content – from downloading and streaming to full broadcasting – ‘any place’ they want. New satellite/terrestrial hybrid networks for the delivery of mobile television services are starting to appear in the U.S. (e.g., Modeo, Hiwire and MobiTV).

These services are also being widely tested and have reached commercialization in Europe and Asia, most notably in Digital Video Broadcasting Handheld (DVB-H) standard over terrestrial networks. SES Global and Eutelsat Communications recently announced plans to establish a joint venture company to provide the first European satellite infrastructure for delivering video broadcasting and other services to mobile devices, including wireless phones, PDAs, laptops and vehicle receivers, using the S-band payload on a satellite to be launched in 2009. As these satellite operators noted, mobile services represent a large and currently underdeveloped market, and a market which is ideally suited for the universal coverage benefit a satellite solution can offer. Indeed, independent research studies predict that worldwide demand for mobile broadcasting services may reach 108 million subscribers by 2010 or soon thereafter, with close to 50 million of those subscribers located in North America and a revenue potential approaching $5 billion.

Similarly, video-on-demand (VOD) services are increasingly allowing people to watch their programming choices ‘any time’ they want. These services have been available for some time in North America but the market has been slow to develop. However, this appears to be changing as more service providers with more content have been entering the market, and as the ‘any time’ nature of this service is becoming a more appealing and better fit with the viewing needs of time-strapped consumers.

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2 SES and Eutelsat Announce Joint Investment to Serve Markets for Mobile Broadcasting and Other Communications Services in Europe, REDORBIT NEWS (30 October 2006)
3 Northern Sky Research, Mobile TV 2006 (February 2006)
It is forecast that the North American VOD market will be worth approximately $3.9 billion by 2010, with Canadian revenues, prorated by market size, to account for some $370 to $390 million of that total.\textsuperscript{4}

The television viewing experience is being further augmented by the proliferation of other new broadcasting services, providing an ever wider range of specialty programming and more choice of programming within the various specialty genres. The CRTC decision to licence Category 2 digital specialty services on a more competitive, open-entry basis sparked much of this increase in programming options and it is continuing unabated. Indeed, as shown in Table 2-B1, since 2002 the number of new Category 2 digital specialty services that have been licensed has more than doubled, going from 32 to 75 services.

It should be further noted that the number of Category 2 specialty services identified in Table 2-B1 are those that have actually launched, whereas the total number of these services that have been authorized by the Commission now run into the several hundred. Two of the main reasons why so many of these services have so far failed to launch are lack of financing and lack of distribution capacity. However, the availability of new spectrum resources (e.g., the 17 GHz BSS band) will mitigate this latter constraint, at least for satellite DTH and SRDU services. To remain competitive with DTH service providers, cable TV and other terrestrial companies will also be forced to find new capacity to carry more of these new services over their facilities and to augment their subscription to SRDU services.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|c|}
\hline
\hline
\textbf{Canadian Conventional (over-the-air):} & & & & & \\
National public broadcaster (CBC) & 31 & 28 & 25 & 40 & 46 \\
Private Commercial & 101 & 101 & 100 & 91 & 81 \\
Religious & 5 & 5 & 5 & 5 & 5 \\
Educational & 7 & 7 & 7 & 7 & 7 \\
Aboriginal & 9 & 10 & 10 & 10 & 10 \\
Transitional digital & 14 & 11 & 9 & - & - \\
\hline
\textbf{Canadian Specialty, Pay, PPV & VOD:} & 49 & 49 & 49 & 49 & 51 \\
\hline
\end{tabular}
\caption{Television Services Available in Canada - 2002-2006}
\end{table}

