Substitution and Signal Integrity

for the Canadian Radio-Television and
Telecommunications Commission

By David Keeble,
with contributions from
Paul Hearty, Ph.D

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Preface: Purpose of the Study

As noted in Broadcasting Notice of Consultation 2009-411, the CRTC wishes to examine measures for "protecting the integrity of Canadian broadcaster signals," in order to "provide revenue support for conventional television stations."

In the past, the Commission has implemented regulations material to this goal including simultaneous substitution and program deletion/compensation. That is, there are in effect regulations that permit the owner of rights in a given program for a given territory to receive value for those rights in one of three ways:

- by requiring broadcasting distribution undertakings (BDUs) to overlay the local Canadian broadcast of a program (to be called *Program X (Local*) in this study) over the *Program X (Distant*) when broadcast at the same time in an out-of-market (simultaneous substitution).
- by allowing the rights holder to require that the BDU "black out" such *Program X (Distant*) when simultaneous substitution is not feasible (program deletion).
- or, to replace deletion by allowing the rights holder to negotiate monetary compensation from BDUs for the damage done to commercial revenues by out-of-market signals, (compensation).

The Commission stated in Broadcasting Public Notice CRTC 2007-53, ("Determinations regarding certain aspects of the regulatory framework for over-the-air television") paragraph 34 that, "In order to protect the program rights of local stations, the Commission imposed requirements on direct-to-home (DTH) BDUs under the BDU Regulations for simultaneous substitution (section 42(1)(a)), simultaneous deletion (section 42(1)(b)) and non-simultaneous deletion (section 43)." In Paragraph 38, it added, "The Commission is of the view that the purpose of such [compensation] agreements should be to ensure that local and regional OTA broadcasters receive fair and equitable compensation for the impact that distant signals have on the program rights that they have acquired."

However, program deletion can irritate viewers, and compensation is difficult to calculate, and while simultaneous substitution may be preferred, it also has drawbacks. First, all of the non-simultaneous offerings of a program on distant signals still enter the market of the local broadcaster, drawing off audience and revenue. Second, in practice, not all local stations are protected by substitution, due to the circumstances of BDUs. Finally, Canadian broadcasters must match their schedules to foreign broadcasters, which can make the scheduling of other programs less than optimal.

Moreover, it must be noted that when simultaneous substitution was introduced, it effectively recovered almost all of the tuning to plays of *Program X* in a given market, because both foreign stations and the few Canadian distant signals offered by BDUs were almost always

from the same time zone as the local station. Now, with the duplication of American signals, often brought in from other time zones, and the multiplication of Canadian distant signals, a local broadcaster can often substitute over only one out of five or six out-of-market broadcasts carried by a BDU.

This study has therefore been commissioned to see if current technology permits the extension of methods of substitution so that better protection of program rights can be achieved, thereby reducing the system's reliance on program deletion, simultaneous scheduling, and compensation agreements.

Structure and Scope of the Study

First, the study will briefly describe current practice in substitution, noting circumstances where substitution is less than complete.

Second, it will describe technical approaches for extending substitution, and outline the benefits and difficulties attached to each method for broadcasters and BDUs.

Finally, it will provide suggested questions on which parties contributing to *Broadcasting Notice of Consultation 2009-411* may chose to comment in order to assist the Commission in evaluating these approaches, including feasibility, the costs of implementation and the consequent economic and policy benefits available to players and to the system as a whole.

It should be noted that this study is limited to a discussion of techniques. Other issues are raised by substitution, notably how various practices are affected by the specifics of program rights contracts. These issues will not be extensively discussed here.

I: Practices and Problems in the Current Simulsub Regime

Approach 1: Market-Specific Signal Substitution

Cable

For a BDU to make a substitution, it must have access to both *Program X (Distant)* and *Program X (Local)* at the appropriate time.

