

SCIENCE & SOUND COLLIDE  
AT CALGARY'S NEW SCIENCE CENTRE

# TELUS Spark

With the grand opening of TELUS Spark in late 2011, the city of Calgary and its citizens were treated to the fruits of a 10-year, \$160-million investment – the first new science centre built in Canada in over 25 years.

By Andrew King



The centre was first opened as the Calgary Centennial Planetarium during the summer of 1967. Come 1983, a group operating as the Calgary Science Centre Society launched a bid to bring an immersive science centre to the city and, in 1987, that wish was granted with an operating agreement that would transform the planetarium into the Calgary Science Centre. In 2005, thanks to a \$9 million donation from the national telecommunications giant, the centre was renamed the TELUS World Of Science Calgary.

Over its last few years of operation, the original location on 11 St. SW in

Calgary's downtown west end would offer a slew of travelling and permanent exhibits, both educational and exciting, to over 300,000 visitors each year; however, plans had been in place since the turn of the new millennium to bring the World of Science experience to a new facility with state-of-the-art architecture and technology.

The new TELUS Spark, located on an 18-acre site at the junction of Deerfoot Trail and Memorial Dr. in the east end of the city, benefitted from the support of the federal, provincial, and municipal government as well as from private and corporate donors from

within the city and beyond.

The 153,000 sq. ft. facility is home to four exhibit galleries – Energy & Innovation, Earth & Sky, Being Human, and the Open Studio – in addition to an expanded Creative Kids Museum, a Feature Gallery, Learning Centre, 164-seat Presentation Theatre, the HD Digital Dome theatre, and a 10,000 sq. ft. atrium space.

With the intention of using the atrium space for everything from concerts and presentations through to gala dinners and corporate events, the senior team at the facility made plans to outfit the space with a very capable



and flexible audio and video system that could complement any programming the atrium would be hosting.

Barry Crean, now the VP of Operations for TELUS Spark, oversaw the technical components of the

was going to do and how."

The outlined systems from Adams were anchored by key components from Yamaha Commercial Audio Systems and Bose, interconnected by an Optocore redundant fibre optic distribution ring. Working in tandem with one of Bose Professional's top field engineers, Brian Kam, Adams performed a number of acoustic tests to ensure his initial proposal that featured some of Bose's latest technologies was feasible.

He was vindicated, and invited Spark personnel to see why.

At the 2011 edition of InfoComm, Bose conducted the first public demonstrations of its new RoomMatch and PowerMatch products, and Adams suggested that Cheng and Crean attend the show in Orlando for the unveiling. After the general demonstration, the Spark team was able to spend some intimate time with the gear, going through their own test material and having questions answered by Bose representatives.

"We were impressed and quick to the conclusion that they'd be the ideal choice," offers Crean. The result for Adams Technologies was the contract from the centre and a subsequent PO.

Adams Technologies' proposal initially comprised two general components: the lower atrium system which comprises everyday reinforcement via enclosures concealed around the perimeter and the system in the 164-seat Presentation Theatre, which is completely compliant with current top-of-the-line digital cinema standards; however, after experiencing the InfoComm demo, Crean approached Adams with the proposal of duplicating the Presentation Theatre's system for a larger reinforcement package for the atrium to be deployed for more significant events.

As the facility had already been constructed and close to finished by the time Adams Technologies was brought into the fold, one of the key challenges faced at the offset was that the team was quite limited as to where product could be placed. Another was the project's timeline. "The logistics on this were a nightmare as we didn't get approvals on a lot of parts until quite late in the process," Adams says – a challenge augmented by the fact that Adams Technologies is essentially a boutique operation with four key staffers behind the project along with a few subs. "Kudos to my guys," he offers. "They stepped up and never said die."

Once again working with Kam out of Massachusetts, a model for the atrium was built working out all of the idiosyncrasies of the cabling infrastructure that would employ Bose's MA12 EX modular line array loudspeakers along the perimeter of the space. A total of 18 MA12EXs were used, double-stacked in nine offset locations around the obscurely-shaped room with a 502B sub below each stack for general reinforcement. The system is driven by three PowerMatch PM8500N networkable amplifiers, each offering 4 kW with 500



installation for the new facility in the capacity of Project Director during the build. Though a larger contracting firm was charged with providing and installing the general paging speakers throughout the facility, for the more advanced needs of the atrium space and presentation theatre, Crean and Spark A/V Manager Dennis Cheng decided to put the install out to tender for a more specialized technology firm.