\textsuperscript{4} Pricewaterhouse Coopers Annual Entertainment and Media Report (2006)}
<table>
<thead>
<tr>
<th>Service Type</th>
<th>2006</th>
<th>2005</th>
<th>2004</th>
<th>2003</th>
<th>2002</th>
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<tr>
<td>Analog specialty services</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>15</td>
<td>16</td>
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<tr>
<td>Category 1 digital specialty services</td>
<td>75</td>
<td>58</td>
<td>48</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>Category 2 digital specialty services</td>
<td>12</td>
<td>12</td>
<td>7</td>
<td>8</td>
<td>7</td>
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<td>Pay television</td>
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<td>12</td>
</tr>
<tr>
<td>PPV (DTH &amp; terrestrial)</td>
<td>13</td>
<td>13</td>
<td>11</td>
<td>9</td>
<td>4</td>
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<td>VOD services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Canadian Services:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community channels</td>
<td>166</td>
<td>235</td>
<td>235</td>
<td>251</td>
<td>246</td>
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<tr>
<td>Community programming services</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>House of Commons – CPAC</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Non-Canadian Services:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Canadian satellite services authorized for distribution in Canada</td>
<td>134</td>
<td>108</td>
<td>107</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td><strong>Total Number of Television Services</strong></td>
<td>659</td>
<td>679</td>
<td>657</td>
<td>631</td>
<td>610</td>
</tr>
<tr>
<td><strong>Total Number of Television Services Net of Community Channels &amp; Community Programming Services</strong></td>
<td>481</td>
<td>433</td>
<td>410</td>
<td>380</td>
<td>364</td>
</tr>
</tbody>
</table>

**Source:** CRTC Broadcasting Policy Monitoring Reports
Similarly, the number of non-Canadian satellite services (many of which are carried on Telesat satellites as part of Canadian DTH and SRDU service packages) has risen from 93 to 134, a 44 percent increase, over this same 2002 to 2006 time period. Moreover, although the total number of television services available in Canada has only been creeping up since 2002, if local community channels and programming services are netted out of this total to better reflect national or regional viewing options (and carriage opportunities for satellite), then the number of available services has actually risen dramatically from 364 to 481, an increase of 117 services, or just over 32 percent.

With its vastly superior picture and sound quality, television programming in High Definition TV (HDTV) format will also greatly enhance the viewing experience for consumers. Indeed, while at present only some 30 channels in a channel universe numbering in the several hundred are being broadcast in Canada in HDTV format by the major BDUs, Canadian viewers are fast embracing this technology and looking for more HDTV content. As of September 2006 it is estimated that approximately 2.6 million Canadian households have purchased HD television sets and this number is expected to jump to more than 8 million households by 2009.5

Wholesale conversion to HDTV format is therefore a trend that Canadian broadcasters and BDUs can ill afford to miss or ignore, and it does not appear that they have done so. As shown in Table 2-B2, information supplied in the consultation process by the CSUA, as agreed to by its members, confirms that the Canadian broadcasting industry is gearing up for the complete conversion to HDTV format.

<table>
<thead>
<tr>
<th>Table 2-B2</th>
<th>CSUA HDTV Demand Estimate Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timeframe</strong></td>
<td><strong>Conversion of Existing Channels to HD</strong></td>
</tr>
<tr>
<td>Next 2-3 years:</td>
<td>30-50 %</td>
</tr>
<tr>
<td>In 5 years:</td>
<td>75 %</td>
</tr>
<tr>
<td>In 10 years:</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Canadian Cable Telecommunications Association (November 2005)
There are thus three principal drivers of new capacity demand which will largely have to be addressed using new BSS frequencies in this broadcasting neighbourhood, and this total new demand requirement promises to be huge:

- **Conversion of the existing base of programming services to HD format:** While the HDTV picture quality is vastly superior to that of Standard Definition TV (SDTV), the total transponder capacity required to effect the full conversion of Bell ExpressVu’s existing base of programming signals to HD format will be enormous and will dominate new BSS satellite capacity requirements over the next several years. Specifically, a transponder can transmit up to a maximum of 10 to 12 SDTV channels, but this number drops to 1 to 2 HDTV channels using current transmission standards (MPEG 2 with DVB-S). This number will likely increase to a maximum of only 4 to 6 channels per transponder with the full development and deployment of next generation transmission standards (MPEG 4-AVC or H.264 with DVB-S2). Depending on the mix of transmission standards actually used, the HDTV conversion will therefore require, at the very least, twice as many transponders to handle today’s number of signals than are currently used to transmit these signals in SDTV format. Requirements for dual illumination of channels (i.e., simulcasting in SD and HD) through the transition period will add further to the overall capacity requirement and likely slow the conversion process until new capacity becomes available.