For it to do so on a market-by-market basis, it must have access to a version of *Program X (Local)* for each relevant market, and it must have the means to insert the relevant *Program X (Local)* over the distant signal for viewers in that market, and only that market.

When substitution began, each cable market was served by its own head-end, which was staffed to implement substitution, typically by manually "flipping a switch" at the appropriate time so that the substituted program would be distributed on the channel normally occupied by the distant signal. Each head-end was responsible for its own market – for example, the Rogers head-end in Kitchener could switch *Program X (Local – Kitchener)* over the US signal while the head-end in Toronto did the same with *Program X (Local – Toronto)*.

Now, local head-ends do not act as switching centres. Most large cable BDUs have concentrated their operations in a central location, with, optionally, regional centres to supplement them. Here, digital television signals are "bundled" into multiplexes that occupy

the bandwidth of a single 6 MHz TV channel, and these multiplexes are distributed by fibre to the local markets served by the cable BDU.

In the most centralized configuration, the Rogers Toronto centre would perform the substitution of *Program X (Local – Toronto)* into a distant signal, insert the modified distant signal into a multiplex, and send it to Toronto subscribers, but it would also perform the relevant substitution for *Program X (Local – Kitchener),* insert that into a different multiplex, and send that to Kitchener. The Kitchener station's signal would be "backhauled" to the central location as a matter of normal operations, so *Program X (Local - Kitchener)* would be available at the central location for substitution. Local viewers in both markets would see only their own local station substituted over the foreign signal, but the operation would be performed in Toronto.

In an optional variant of this configuration, the central distribution centre would send out only one multiplex to all areas, but a regional distribution centre would intercept it, de-multiplex the signals, perform the substitutions for local markets in its area, re-assemble a number of multiplexes, and distribute them to the appropriate local markets. This configuration still exists, although increasing centralization is the trend.

This whole process is typically automated, but it is monitored in real time by the BDU, and manual over-rides may be made, if for example, the episode of *Program X* turns out not to be the same, if the quality of a Canadian local HD broadcast is held by the BDU to be inferior to that of the distant signal, or if digital bit-stream errors prevent the switch from happening automatically[1]. In both of these cases, the BDU may back out of the substitution. Needless to say, such incidents are the subject of disagreements between broadcasters and BDUs, as are other cases when substitution does not take place as requested – for example, when a local station is not substituted over a distant Canadian signal even though the programs are simultaneous.

In spite of these incidents and disagreements, Approach No 1 is the preferred technique for simultaneous substitution, and can accomplish the goal. It uses a lot of bandwidth on the fibre networks, because signals must be multiplied to be adapted to local conditions, but fibre bandwidth is not constricted.

For broadcasters, the requirement of simultaneity imposes real restrictions on scheduling, particularly when the distant station originates outside the local station's time zone. An 8 pm broadcast of P*rogram X (Distant*) from Seattle requires that a Calgary station broadcast *Program X (Local)* at 9 pm, and a Winnipeg station at 10 pm, or miss the opportunity for substitution over the Seattle broadcast.

The adaptation of this approach to non-simultaneous substitution will be discussed below.

Approach 2: Market-specific Virtual Channel Over-ride (VCO)

Approach No 1 is useful for terrestrial networks like cable, wireless cable, and Telco DSL-based services, because all of these can separate a small geographical area in their distribution architecture and treat it differently. The same is not true of satellite-based DTH networks.

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[1] A decreasing phenomenon as equipment and practices improve.

DTH BDUs also assemble digital multiplexes of signals, but these are uplinked to satellites and distributed to the entire country at the same time. They cannot typically separate regional services physically through regional or local head-ends, as terrestrial systems can. This creates a significant problem, as advertising in any *Program X (Local)* is sold on a market-specific basis, so there are many versions of *Program X (Local)* needing substitution, but only in their own markets.

Approach 2 suggests an interesting and very efficient solution to this problem - to use the ability of the DTH subscriber authorization/management system to control individual receivers to effect substitution **at the box itself**, rather than at the head end.