"We wanted a sound system in the atrium that was unique to that space," Crean explains. "We were doing our utmost to get reverb time down in there during the construction process, running regular acoustic tests to ensure the finishes we chose would bring that to a minimum and, once we were satisfied, we went on a hunt for the right system to occupy the space."

One of the two primary goals of Spark administration for the atrium system – because of the room's size, shape, and reflective build materials – was maximizing intelligibility. "I've been in too many big, cavernous spaces like that with too much echo and reverb that muddies up the sound," Crean explains about what had to be avoided.

The second of those goals, which also applied to the Presentation Theatre's system, was connectivity. "That was a fundamental goal for this entire centre to begin with," Crean elaborates. "We wanted to be leading edge in terms of connectivity across all of these spaces so that, should we have an event in the atrium, we could overflow those audio and video signals into any other room."

With a very general spec for the job out to tender, Martin Topp, Territory Manager for Western Canada with Bose Professional Systems Division, was in touch with Gerry Adams of Calgary's Adams Technologies. Topp arranged a meeting between Adams, a longtime Bose dealer and advocate, and Crean and colleague Brad Struble to discuss potential solutions for the space. Recalls Adams of their initial meeting: "Brad was adamant that he didn't want to see loudspeakers in his atrium. I twigged on this instantly and knew exactly what I



**TELUS Spark**  
220 Saint Georges Dr. NE  
Calgary, AB T2E 5T2  
403-817-6800  
info@sparkscience.ca

Facing south end of atrium with Bose RoomMatch hangs suspended.

watts for each of its eight channels with full DSP. On the front end of that system is a Bose ESP-88 engineered sound processor and control is provided by Bose's CC-64 control centre GUI.

"These speakers allow us to avoid all of the hard surfaces in the space and reflect sound into the walls with acoustic treatment," Crean explains of what made the MA12EXs more attractive than standard in-ceiling options. Regarding the workflow for this later phase of the project, Cheng notes that any challenges that arose were approached by identifying a number of potential solutions and weighing the effects of each. One of those challenges was the integration of the sound systems with the facility's preexisting architecture in the least obtrusive manner.

The larger event system comprises left and right arrays, each featuring five RoomMatch high-mid cabinets permanently mounted to the steel structure at the south end of the atrium – the wider end of what's essentially a long wedge. The arrays are configured with a number of different horizontal and vertical patterns to accommodate the odd dimensions of the room and avoid slapback and unwanted reverberations.

"Acoustically, the atrium was a major challenge," Cheng begins. "The amount of glass and hard flooring in there would make you want to pull your hair out trying to properly set up a sound system." He adds that since the system has been operational, a number of sound-savvy professionals from the area have come through the space to have a listen and admittedly expected a sub-par sound because of the shape and make-up of the room; however, they've been surprised with how the sound has been contained and even takes on a warm character.

The hangs are driven by seven 4 kW PM8500Ns. Covering the low end are eight RMS215 subwoofers loaded

onto carts and wheeled out into the atrium for events that call for them. To make for a fast and efficient set-up, quick connects on breakout panels are loaded at stage left and right for the subwoofers. The special event reinforcement system also employs ESP-88 processors and a CC-64 for control.

Finally, reinforcement for the presentation theatre also comprises a pair of RoomMatch arrays, this time with three mid-high boxes and two RMS215 subs per side, as well as a complement of 402 Series II and DS-100SE speakers and Panaray Modular MB-4 subs mounted around the upper perimeter of the ceiling as side fills to take advantage of the theatre's multi-channel surround capabilities. "The main focus of that space was to allow it to host live or theatrical demonstrations," Crean explains. "We also wanted to be able to show 3D films with 5.1 surround and relay that programming elsewhere in the facility if the situation called for it." The system can take eight channels of discreet cinema sound or relay 5.1 via TOSLINK for any consumer sources.

A pair of Yamaha M7CL digital mixing consoles drive the Presentation Theatre and atrium systems – one permanently installed in the presentation theatre's control room and the other on a mobile cart that can hook into any of the Optocore nodes strewn across the atrium for its various potential configurations. "The big seller (of the M7CL) was the fact that it's very familiar to a lot of people, and if not, it's a very easy board to pick up, whether you've been an analog user or are accustomed to other digital boards," offers Cheng.