- **Growth in the existing base of programming services:** Over the past several years the base of available programming services (net of community channels and programming services) has been steadily growing, with no suggestion that this trend is about to end or reverse itself any time soon. Indeed, over the past four years some 117 new services have been added to this total, averaging close to 30 new services a year. If this trend continues, then, even assuming conservatively that most would launch in SDTV format, an additional two to three transponders per year will be required to transmit the additional new services. And while it is true that a significant number of the newly authorized services may never be launched commercially, the eventual conversion into HDTV format of those that are will again drive this capacity requirement upwards.

- **Development and deployment of new broadcasting services:** Mobile television is a new broadcasting application that is evolving into a must-have consumer service, particularly among certain segments of the consuming public. Terrestrial networks have so far been able to accommodate the bulk of the carriage requirements associated with this emerging service, but the expectation is that satellite, with its inherent advantages in the delivery of broadcasting services over wide geographic areas, will have a prominent role to play in the carriage of these services, likely as part of a hybrid network.
As these satellite/hybrid networks are still in the early stages of development, it is difficult to precisely forecast satellite capacity requirements at this time. That said, HD format will likely be the industry standard; consequently, even if service providers were to start by offering only a limited number of programming services and add more as the market develops, whole transponder capacity requirements will quickly mount up.

Taken together these drivers indicate that substantial new Canadian BSS capacity demand will materialize over the next several years and will require the phased introduction of new satellite capacity in the 17 GHz BSS band at a number of orbital locations, and particularly in Canada’s established BSS neighbourhood stretching from 91.1° to 72.7°WL.

\textbf{C Telesat’s 17 GHz BSS Capacity and Service Plan for the 72.5°WL Position}

Telesat’s 12 GHz BSS Nimiq satellites enabled Bell ExpressVu to introduce affordable DTH and SRDU services to all areas of Canada, the far North included. They have helped establish the 91.1° and 82°WL positions as a Canadian broadcasting neighbourhood where several hundred programming signals are currently being delivered to some 1.8 million Canadian DTH subscribers and hundreds of cable television company headends.

As noted above, Telesat and Bell ExpressVu are in the process of expanding this Canadian neighbourhood to include the 72.7°WL 12 GHz BSS position where Nimiq 5 will go into service for Bell ExpressVu’s use by 2010. All available 12 GHz BSS capacity at these three orbital locations is therefore committed, with full utilization of this capacity expected to be reached in the first few years of Nimiq 5 going into service. Expansion capacity in a complementary band, such as 17 GHz BSS, will therefore need to be introduced and developed in a timely manner to address the huge emerging demand requirement identified above.

Experience has shown that a single-satellite solution to meet all demand requirements in a given frequency band is not optimal. It leaves service providers and their customers in an extremely vulnerable position should that one satellite malfunction or fail completely. This is an especially troublesome situation where, as in the present case, the satellite service involves DTH and the end-user customer number is in the millions.
As a significant number of these Canadian DTH customers would be in rural and remote areas where there is no terrestrial service alternative, a satellite malfunction could mean that these customers would be deprived of television service completely, with little likelihood of having their service quickly restored. Satellite diversity and emergency back-up is therefore a critical component of any responsible Canadian satellite service plan.

The priority and main thrust of Telesat’s 17 GHz BSS capacity and service plan for the 86.5°WL position, in combination with the 82° and 72.5°WL positions, is therefore to meet these two requirements head on, and specifically to provide:

- phased-in growth capacity at the three orbital positions comprising this Canadian broadcasting neighbourhood
- a back-up scenario in the event of a catastrophic failure or serious degradation in a 17 GHz BSS satellite at any of these positions

**Growth Capacity**

To address the identified new BSS capacity requirements in this Canadian broadcasting neighbourhood, Telesat is proposing to launch four new 32-transponder BSS satellites, phased in over the next 10 years.