Digital set-top box receivers are "addressable," which means that instructions can be sent from the national head-end that affect a single receiver or a group of receivers. For example, receivers are given the codes needed to decrypt only the signals that the household has paid for in its subscription package. All of the signals on the satellite arrive at the receiver, but only some can be viewed by that receiver.

Likewise, it is possible to de-authorize, and therefore black-out, a given signal for a period of time for a set group of receivers, so that an out-of-market broadcast of *Program X* cannot be viewed on any receiver within the blacked-out local market, though it is still present in the distant signal and can be seen elsewhere in the country.

Black-out can then be turned into substitution by re-programming the receiver so that for the duration of *Program X,* when the viewer enters the channel number of the out-of-market signal, the box tunes the local channel instead.

This is a workable solution for simultaneous substitution but there are two requirements:

First, the local channel must be available on the satellite, or *Program X (Local)* will not be available at the receiver – and not all local channels are carried. As it stands, DTH BDUs are not required to carry all Canadian local signals and many signals are not carried, so their versions of *Program X* are not even available to the DTH BDU for substitution. To implement a complete simultaneous substitution regime, all local programs for which substitution is requested would have to be available on the satellite so that the channel over-ride could work.

Second, the software of the set-top box and the network control system must be capable of executing a large number of programming changes quite rapidly, and not all DTH systems can do this. The Motorola system operates by sending instructions in advance that are stored in the box and executed at the desired time and for the desired period. This method is not foolproof, as a "power cycle" (turning the box off and on) may cause some models to lose the instructions, but it works relatively well.

Shaw's DTH system currently uses this method of substitution; the Bell system cannot use this technique and relies instead on the third approach, described below.

Approach 3: Single Substitution per Time Zone

The third approach is to make a single substitution for an entire time zone. A broadcast of *Program X* on a Toronto station may be substituted over a US station's *Program X* from the Eastern time zone, which would typically broadcast it at the same time. A broadcast of *Program X* from Vancouver could be substituted over a US station from Seattle in the Pacific

time zone. Both of these signals, including the substitution, are distributed available nationally, and available to authorized subscribers.

This is only a partial solution, since other Canadian stations in those same time zones do not receive the benefit of the substitution, even if they are carried on the satellite, and cities in other time zones see only Toronto and Vancouver versions. From the point of view of such a station, a distant Canadian signal is entering its market with *Program X*, rather than a distant US station, and substitution is not implemented for any of its programs. This is not simply an issue for small market stations, but for stations in very large markets as well.

It would be possible, within this technique, to make substitution available to more stations, but for each local station added, the satellite would also have to carry duplicate foreign signals during the time period when *Program X* is being substituted, and a method would have to be found to ensure that receivers in that local market tuned only the appropriate duplicate. That is, the satellite would have to carry WKBW (Toronto Version) and WKBW (Kitchener version).

This is therefore the least comprehensive technique currently employed for simultaneous substitution.

II - Approaches to Extending the Substitution Regime

Approach 4: Set-Top Substitution

Approach 2, Virtual Channel Over-ride, improved on Approach 3 because it was able to use the receiver itself to manage substitution, but it still fell short because not all local signals are carried on the satellite.

A fourth approach suggests that one might avoid the need for additional satellite carriage by using the ability of some set-top receivers to tune over-the-air digital signals, and extending that ability through software that would substitute an over-the-air signal over a satellite-received signal in the receiver itself.

If this could be done, then market-by-market simultaneous substitution would be feasible while saving satellite capacity – even with HDTV. In fact, local signals would be available to DTH viewers in their markets, and their programming could be tuned on the set-top box like any other service. These are real advantages to this approach.

However, such a solution has some inescapable requirements, which are difficult to meet. First, the local signal would have to be provided over-the-air in digital format, and it is not clear at this time that all local stations will implement digital transmission.

