



CTV

CANADA'S OLYMPIC BROADCAST EXPERIENCE

STORY & PHOTOS BY DENNIS BAXTER

GAME-CHANGERS

It's been 22 years since Canada last hosted the Olympic Games. The broadcast of the 1988 Calgary Winter Games was produced in Standard Definition (SD), the audio was mono, the mixing desks were analog, and the signal path, before transmission, was copper. CTV was the Canadian Rights Holder and the Host Engineering and Production entity for the broadcast.

The 2010 Vancouver Winter Games broadcast was produced in High Definition (HD) with 5.1 surround sound. The core sports coverage was produced by the International Olympic Committee (IOC) and Olympic Broadcast Services (OBS). As Host Broadcaster, the OBS production and engineering team produced all sports and ceremonies coverage for every Rights Holding Broadcaster, including the Canadian Consortium of CTV and Rogers.

Today, the sheer scope and size of the Olympic Games require that the sports coverage be captured and produced by a single broadcast entity for all the television rights holders. But that has not always been the case. Before 1992, the Games' television coverage was produced by the host country's national network. For example, when the Games were in Moscow in 1980, the television coverage was produced by the Russian Television Network. For the 1984 Summer Games in Los Angeles, the coverage was produced by the US rights holding broadcaster ABC. The 1988 Summer Games coverage was produced by the Korean Broadcast Systems, the national network of Korea. The 1988 Winter Games coverage was produced by CTV. The result? Too much host-country coverage and a wide disparity in the broadcast production quality of the Olympic Games.



ABOVE: BOB MILES, MICHAEL NUNAN & ANTHONY MONTANO AT THE OLYMPIC CAULDRON.
INSET: POV CAM WITH AT MICS ON BOBSLEIGH/
LUGE TRACK.

By 1992, one of the most significant changes in the broadcast production of the games was the implementation of an independent Host Broadcaster whose sole responsibility was to cover sports – all sports. The 2010 Vancouver Games broadcast coverage was produced by the IOC and OBS – also known as the Host Broadcaster.

The second noteworthy change has been how broadcast rights have been negotiated through a consortium of media providers. Most countries of the world bid for the right to broadcast the games – independently or collectively – in consortiums like Canada has done for Vancouver 2010 and London

2012. CBC was the holder for the Olympic Games in Canada through Beijing 2008, but the dream of CTV's President Keith Pelley was to wrestle the rights for the 2010 Winter Games away from CBC. A fateful phone call to Rogers birthed the Olympic Broadcast Consortium ...

The IOC requires a free-to-air broadcaster in each country that has broadcast rights. Once that requirement is fulfilled, the rights holder can add cable, satellite, radio, and Internet channels. Enter the consortium arrangement to fill out the broadcast and transmission opportunities that are available to a rights holder or to a consortium. The Olympic Broadcast Consortium negotiated the coverage of the games for its group of media outlets consisting of CTV, RDS, Rogers Sportsnet, TSN, V, RIS, Omni, MuchMusic, OLN, APTN, and ATN.

The Canadian telecast of the Winter Games is a production by the Olympic Broadcast Consortium for the consortium partner networks. The Olympic Broadcast Consortium is a separate company from CTV and the other Rogers Networks, and is the "rights holder" to the Olympic broadcast assets.

THE OLYMPIC BROADCAST CONSORTIUM

The Olympic Broadcast Consortium has a full-time core group of producers and engineers who designed and built the remote broadcast facilities and created a production plan that works for so many consortium clients.

The Olympic Broadcast Consortium facilities included six studios at the International Broadcast Center (IBC) and one studio located on Whistler Mountain Square. The infrastructure included master control switching and mixing for all studios, an integrated routing system which ingests and records the program feeds, as well as edit suites, audio mixing and recording rooms, and graphics stations.