Nimiq 5, a 12 GHz BSS satellite which Telesat is already authorized to launch into the 72.5°WL position, would be the first of the four satellites to go into service. Bell ExpressVu recently committed to taking all capacity on this satellite and thus will have access to 32 new BSS transponders for Canadian customer use in this neighbourhood. This new capacity, with traffic allocated by Bell ExpressVu across this and the other Nimiq (12 GHz BSS) satellites as appropriate, is more than sufficient to accommodate CSUA’s demand estimate for HDTV conversion of ‘30-50% of channels’ by 2010. Based on aggressive assumptions regarding the deployment of next generation transmission standards, Telesat estimates that the equivalent of approximately 29 of these 32 new transponders will be needed by that time to fulfill this conversion estimate to the 50 percent level. The capacity of the three remaining transponders would be available to serve the other new sources of Canadian demand identified above (i.e., to launch new programming services, or for use with new applications such as mobile TV), or to accelerate the HDTV conversion process.
Telesat’s first 17 GHz BSS satellite (BSS1) in this Canadian broadcasting neighbourhood would go into service in early 2012 at the 86.5°WL position. This will introduce another 32 transponders of BSS capacity into this neighbourhood. Telesat estimates that the new capacity on this satellite would be sufficient to satisfy CSUA’s demand estimate for HDTV conversion of ‘75% of channels in 5 years time’, possibly leaving up to 16 of the new transponders available to address the other identified new Canadian capacity requirements or to accelerate the HDTV conversion process. Realistically, however, business decisions or on-going regulatory requirements concerning simulcasting of television programming in SD and HD format will impact the maximum number of transponders that would remain available to address these other new demands.

Telesat would launch its second proposed 17 GHz BSS satellite (BSS2) into the 82°WL position to commence service in 2014, and its third (BSS3) into the 72.5°WL position to commence service in 2016. The capacity of these two additional satellites would be sufficient to meet the CSUA’s demand estimate for complete conversion to HD format of the existing base of programming signals ‘in 10 years time’, leaving approximately half of new capacity available to address the other new Canadian demand requirements mentioned above. Again, however, simulcasting requirements will impact the actual number of new transponders available to address these other demands.

Table 2-C1 summarizes this matching of Canadian demand for additional BSS spectrum in this Canadian broadcasting neighbourhood with the phased introduction of the four new satellites.
Table 2-C1  Phased BSS Capacity Introduction in the 91°-72.5°WL Neighbourhood

<table>
<thead>
<tr>
<th>Year</th>
<th>New Satellite In Service</th>
<th>New Transponders Available</th>
<th>CSUA HDTV Conversion Target*</th>
<th>New Transponders Required to Meet CSUA HDTV Conversion Target**</th>
<th>New Transponders Available to Address Other Demands (Including Simulcasting)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(band/location)</td>
<td>(Cumulative)</td>
<td>(Cumulative)</td>
<td>(Cumulative)</td>
<td>(Cumulative)</td>
</tr>
<tr>
<td>2010</td>
<td>Nimiq 5 (12 GHz/72.7°WL)</td>
<td>32</td>
<td>50 %</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>2012</td>
<td>BSS1 (17 GHz/86.5°WL)</td>
<td>64</td>
<td>75 %</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>2014</td>
<td>BSS2 (17 GHz/82°WL)</td>
<td>96</td>
<td>85 %</td>
<td>56</td>
<td>40</td>
</tr>
<tr>
<td>2016</td>
<td>BSS3 (17GHz/72.5°WL)</td>
<td>128</td>
<td>100 %</td>
<td>71</td>
<td>57</td>
</tr>
</tbody>
</table>

* CSUA did not provide a specific HDTV conversion target for 2014. The 85% target is an estimate, consistent with the target percentage progression provided by CSUA, as to the extent of the HD conversion that should be complete by this date.

** The underlying assumptions on technology adoption through the HDTV conversion process were as follows: MPEG-2 & DVB-S used to convert 25% of the CSUA target number of signals in 2010 (i.e., 25% of the target level of 50%), dropping to 20% to meet the conversion target in the subsequent years shown, at 2 signals/transponder; MPEG-4 & DVB S2 used to convert 75% of the CSUA target number of signals in 2010 (i.e., 75% of the target level of 50%), increasing to 80% to meet the conversion target in the subsequent years shown, at 5 signals/transponder.

The 57 transponders shown cumulatively as available over and above the HD conversion process would be introduced staggered over a six year period (i.e., starting in 2010 following the launch of Nimiq 5 and ending in 2016 with the launch of BSS3). Over this timeframe some of these transponders would be required to simulcast television programming.