Second, the software in the set-top boxes would have to be designed so that the electronic program guide integrated information from available over-the-air signals, and tuned to the over-the-air version of *Program X* in place of the satellite-delivered version when substitution was required. (In other words, the box would perform a virtual channel over-ride, but using OTA signals as well as DTH signals.)

Third, this solution would only work for DTH receivers that are equipped to receive over-the-air signals. There is a very large installed base of DTH receivers that is not so equipped, so these subscribers could not currently receive substitution by this means.[2]

The manufacturer of receivers for the Bell TV system (Echostar) makes two models of receiver (Echostar 222K and 722K,) that can be so equipped. In fact, each can contain up to two separate over-the-air digital tuners. However, Bell TV has never ordered this option on the receivers it makes available to Canadians.

The manufacturer of receivers for the Shaw Direct system (Motorola) do not currently make any models that are so equipped, and it would take some time (estimates range from 18 months to four years) after the request was made for such a model to be designed and supplied.

In short, if it were decided to adopt this fourth approach to the substitution problems of DTH, implementing it by replacing the installed base of DTH receivers would take considerable time if replacement is done as part of general, end-of-life change-out and considerable expense if done by more expedited means.

Approach 5: Spot-beam Substitution

Another possibility is the use of satellite technology that can address one of the DTH problems, i.e. that the national coverage footprint of satellite prevents market-by-market substitution. This approach could use spot-beam technology to focus satellite coverage in much smaller areas, which more closely approximate terrestrial stations' market areas. This avoids the inefficiency of transmitting signals of local interest to the entire country.

For example, looking at the coverage of the US Dish network's spot beams, illustrated below[3], one can see that a single spot beam from a single transponder might cover only two US over-the-air markets. If this spot beam were to carry both the local signal and the out-of market signal that must receive the substitution, something closer to market-by-market substitution could be implemented.

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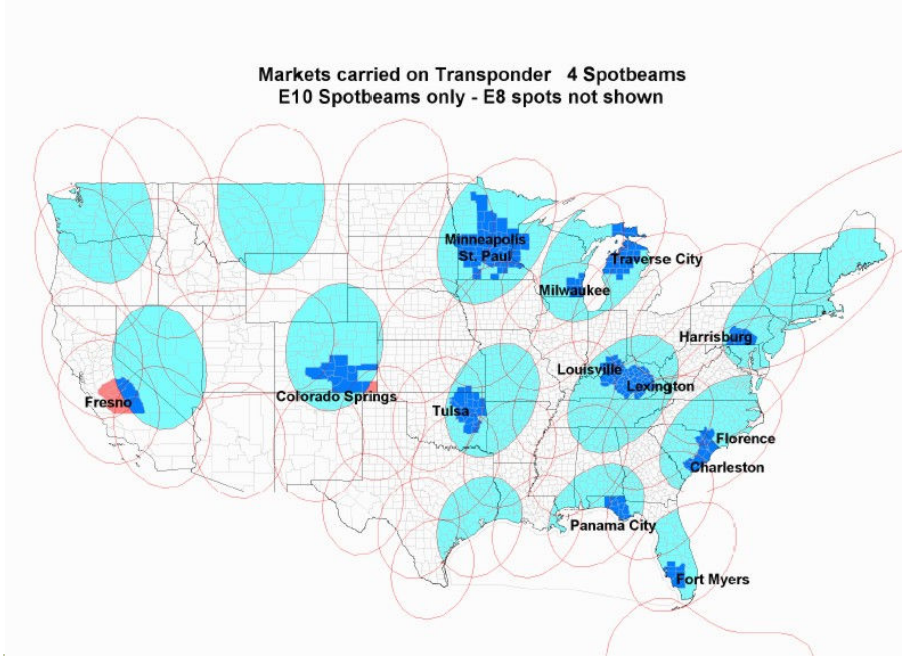
[2] Although the ATSC over-the-air digital system is a standard in Canada, there is no requirement that all set-top boxes be able to receive it. If the signal was received only by the set itself, and not the set-top box, there would not be the necessary integration between the satellite and the over-the-air signal tuners to effect substitution. Moreover, many TV sets will contain only analog tuners for some time.