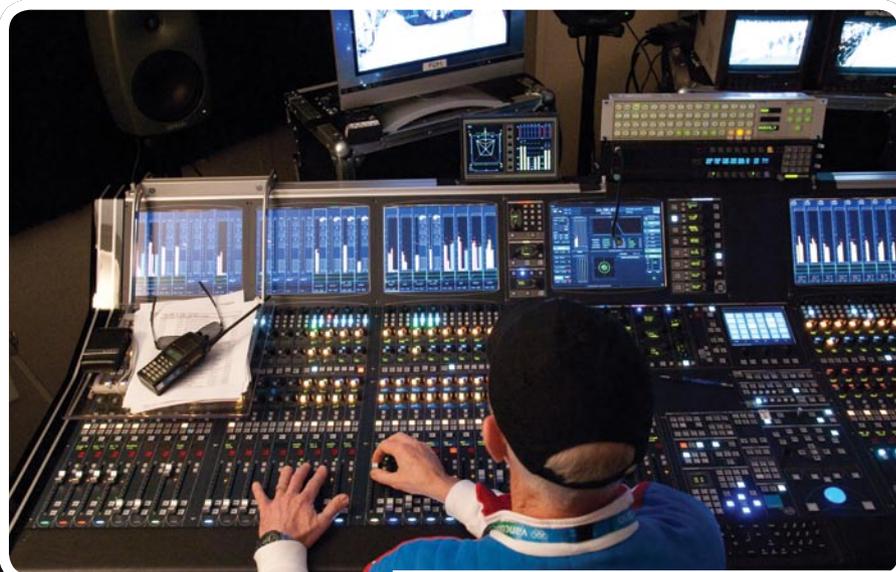
The Consortium audio facilities at the IBC included seven control rooms with Lawo mixing desks, one ProTools suite with Digidesign surface, and four "whisper rooms" or voice-over booths. There was one audio control room at Whistler Mountain Square and one whisper room at the Mountain Broadcast Center (MBC).

The Consortium hired 900 Games-time positions that were responsible for the planning, production, and execution of every aspect of the 17 days of live transmission from Vancouver and Whistler. The Games-time positions of engineering, operators, and production were applied for by the employees of CTV and Rogers, and during the Games, the engineers, operators, and producers worked for the Olympic Broadcast Consortium and produced all Olympic telecast and broadcast signals for the Consortium broadcast partners.

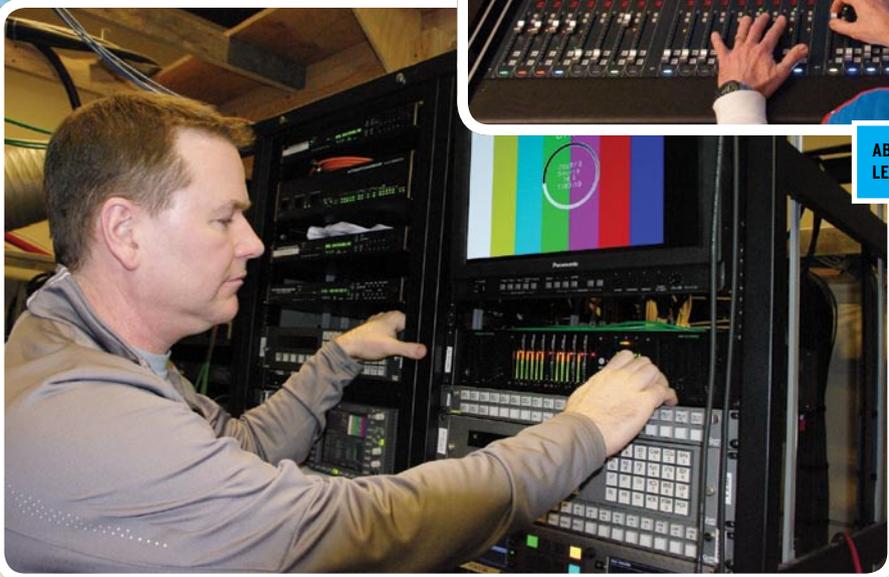
To design the infrastructure for the Olympic Games coverage, the Broadcast Consortium contracted three video engineers and audio engineer Bob Miles from outside CTV and Rogers. The team of four was dedicated specifically to the Games and operated in the best interest of the Olympic Consortium, not answering directly to any single consortium partner.

The four-man engineering team designed the entire CTV/Rogers Olympic Broadcast infrastructure in 18 months and constructed it in a warehouse near Toronto. The operation was fully functional and tested before it was packed and shipped to be reconstructed at the IBC in Vancouver.

Bob Miles had unique Olympic experience from working with the Host Broadcaster entity as far back as the 1996 Atlanta Games. Miles also did Olympic coverage for both NBC and CBC. "A lot of people are sensitive to audio in Canada," says Miles. "There have been a good number of audio mixers that have moved into production positions



ABOVE: NORM MALLALIEU MIXING BOBSLEIGH ON LAWO CONSOLE.
LEFT: BOB MILES CHECKS THE TRANSMISSION LINK.