As Project Manager for Adams Technologies, Gene Sydor oversaw the building's integration design, HD-SDI video distribution, master control room design and build, and worked in tandem with Bill and Brandon Coons of Contact Distribution and Optocore North America



Presentation Theatre

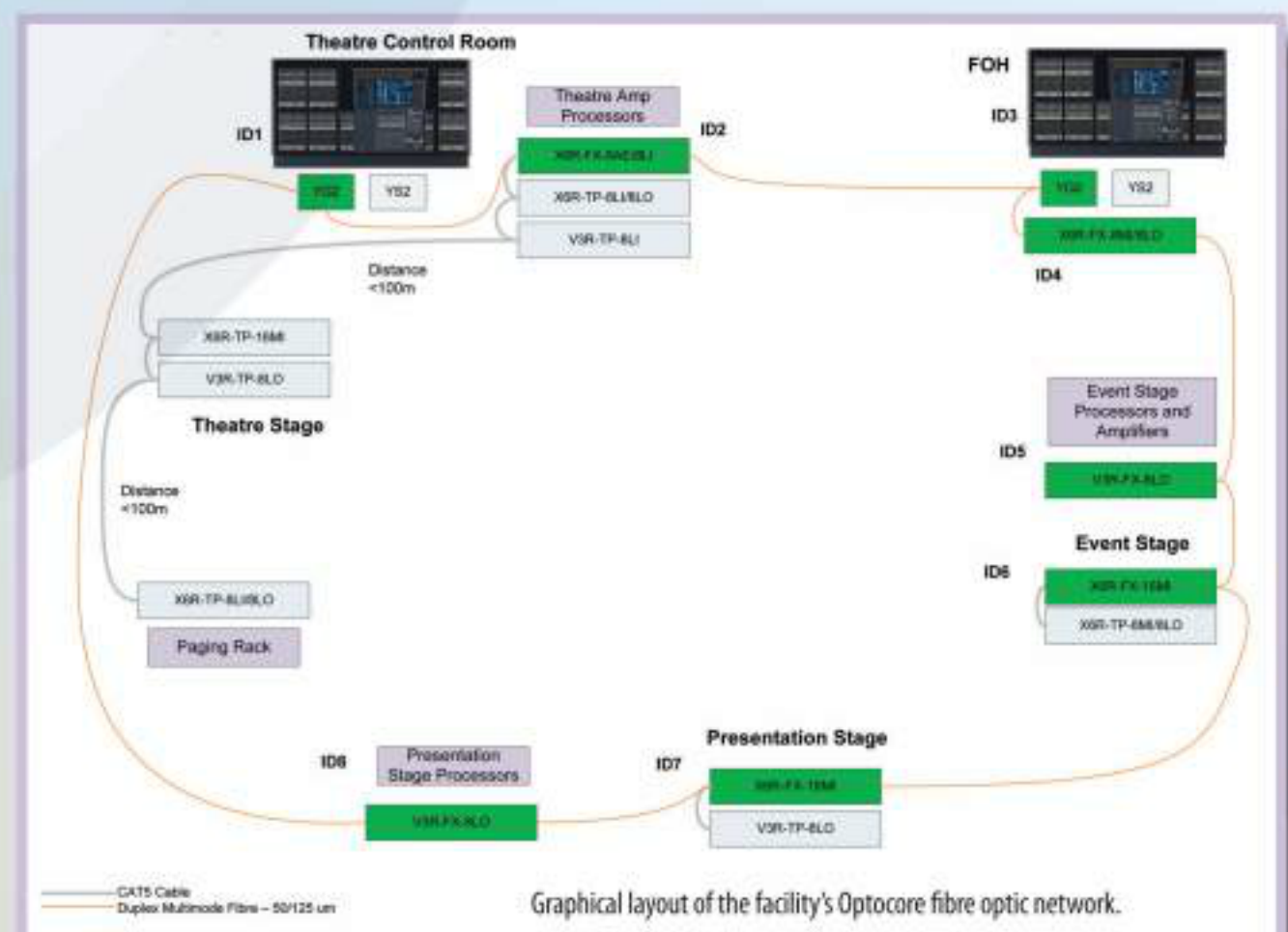
on the extensive fibre network. Explains Sydor: "We wanted complete functionality between the three systems and beyond throughout the facility. We wanted an infrastructure that would allow the centre to host a variety of events well into the future."

Though all of the equipment for this leg of the job was commissioned before the end of summer 2011, installation of the atrium and theatre spaces began in September 2011 with the centr's soft opening set for the end of October of that year. "As we commissioned the systems," explains Sydor, "we configured the hardware to work in the manner they needed for these various purposes." A total of nearly 20 km of fibre, coaxial, and multicore cable was added to the infrastructure already in place throughout Adams' phase of the project.