[3] Source: http://dishuser.org/E10spots/e10t04.pdf



However, this technique creates the substitution in the transmitted signals, rather than at the receiver via Virtual Channel Over-ride, and therefore a version of *Program X (Local)* must be transmitted for each station requiring substitution. That is, if there are two Canadian local stations carried in the spot beam, two versions of the distant signal must also be transmitted, each one carrying the corresponding market-specific version of *Program X (Local)*.

It follows that another key requirement is that the foreign station, which typically is provided to a national audience, would have to be duplicated across many spot beams, in order that different regional substitutions could be implemented in each beam. These considerations create a significant satellite capacity demand, but it should be noted that any market-specific solution that does not create the substitution in the receiver using VCO would create a similar demand, so the use of spot beams makes more efficient use of frequency resources.

Spot-beams can be implemented in Ku-band, Ka-band, and the new 17 GHz BSS band recently licensed by Industry Canada. Bell TV has access to spot beams covering Canada at Ka-band, but these appear to be large in geographical area, and contain many television markets, exacerbating the problem of signal duplication. As noted by Bell TV in their letter to the Commission of May 14th, 2009, which describes the FreeSat proposal,

> *The footprints for the regional Ka band spot beams were provided in the confidential version of Bell's technical description undertaking filed 13 May 2009. Briefly, the spot beams cover six overlapping regions: Pacific, Prairie, Northern Ontario, Southern Ontario, Québec and Atlantic.*

Moreover, the FreeSat proposal, if it goes ahead, proposes a quite different use for the Ka-band spot beams available to Bell. In that proposal, the spot beams would carry many local signals, but not in HD, nor would it include the foreign signals necessary to implement substitution. And, of course, current Bell TV subscribers are not equipped to receive Ka-band and would not receive the new local signals. To accommodate them would create a box-replacement issue similar to that of Approach 4.

The limitations described above are not inherent in satellite technology and would not necessarily apply to new entrants in DTH. Lacking the limitations of existing technology and an installed base of subscribers, new entrants would be free to choose different frequencies, narrower beam coverage, and even incorporate virtual channel over-ride into their system design. A newly designed DTH system might well be able to provide market-specific substitution using sport beams, even for HD.

Approach 6: Advertising Substitution

An idea that has been brought forward from time to time is to implement substitution for ad spots, rather than for full programs. The reasoning runs that if the problem is a loss of advertising revenue in local markets, then permit the broadcaster to supply its own advertising, which the BDU will substitute over out-of-market commercials in the same way that they insert promotional material into the commercial avails of US specialty services.

The idea becomes more refined with the advent of advanced commercial insertion equipment for cable BDUs. While this technology is still under development, standards have been developed recently that will permit manufacturers to design equipment to implement quite advanced applications[4].

For example, cable companies will be able to deploy video servers that can store and play back video material under automated control – when used at the "edge" of cable networks, these would enable the BDU to provide different advertising for different neighbourhoods, program different commercials into the playback of video-on-demand material requested by subscribers, or enhance cable's ability to insert commercials into the avails of foreign services or other linear channels.

Such technology could be used as well to supply different commercials for different markets, and thereby, the reasoning goes, accomplish the goals of program substitution while achieving several other advantages[5]:

- It would be more efficient in its use of distribution capacity.
- It was suggested that it might avoid some of the digital splicing and switching issues experienced now.
- By integrating into the commercial insertion technology being considered by BDUs, it might create new commercial opportunities for broadcasters and BDUs alike.