IT'S ALL IN THE NUMBERS

A large contingent of Canadian audio engineers were involved in the Vancouver Olympics. The OBS Host Broadcast employed 52 Canadian audio mixers and technicians to work on the audio production of Men's and Women's Hockey, Curling, Figure Skating, Bobsleigh/Luge, and Quality Control. The CTV/Rogers Consortium had a total of 42 audio people working the games: 20 sound mixers (A1s); 15 assistants (A2s); three post audio mixer/producers; three maintenance engineers; and one audio/project manager. Additionally, a number of Canadian freelancers and manufacturer's support people were also involved.

and even management – and know what they like and do not like. Even the VP of Production for the consortium is an ex-audio guy."

CTV, the flagship broadcaster of the consortium, has long had a commitment to surround sound and promotes quality sound as a market differentiator for the channel. When CTV began materializing as a broadcasting powerhouse, management looked internally to sound producers Michael Nunan and Anthony Montano, both with high standards and experience in audio post-production and music. Nunan says: "The philosophy at CTV is that HD is delivered with 5.1 surround sound. At first we worked with surround sound in a vacuum, not live to air. This certainly allowed us to develop what we thought worked best for television and not follow blindly the film definitions."

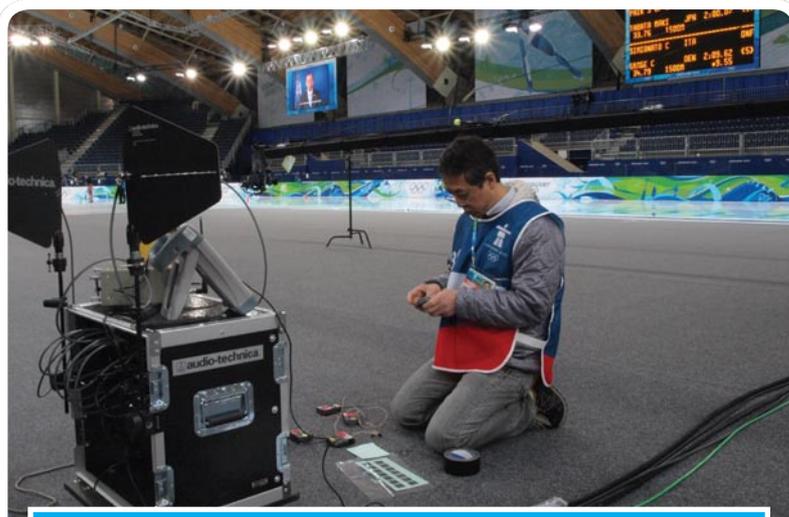
"CTV came with tall expectation for audio which dictated high standards and flexibility in the engineering design and operational workflow of the broadcast centre in Vancouver," states Miles. "The Host Broadcaster delivered 1080i HD

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video with 5.1 surround mix that was ingested discretely and directly into the consortium's Harris system. The Harris can record eight channels of audio with each HD video source. Although somewhat limiting, the six channels of discrete audio left two channels for the commentary audio – one English and one French. The commentary from the hockey venue was recording real-time during the competition, while a major portion of the commentary from other sports was recorded “off-tube” at the IBC.

The consortium uses an Exertz EQX Router with 6000 x 6000 mono audio crosspoints that de-embeds, embeds, and transports all the signals between all control rooms, recording devices, and transmission paths. “We do not mix anything before the router which requires all audio to pass through a mixing desk before it can leave the plant,” says Miles. “The 5.1 layer is combined with the appropriate commentary (English or French), music, or other audio production elements, balanced for the final audio mix, and then re-entered into the router with the video as an embedded signal.”

This audio mapping and workflow allows the surround mix to use the centre channel as part of the audio production. Nunan states: “At CTV, we believe that the centre channel is not strictly a dialog or commentary channel; even the CTV's music package uses the centre channel.”



ABOVE: FUMIO KAMIMURA WITH TRANSMITTER AT CURLING RINK.
RIGHT: CURLING CAMERA STATION WITH MICS.

BEHIND THE BOBSLEIGH

The Host Broadcaster covers all sports and uses an International production team of sports-specific experts. Because there is not much broadcast coverage of Bobsleigh and Luge outside of the Olympics, a team of veteran broadcasters was recruited for the Winter Games coverage. This team included longtime audio mixer Norm Mallalieu. I have known Mallalieu since the 1996 Atlanta Games where he mixed a feed from track and field. In 2004, he mixed the Opening Ceremonies in surround. The really cool fact is that he also mixed the bobsleigh sport at the 1988 Calgary Games.