However, a significant number of these transponders would remain available to address new Canadian demand requirements, including the launch of new programming services, which the CRTC is currently licencing at a rate of close to 30 new services a year, and new broadcasting applications such as mobile TV.
Should no Canadian requirement for some portion of these available transponders at any of these locations materialize, Telesat would consider marketing them outside of Canada. However, Telesat’s proposed phased introduction of new capacity in this neighbourhood with four new BSS satellites appropriately spaced over the next ten years best ensures that this capacity will be used to the maximum extent possible to meet Canadian broadcasting industry requirements. Launching new satellites into each of these positions in a shorter timeframe, let alone all at once, would simply swamp the then current Canadian demand requirements and lead to a much greater portion of this capacity having to be marketed outside of Canada, with little likelihood of it ever being repatriated.

**Satellite Design and Coverage**

The three 17 GHz BSS satellites Telesat proposes to build to fulfill Canadian demand requirements in this neighbourhood would be virtually identical. Each would carry 32 27 MHz BSS transponders, using the 24.75 to 25.25 GHz spectrum on the uplink and 17.3 to 17.8 GHz on the downlink. The full 500 MHz of spectrum, in both polarizations, at each of these positions would therefore be used. The satellites would be designed for 15 year service lives. Construction of each satellite through to in-orbit delivery would take approximately 30 months from the date of contract signature with the satellite manufacturer.

![EIRP Coverage of Canada at 72.5°WL](image)

**Figure 2-C1**  
EIRP Coverage of Canada at 72.5°WL
The coverage pattern for BSS3 located at its proposed position of 72.5°WL is shown in Figure 2-C1. Each of the new satellites would be designed for optimal coverage of all areas of Canada from its orbital position. However, the beam coverage on each of these satellites will be switchable between the Canadian and (continental) U.S. footprint, on a transponder-by-transponder basis. This design will provide the maximum flexibility for Telesat to provide service on any of these satellites to one or more U.S. customers should there be any capacity surplus to the needs of Canadian customers.

Allowing non-Canadian customers to access such surplus capacity spreads satellite construction and operation costs over a broader base, and thus will make the capacity used by Canadian customers even more affordable.

**Marketing Approach**

Regarding the marketing of 17 GHz BSS capacity at the three orbital locations, Telesat is following the same approach it has used in the marketing of DTH capacity on the Nimiq and Anik satellites. Under this approach customers have generally committed to taking blocks of capacity, under long term contracts, to develop their own end-user service. This approach has proven extremely successful in the development of DTH markets in Canada.

As indicated above, Bell ExpressVu has expressed a strong interest in taking all the capacity on the BSS1 satellite launched into the 86.5°WL position, and possibly at other 17 GHz BSS positions in the neighbourhood, including the 72.5°WL position. Telesat is working to fully accommodate this customer’s requirements.

As also indicated above, in the event that capacity surplus to Bell ExpressVu’s or other Canadian customers’ requirements remains on a planned satellite, that capacity will be made available to a U.S. customer(s) based on the same marketing approach (i.e., sale of blocks of unused transponders).

**Other Near-Term BSS Capacity Enhancements**

In addition to procuring four new state-of-the-art 12 and 17 GHz BSS satellites for the 86.5°, 82° and 72.5°WL orbital positions to satisfy growth requirements, there are other important elements in Telesat’s overall plan to effectively develop this neighbourhood for the immediate and long term benefit of the Canadian broadcasting industry.

The 17 GHz BSS frequency band is a new band and so there are no spare in-orbit satellites operating in this band that Telesat can acquire for interim use at any of these positions.
However, Telesat has acquired spare 12 GHz BSS satellites over the past few years to maximize the number of BSS frequencies in this band available for use in Canada at the 91.1° and 82°WL positions (Nimiq 4i and Nimiq 3 respectively) and/or to enhance service performance of the BSS signals at these positions.

Moreover, Telesat has a state-of-the-art replacement 12 GHz BSS satellite under construction (Nimiq 4) scheduled for launch in 2008 into the 82°WL position. In addition to the full complement of 32 BSS transponders, this satellite is being equipped with 8 Ka-band transponders which could also be used in the delivery of Bell ExpressVu’s BSS service.

Telesat is also very active in the development of new technologies and improved compression and modulation techniques geared towards enabling service providers to increase the number of TV signals on a satellite per unit of bandwidth. This development is continuing and promises to allow service providers to add new television services without compromising digital quality.