However, difficulties were also apparent to some respondents:

- This technique would only work when the signal over which the ads are being substituted contain cueing messages like the analog "cue tone" – embedded signals that indicate that a commercial is coming and permit automated equipment to trigger the playback of local commercials. Such messages are present in the signals of US specialty services to trigger the

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[4] ANSI/SCTE 30/35 describes how to implement Digital Program Insertion cueing messages, 118 is for program-specific ad insertion, and 130 describes Digital Program Insertion interfaces and addressing.

[5] While the impact of substitution on rights agreements is outside the scope of this paper, it is clear that advertising insertion would have a different impact than program insertion. It might avoid some of the issues associated with "multiple plays", but it might raise issues around trade agreements.

playback of local avails, and could be supplied in distant Canadian signals. In other services, such as the US 4+1 stations, the co-operation of the originating broadcaster in supplying these signals, and thereby removing their own commercials, cannot be assumed[6].

- Broadcasters would have less control over program content and ad placement than they have with program substitution. Program content and timing for *Program X (Distant)* and *Program X (Local*) is not always identical, which could make ad insertion difficult to manage. That is, the US broadcaster might take a 90 second break where a 2 minute break was expected, or a Canadian broadcaster might edit material to make room for a show promotion.

- This application would require considerable communication between the traffic departments of broadcasters and BDUs. Last-minute commercials would need to be made available in a timely manner to multiple BDUs, along with instructions for their insertion; BDUs would need to report commercial plays to broadcasters, etc.

- In informal consultation, broadcasters and some BDUs expressed discomfort with the degree of co-operation and shared responsibility required to implement ad insertion. Should such cooperation develop to exploit other commercial insertion opportunities, ad substitution could also be implemented. However, the adoption of this technology by BDUs is not certain; the business case remains to be proved.

Approach 7: Non-Simultaneous Substitution

Some of the approaches described above attempt to address the current difficulty that DTH has in achieving market-specific simultaneous substitution, a difficulty that continues to prompt some broadcasters to propose program deletion as the solution.

In the larger context of signal integrity, however, another major issue is whether it is technically possible to extend the substitution regime to include non-simultaneous substitution – to ensure that <u>all</u> the plays of Program X in a market are those of the local rights holder, containing its commercials.

The answer to this question, naturally, is different for cable and DTH, and for the different approaches employed. In all cases difficulties need to be overcome.

As noted at the beginning of the discussion of approach number one, used by terrestrial systems, for a BDU to make a substitution, it must have access to both *Program X (Distant)* and *Program X (Local)* at the appropriate time. Program X (Distant) is of course available, since it is the triggering event; the change with non-simultaneous substitution is that Program X (Local) needs to be available at multiple times- not just the time of its local broadcast.

If it is being substituted over a US broadcast, it must be available twice – at Eastern Time and at Pacific Time. If it is being substituted over Canadian distant signals, it will need to be available 5 times, once for each time zone, if the station schedules are identical in each time zone.

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[6] In fact, some US border stations are reported to take measures to defeat substitution such as changing the episodes of series programming at the last minute, altering start times etc.

If all of the non-simultaneous substitutions took place after the original broadcast of Program X (Local) this would not be difficult – the simplest solution is for the BDU to record the broadcast on a video server as it comes in, and play it back as if it were a live signal at the appropriate times. Alternatively, the broadcaster could provide all the feeds in real time[7].

However, this is only the case half of the time. If the normal scheduled broadcast for *Program X (Local)* is 8 pm, then *Program X (Local – Vancouver)* will play out at 8 pm Pacific Time, but it will need to be substituted over a Canadian Atlantic Time Zone broadcast which plays in Vancouver at 4 pm Pacific, the US and Canadian Eastern broadcasts at 5 pm PT, and so on. So this version of *Program X* must arrive at the Vancouver BDU early, before its local broadcast.

Moreover, one of the advantages to non-simultaneous substitution is scheduling flexibility against the US, so one cannot assume that even the Toronto local broadcast will be before or simultaneous with the US Eastern broadcast – it might also be later, and require pre-feeding to the BDU to be available for substitution during the US play.