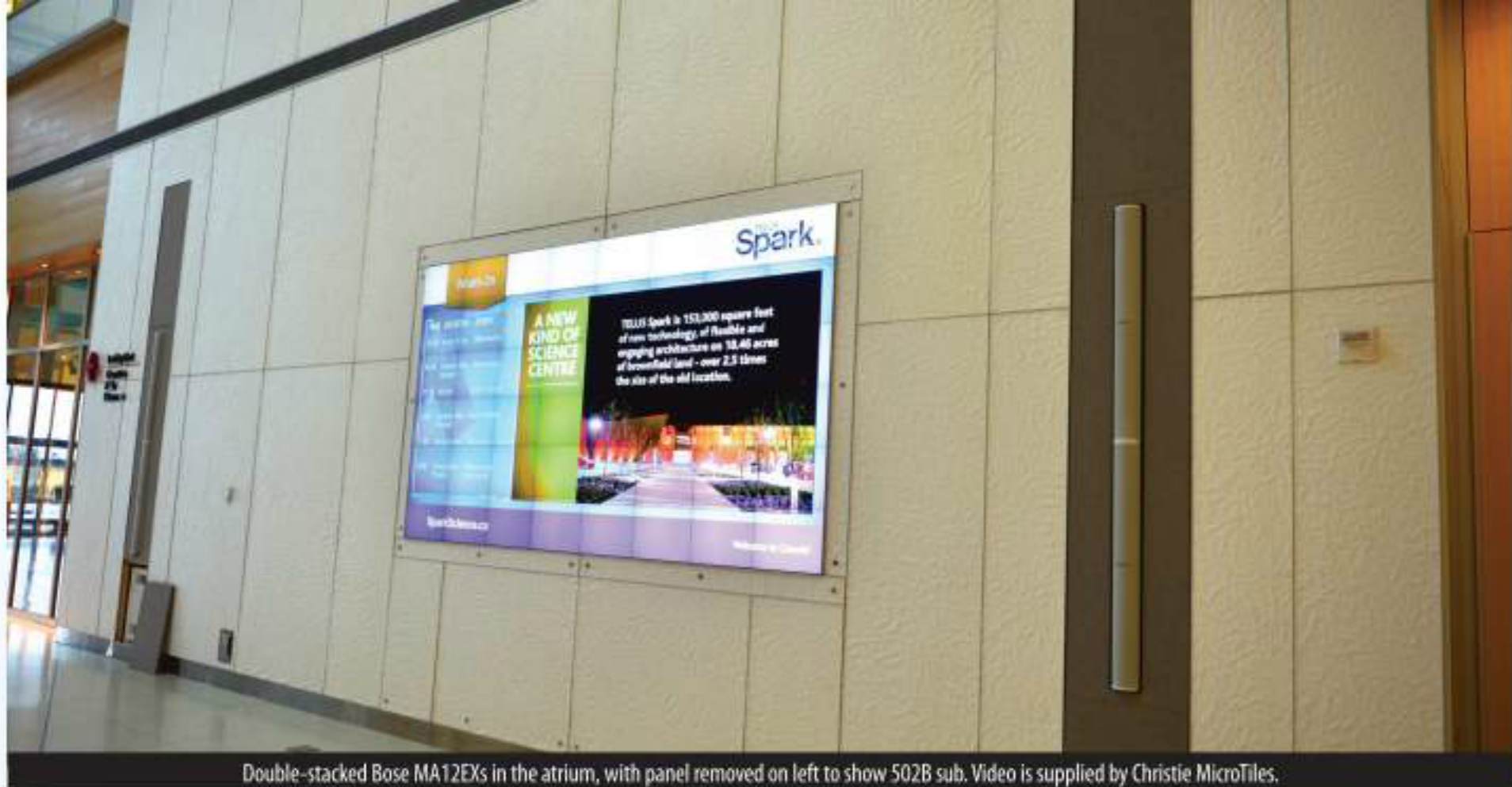
With a total of eight locations between the atrium and presentation theatre requiring signal distribution, Adams Technologies decided to employ the Optocore ring to ensure consistent reliability. "We looked at a number of manufacturers and ended up choosing Optocore," Sydor begins. "We have a mission-critical undertaking for the high-profile events, so we wanted something proven. What was demonstrated to us in terms of the calibre of facilities and events that have used the fibre system in the past gave us total confidence."