“At the 1988 Calgary Games, I mixed the entire bobsleigh course on a 32 channel Ward Beck console with four groups: two auxiliary outputs and a stereo and mono output,” says Mallalieu. “The CTV host mix was mono, but some of the Rights Holder were making stereo.”

For the Vancouver Games, the sound of bobsleigh and luge was one of the highlights of the 2010 broadcast coverage. 167 Audio-Technica microphones and a very sophisticated audio-follow-video system were incorporated into the design and used to create surround sound zones around every camera position. Half of the more than 44 camera positions were handheld cameras, which offer a very tight perspective of the course as well as an opportunity to place stereo microphones on top of the cameras. Additionally, a microphone captured the trailing sound as it traversed to the next shot. This microphone was assigned directly to the appropriate surround channel depending on perspective – left surround channel or right surround channel.

There are three distinct and interesting atmosphere zones. At the start of

the course, four Audio-Technica AT899 lapel microphones were hung over the athletes and the sled with each microphone assigned discretely to a specific channel to create a 4.0 surround field. This start surround zone allows the viewer to hear the energy and activity of the start of the run. Note: there is no finish line atmosphere in this mix. The first six cameras were mixed on top of the start surround atmosphere.

The camera soundfield was typically three or four microphones with the front sound coming from an A-T BP4027 stereo shotgun microphone. The trailing microphone was an AT350 because it could handle the high SPL. When the sled was on the course, a different surround atmosphere was used to capture the 4.0 surround base. Once again a spaced array of AT4050s was used. As the sled and athlete approached the finish line, the final surround zone, another AT4050 array captured the spectator jubilation, which was predominant in the mix until the sequence began again.

The number of microphones and surround groupings utilized required a large-scale, programmable mixing desk. A Lawo MC266 was chosen because of the large number of inputs and outputs plus the programming versatility this desk provided. The Lawo MC266 was configured with 56 mix faders, six banks with two layers each (12 total layers) using approximately 280 inputs for the production.

An important feature of the Lawo mixing desk is an integrated remote input/output system better known as stage boxes. The input section can be controlled directly from the mixing desk and the digital signal transport over fibre optics. This permits control of the microphone gain close to the source and provides a clean signal path from microphone to mix fader. The bobsleigh/luge course used six remote stage boxes with a total of 304 inputs.

Finally, because of the quick nature of the bobsleigh/luge sport, a powerful “audio follow video” technique was incorporated into the design. Audio follow video is not a new technique. In fact, it has been used successfully for years in automobile racing.

Audio follow video is a useful tool when used properly – and bobsleigh is the proper application. The camera cuts are called by a director and are subject to missed calls and errors. In a sport like bobsleigh, where the sled completes the course in 45 seconds, it is easy to get lost, so if video is lost, it is best if audio follows along for the ride.

Felix Kruckles from Lawo explains the system: “The Virtual Studio Manager (VSM) is a control management system that communicates between broadcast devices such as routers, mixers,





DAMN THE COWBELLS

High SPL is a significant problem not only because of the sled sound, but also because of the close accessibility of the audience. Cowbells have become a staple of winter sports ... and, unfortunately, winter audio.

switchers, and audio systems. This software and hardware system facilitates complex operations with a single execution command. For example, audio follow video works fine with simple, single camera cuts, but it can be problematic with video layers and other keying functions. VSM control facilitates programming the audio to properly follow these multi-stroke video functions.”

Once the video snapshot is created, a trigger is programmed to activate an audio function. Then the audio snapshots are built in the Lawo MC266 to match the video scenes. In the audio desk the mixing dynamics and fader moves are programmed as well as EQ, compression, gating, and routing of the audio signals.

The video snapshot and the audio snapshot can be simple camera cuts or complex video overlays that require the same from audio. When the audio is following the video cuts, you see the faders moving. This gives a visual reference and permits the sound mixer to manually take control of a fader or mix to make adjustments while underway.

HOLISTIC HOCKEY

The national sport of Canada is unquestionably hockey, and that translates to the need for a consistent level of sound for many Canadian audio mixers and technicians. “Canadians grow up knowing what hockey sounds like,” says Montano. “Many people have played hockey and have heard the ice, puck, and stick up-close.”

A major focus of the Vancouver Winter Games has been the proper and innovative application of surround sound. Certainly the LFE channel in television surround sound is still a problematic issue. When television adopted surround sound from the film industry, the LFE channel was realistically part of the mix and used sparingly for effect.