Clearly, both broadcasters and BDUs would need to add to their distribution systems. Broadcasters would have to add master controls to handle the additional feeds to BDUs, even if the BDUs use their recording and playback technology, and BDUs would have to develop "ingest" systems to manage the additional market-specific early inputs from broadcasters, and the multiple substitutions within their systems.

Broadcasters themselves now assemble local station feeds in centralized facilities, not unlike BDUs. A single centre will feed multiple stations with complete signals including network programming and local commercials, having first "backhauled" the local programming from the local station[8].

Adding the requirement for non-simultaneous substitution can be seen by either broadcasters or BDUs in two ways: "not necessarily complicated, but expensive," or an additional level of complexity that may be hard to manage.

One must also bear in mind that the assembly of programs in the broadcasters' facilities may occur quite close to the broadcast time. Apart from live programs – which obviously cannot be pre-fed – there are programs which arrive at the broadcasters' facilities close to broadcast time, and frequently, commercials arrive at the last minute. Workflows would have to be adjusted if non-simultaneous substitution were to be implemented.

An additional issue may arise from the fact that elements of any broadcast are meant for the particular time they are broadcast. Some of these can be a problem with simultaneous

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[7] Or even take all of the distant signals through their facilities and perform the substitutions. This is permitted by current regulation.

[8] Curiously, the centralization of BDUs and broadcasters has not been coordinated – on the contrary, there are many oddities, e.g. a broadcaster may bring programming from Winnipeg to its central location, then feed the complete station signal back to Winnipeg for transmission. The BDU – whose central location may be in the same city as the broadcaster's – may not pick up the signal directly from the broadcaster, bit will instead pick it up in Winnipeg, feed it back to the same central location, perform substitution and multiplexing, and then feed it back to its local system in Winnipeg.

substitution as well: "Coming Up Next" announcements, for example, may not make sense in their substituted context.

DTH – Approach 2, 3, and 5

When the basic approach is Virtual Channel Over-ride, Single substitution in a Time Zone, or spot-beam, implementing non-simultaneous substitution would increase the number of programs that the satellite must carry by some multiple of the number of local conventional stations in order to manage all of the time-zone plays. Since satellite capacity already limits the effectiveness of simultaneous substitution, and in fact, simple carriage of many stations in SD, much less HD, this additional demand would be a significant problem.

DTH – Approach 4: Set-Top Substitution

Using the local over-the-air transmission to supplement satellite capacity raises a new possibility for non-simultaneous substitution. That is, it could be accomplished where local stations provided multiple feeds of programs using their digital television (DTV) transmitters[9].

These additional releases could then be substituted by the receiver over distant broadcasts that arrive in the market at a different time than the original local broadcast, provided the integration with the DTH system is accomplished.

Multiple feeds of standard-definition broadcasts would be simple enough, since the capacity is present in the over-the-air DTV multiplex to provide multiple SDTV broadcasts at bit-rates equivalent to DTH, but to carry multiple HD signals would require additional transmission capacity.

Approach 6 – Ad Insertion

Of all these approaches, this technique is most easily adaptable to adding non-simultaneous substitution. A commercial substitution system can accommodate this addition because no program pre-feeds are required – only the commercials and their instructions need to be available to the BDU.

Conclusion

The options discussed above are all possible, but none can be implemented without some cost: the key question is whether the benefits outweigh the cost. And in that context, it must be remembered that in a number of cases, the true costs should be calculated, not as an incremental addition to the present day structure, but as an addition to a future structure, created for a number of business proposes, not simply to improve substitution.

Necessarily, this calculation becomes somewhat speculative: for example, a new entrant to the DTH market, equipped with new technology and not influenced by an installed base of old technology, might cause incumbents to respond competitively with a major overhaul of their own systems. Likewise, cable companies' adoption of commercial insertion technology

[9] Rights agreements might interpret these plays as additional broadcasts – though encrypting the additional feeds so they could only be received by DTH set-tops might make a difference.

depends on a number of factors; should they proceed, that would raise the competitive pressure on DTH BDUs, and so on.