Presentation Theatre rack.



Graphical layout of the facility's Optocore fibre optic network.



Double-stacked Bose MA12EXs in the atrium, with panel removed on left to show 502B sub. Video is supplied by Christie MicroTiles.

The distribution system transports all mic and line levels around the bulkheads and panels throughout the spaces outfitted by Adams Technologies on a closed system. The rest of the general paging system exists on its own network, connected through a line level feed to the Adams components. In total, there are over 170 audio inputs available on the optical network. "The versatility we wanted to offer was very easily met as we were able to eliminate any requirements for mechanical patching," Sydor explains. "Any patching, if you want to call it that, is just a click of the mouse on the software matrix." This capability makes for efficient set-ups when, for example, the centre closes to the public at 4 p.m. for an event with a unique configuration beginning just two hours later. This efficiency is augmented by pre-loaded macros on the Yamaha desks that bring up patching arrangements for various scenarios.

In the atrium, for example, there are three separate bulkhead panels that house Optocore connections as well as the coaxial and Ethernet connections. The FOH area has 16 mic ins and eight line outs; the events stage has 24 mic ins and eight line outs; and the smaller presentation stage in the atrium has 16 mic ins and eight line outs. A fourth Optocore node comes via the atrium's portable M7CL and its YG2 and YS2 card modules, offering 32 ins and 32 outs of network connectivity. Sydor explains that the choice of both the Optocore network and Yamaha consoles was simultaneous thanks to their inter-operability. Two other nodes are housed within the rack room for the atrium's larger event and smaller presentation stages.

The remaining network nodes outside of the atrium include the theatre's control room via the second M7CL and its cards and the theatre's amp processing room which feeds the bulkhead panel with 24 mic ins

and eight line outs on the stage via Cat-5 cabling. The fibre ring offers complete redundancy in the case of any equipment failure or compromise to ensure that Spark programming can continue uninterrupted. Adds Cheng: "We're even able to operate or mix sound from a separate location if we want – say for a post mix or a recording, for example, in a contained environment for proper listening conditions."

"This was our first time using a fibre optic network and I was more than a little nervous about it, to say the least," Adams admits about his initial attitude, though it didn't take long to establish his confidence. After seeing the gear in action at Walt Disney World in Orlando, Adams says he was a believer. "That was it. These guys do three live acts a day and had nothing negative to say about the stuff. That's a pretty good testimonial."

Though Adams shares a longstanding professional relationship with both Bill Coons and Mike Davidson of Optocore North America, it was Brandon Coons, Bill's son, that took on the brunt of the responsibility for design and support on TELUS Spark, working closely with Sydor on the centre's set-up and, in Adams' eyes, surpassing expectations to ensure everything was thoroughly covered and considered before delivering a final product.

"What I strive to deliver to any facility is a future-proof design," Sydor muses about the package as a whole. "What thrills me most about completing this project is having a facility in place that is fully-compliant with all of today's audio and video standards in terms of signal distribution. It's all digital over fibre, so as the centre goes forth adding other spaces and more production equipment for their requirements, it can literally just be layered on. The forethought that went into planning this facility was intense, though our reward is being able to present some-

thing state-of-the-art."

Says Cheng about working with Adams Technologies: "I found them to be a great boutique company, if you will. They're able to adapt and come up with solutions outside of modular thinking when approaching problems." He adds that the mandate of keeping the system future-proof and expandable was exactly in-line with the ideals behind the entire facility. As his A/V staff comprises an additional three technicians working beneath him, Cheng also notes how the system is not only easily operable for all of its intended uses, but that his team can also train presenters and other non-technical users on basic functions or program easily-accessible presets for further efficiency.

The atrium event stage system's first big test was a charity gala where an outside A/V company put it through what Adams calls a "pretty good test." The Bose hangs were used as the main PA, though as per the performer's rider, an external console was brought in. Shares Adams: "They plugged that into our reinforcement system and we had a great event – no issues at all." That, he says, was the ultimate goal – providing a system that could deliver without fail for virtually any scenario. "Every decision I made on gear for the project came down to one criterion: [which manufacturers] can I absolutely trust without fail?"

With TELUS Spark having now been welcoming visitors for over six months and all of the systems fully operational as of spring 2012, there are a few names that have cemented their spot on Adams' list of such companies. ■



Andrew King is the Editor of Professional Sound.