There are a few basic rules about LFE: the first one is never put something exclusively in the LFE that is critical to the mix because it will never transfer to the downmix.

If you look at sound design as a holistic approach and apply the concept of a “surround sound zone” where specific use of the channels includes the surrounds and LFE, sound designers arrive at a pleasing and proper use of surround.

“Microphones on the glass are core to hockey coverage,” says Graham Zapf, a veteran of Olympic and Canadian hockey broadcast coverage. “There are three different schools of thought in the microphone selection and technique for hockey. Lapels, PCCs, and the A-T boundary microphones have all been used in Olympic and Stanley Cup hockey – and each has its own advantage.”

Zapf says the lapels have the depths and fidelity, but are labor intensive to set up and are not practical. The boundary microphone has a distinct advantage because, with a cardioid capsule, it has very good PA rejection. In

addition, stereo boundary microphones behind the goal contribute significantly to space and imaging in a surround soundfield.

The Canadian Hockey Place (GM Place) structure has an overhead catwalk system that permitted fairly precise placement of an Audio-Technica AT4071, a long shotgun microphone, over centre ice and the blue lines. The Hockey Federation, as well as the NHL, prohibits microphones in the penalty boxes, but Zapf’s audio assistants were able to get something close to the benches.

Hockey is a sport that is often presented from the man-in-the-stands centre ice viewpoint – the best viewing position. This often leads to fairly straightforward sound design: athlete and sport sound in the front speakers and atmosphere in the surround speakers. The atmosphere was created with a spaced array of AT4050s.

There are different thoughts on surround atmosphere, including correlation and space. The “variable array” offers moderate correlation, but delivers a spacious perspective of the venue. “When I began the sound design for the Vancouver hockey venue, I looked specifically at how I was going to convey the LFE,” says Zapf. “First, I established a surround sound zone where I use all the surround channels to create an effect. I apply the pure ‘film’ definition of LFE, meaning low frequency effect. Next, I try to capture excitement.”

In two corners of the rink, the television coverage uses two ice level handheld cameras. Often the players crash into these areas, creating a very intense, broad frequency sound. Both the corners and camera coverage are full surround sound zones. The handheld camera has an AT4027 stereo shotgun on it and there is a spaced pair of microphones behind the camera assigned to the rear surround channels.

Finally, Zapf relied on an old trick: using a lapel microphone and a Frisbee flush against the board. He gated and band passed the signal directly to the LFE channel for the effect. The front and surround channels are full frequency and deliver all relevant bass information; the LFE excitement is only for effect for the home theatre listeners.

CLOSE-UP CURLING

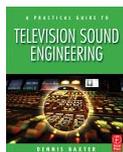
Curling has its roots in Canadian sports and technology. Curling became an official Olympic sport in 1998 in Nagano after an introduction as an exhibition sport at Calgary. Curling is a sport that has benefited tremendously from the use of wireless microphones on the athletes. The athletes are always in the vicinity of key sound elements of the sport and this allows for a microphone to be in close vicinity of the action. Clearly, these close microphones bring the distinct sound of curling to the picture.

Audio-Technica RF engineer Fumio Kamimura and his partner provided a turnkey curling mic solution: combining frequency planning with special usage RF applications with the Canadian government for the design and installation of the equipment. The A-T AEW5200 series wireless allowed for 48 channels of continuous operation in a very congested RF environment.

For the curling venue, the surround atmosphere was created with a five-microphone, spaced array. This plan offers a broader, more dimensional capture of the venue and provides superior results over a closely spaced array. The surround sound atmosphere was created in one OB Van and shared with all the curling sheets. Peter Wugalter was sound supervisor for curling. “There has not been much surround production of curling,” Wugalter says, “and this certainly was an opportunity to explore the possibilities.”

A HISTORIC FIRST

After the Vancouver Winter Games, the ratings began to tell the story of the effectiveness of the broadcast. Nearly all (98 per cent) Canadians watched or heard some Canadian Olympic broadcast coverage. Consortium partner ratings are better than expected, and worldwide, the ratings and reactions show that this was the most experienced Winter Games in history. ■



Dennis Baxter has been the sound designer and principal sound engineer for the last five Olympics. A multiple Emmy Award winner for his broadcast work, Baxter is the author of *Television Sound Engineering*, an entry-level book about broadcast audio. If you have any comments about this article, please contact him at dbaxter@dennisbaxtersound.com.