The questions outlined below are therefore intended to place the discussion of program of program rights and substitution in the context of the development of the system as a whole, to the extent that its development can be projected.

III - Questions for Discussion

The Commission wishes to encourage parties participating in *Broadcasting Notice of Consultation 2009-411* to make comments on the possibility of extending the substitution regime to better protect broadcasters' signals. Without limiting the comments that parties may make, the Commission is particularly interested in hearing comments on the feasibility of the new approaches and their costs and benefits.

The following are some specific questions that could be considered.

General

1. Are there other methods for extending the substitution regime that have not been considered here?
2. How often are requests for substitution not implemented, and why?
3. To what degree do difficulties in implementing market-specific simultaneous substitution in DTH impact the revenues of local stations?
4. At what level would improvements in substitution be an acceptable alternative to payments compensating for the loss of local revenue as a result of distant signals, Canadian and US?
    a. Would the implementation of substitution over all distant broadcasts, including non-simultaneous, be a complete solution?
5. How do the incremental costs of implementation of these approaches (i.e. incremental to capital or other expenditures planned for other reasons) compare to the costs of the compensation agreements currently in place?

Non-Simultaneous

6. Are broadcasters able to provide BDUs with pre-feeds of all programs requiring non-simultaneous substitution? Are BDUs able to design "ingest" systems to accommodate these new non-simultaneous substitutions?
    a. What is the likely cost of implementing non-simultaneous substitution for participating broadcasters and BDUs?

Commercial Insertion

7. Over the next few years, cable BDUs may acquire technology to permit the insertion of commercials in on-demand and linear program streams being distributed through their facilities. In theory, this technology could be used to substitute local commercials in place of those existing in distant signals, both Canadian and

American, as an alternative means to accomplish the same goal as simultaneous and non-simultaneous substitution.

a. When is commercial insertion equipment likely to be deployed, if at all?

b. Do BDUs foresee making use of the technology for this purpose, among others?

c. Active cooperation would be required between broadcasters and BDUs to implement such a solution. Is such cooperation likely, and if not, why not?

DTH Issues

8. The main barriers to implementing simultaneous and non-simultaneous substitution in satellite systems appear to be:

    a. first, the additional capacity required to carry all the local programming that may required for substitution,

    b. second, the ability to instruct receivers in local markets to retune to the local broadcast over the out-of-market broadcasts, using virtual channel over-ride or other means, and

    c. third, the capacity required to carry additional plays of local broadcasts so that these can be substituted over non-simultaneous plays of the substituted program in out-of-market signals.

    d. Can these barriers be overcome in the future, by existing or new entrants? For example, can Virtual Channel Over-ride be implemented in all DTH systems?

9. Where DTV transmission exists, would broadcasters co-operate in a DTH substitution solution in which DTH receivers tuned to the local DTV broadcast in place of out-of-market signals?

    a. Will broadcasters have DTV facilities in all markets where local programs may require substitution?

    b. Would broadcasters co-operate in non-simultaneous substitution, using this method, if it required the additional feed of substituted programs encrypted in the DTV multiplex?

    c. What barriers exist to such an implementation in DTH systems, for existing and new entrants?

Other

10. What legal and contractual restrictions exist that might limit the adoption of any of the approaches described here?

    a. For example, would broadcasters be concerned that non-simultaneous substitution would lead to program rights holders claiming these are extra releases, beyond what is contracted, even though these plays were not initiated by broadcasters but rather by BDUs?

b. Would the concern be lessened if program rights holders continued to receive payments for these broadcasts as distant signals?

c. Is commercial substitution a legal alternative to program substitution?

d. Does program deletion raise similar issues?

David Keeble,

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