This increased efficiency would also translate into significant cost reductions for broadcast distributors and programmers and would assist their transition to HDTV format in the near term while capacity remains tight. However, as Bell ExpressVu has observed, even with the adoption of these more efficient techniques, there will still be a need for more satellite capacity to accommodate Canadian broadcasters’ transition to HD.6

**Satellite Diversity and Emergency Back-up**

Over the years customers have consistently voiced concerns that single-satellite approaches to satisfying their capacity needs can leave them in an extremely vulnerable position. Should anything go wrong with the one satellite, their entire business on that satellite could be irreversibly lost or take years to re-establish. This concern is particularly troublesome for individual broadcasters and broadcasting distribution undertakings requiring large blocks of capacity or whole satellites for their service, as finding sufficient capacity capable of satisfying their immediate requirements from another operator on such short notice would be extremely difficult, if at all possible.

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6 See Comments of Bell Canada re Broadcasting Public Notice CRTC 2006-72, 1 September 2006, at ¶ 36.
In the development of new frequency bands, the likelihood of finding suitable emergency or back-up capacity from another source is further diminished by the fact that there will be few operating satellites in the new band. Indeed, in the case of 17 GHz BSS, no satellite operating in this band has yet been built, or to Telesat’s knowledge is currently under construction.

Dealing with an operator that can offer satellite diversity and emergency back-up is therefore an important customer consideration, and in the present context of 17 GHz BSS can only be addressed if the operator launches more than one satellite in a short timeframe. This is precisely what Telesat is proposing under its plan to launch three such satellites into the 86.5°, 82° and 72.5°WL 17 GHz BSS positions. As described above, Telesat’s plan is to launch its BSS1 17 GHz BSS satellite into the 86.5°WL position in 2012, as this is the preferred initial position of its customer Bell ExpressVu.

Within two years of that date, Telesat would launch its second 17 GHz BSS satellite, BSS2, into the 82°WL position to back-up BSS1. Within another two years, BSS3 would be launched into the 72.5°WL 17 GHz BSS position, providing critical back-up for both BSS1 and BSS2, as well as for service expansion in its own right.

Telesat will therefore have three full-capacity 17 GHz BSS satellites in service in the 86.5°, 82° and 72.5°WL neighbourhood within the space of four years. A failure or significant malfunction of any of these satellites would be damaging but contingency arrangements could be implemented to mitigate the impact of the problem. Without this satellite diversity and back-up, options would be severely limited, if available at all, and a failure or significant malfunction of a single-service satellite in this neighbourhood could devastate a service provider’s business and leave its end-user customers without a 17 GHz BSS service.

**Other Customer Requirements Addressed**

During the consultation process undertaken by Telesat, a number of parties expressed the importance of continued access to reliable and reasonably priced satellite communications services. In response, Telesat would note that, with a network service availability performance level that has consistently been above 99.9 percent, it has established itself as one of the most reliable satellite operators in the world.
Telesat has also established itself as being a low-cost supplier of satellite services, and its transponder capacity prices remain amongst the most competitive in the North American marketplace. Perhaps more importantly, Canada has always been Telesat’s core base of operations and most important market. Telesat has no intention of risking its position in this market, as would occur if it were to abandon its commitment to being the low-cost supplier of reliable satellite services to all areas of Canada.

D Procedure for Customers to Obtain Capacity/Services

Telesat will operate its proposed 17 GHz BSS satellites as a Canadian telecommunications common carrier, offering service from each of these satellites on a non-discriminatory, first-come, first-served basis. This first-come, first-served capacity reservation process is open now, conditional on Telesat ultimately being awarded the licence for the 17-GHz BSS frequencies at these positions. To date, only one customer, Bell ExpressVu, has indicated strong interest in taking capacity on 17 GHz BSS satellites to be launched into this neighbourhood.

Canadian satellite service users are therefore strongly encouraged to keep Telesat fully informed as to their anticipated requirements for service on these satellites and to enter into the appropriate arrangements for service, once they have a firm understanding of their actual requirements.

If capacity remains available on any of these satellites at the time Telesat is awarded the authorizations, Telesat will consider initiating a public “call for interest” for 17 GHz BSS capacity, first for the remaining capacity on the satellite to be launched into the 86.5°WL position, followed at the appropriate time by similar calls for the remaining capacity on the 17 GHz BSS satellites launched into the 82°and 72.5°WL positions.

Throughout these processes, Telesat would continue to operate as a Canadian telecommunications common carrier, offering service on the satellite on a non-discriminatory, first-come, first-served basis.