MISSISSAUGA'S

While it may not boast the same size as nearby metropolitan Toronto, the City of Mississauga is equally as diverse and multicultural. The City's Celebration Square, centrally located at City Hall, is the prime location for community events, connecting citizens through art, culture, and heritage. While its programming has welcomed hundreds of thousands of residents over the past several years, the city recently outgrew its physical and mechanical infrastructure – particularly its performance stage, sound, and lighting packages – and was in need of a revival.

Celebration Square currently includes a large, permanent performance stage with a high-performance sound and lighting system; a 300-seat outdoor amphitheatre equipped with its own sound and lighting package; a market area; an interactive fountain feature, complete with its own sound reinforcement system, that transforms into an outdoor rink during the winter months; and other aesthetic features like gardens, a monument honouring the city's veterans, and more.

To complete the overhaul, the city enlisted the help of Novita Techne to design the various audio and multimedia systems outfitting the redesigned Square. Due to the sheer size

CELEBRATION SQUARE

A Community Network

BY ANDREW KING
PHOTOS BY CRAIG LEACH

FAR LEFT: Main performance stage with Meyer Sound PA.
LEFT: Amphitheatre stage with Fulcrum Acoustic reinforcement system.
BOTTOM: Celebration Square's main performance area.

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of the space and the wide variety of activities it would be hosting, the system runs on a rather complex set of networks and boasts some truly unique features thanks to equipment installed and programmed by PA Plus Productions.

The result is a space with cutting-edge technology incorporated to bring the community together and celebrate its diversity – a strong network that brings out the best in its individual parts.

The city had a portable stage that it would truck around to various public and community events, often in the Square, though it simply couldn't accommodate the increasingly high-profile talent being booked. Opting for a more capable, permanent solution, the city decided to erect a large performance stage at Celebration Square and hired Novita Techne to design the sound system for it and the rest of the space.

Novita had worked with the city a few years ago upgrading the systems in the Council Chambers and, more recently, updating a local library theatre. "We have all sorts of experience with this type of venue," adds Novita Principal David Jolliffe. "The city was looking for a consultant with this kind of experience, and there was an obvious fit with us being local and having an existing relationship."

Novita worked collaboratively with site designer CS&P Architects Inc. and general contractor PCL Constructors Canada on the $43-million project, a benefactor of the Federal Stimulus program. The space is rather unique in that about 80 per cent of its programming is put on by community groups.

"A great deal of research went into this project in a rather short period of time," explains Novita's James Boutilier, Senior Audio Consultant for the project. "I looked at a number of similar applications in theme parks and work we've done with other municipalities. We wanted to come up with a system that would be future-friendly and easy to operate, as we have everything from community groups to touring acts using the facility."

One of the major considerations for the design was noise pollution and the mitigation of unwanted sound into the surrounding residential spaces, as there's a significant population residing within a square kilometre of the site. The previous portable stage and its rental systems would often elicit noise complains from residents of the nearby condominiums. "We looked at loudspeakers that were highly directional and would give us as much control over dispersion as possible," says Boutilier, "though we also looked at aesthetics, working with the architect to make the technology as unobtrusive as possible."

A Meyer Sound system was chosen for the large performance stage, consisting of MILO line arrays and M3D-SUB cardioid subwoofers to control the back radiation of the low frequencies. "Listening tests have confirmed how effective that choice was," explains Boutilier about the subs, noting that the volume drops in excess of 20dB behind the stage on busy Burnhamthorpe Rd., easily overshadowed by mid-day traffic noise.

The MILO arrays offer a very tight dispersion pattern, blanketing the lot in front of the stage and grounding out exactly at its edges. A selection of Meyer front fills helps ensure a full concert experience for those in front of the stage, and should the assembled crowd extend past the lower plaza, a selection of Renkus-Heinz ICONYX IC Live weather-resistant, digitally-steerable arrays can help extend the audio at a comfortable level with good intelligibility.

"The architects had already specified a series of slim poles with lighting fixtures at the top, and the ICONYX arrays fit the towers nicely. Being digitally-steerable, we can control their dispersion and ensure sound isn't bouncing everywhere."

Tying the three systems together – the main Meyer rig on the performance stage, ICONYX enclosures extending from the back of the lot to the water feature, and the Fulcrum Acoustic boxes in the amphitheatre – is an Optocore fibre optic network. "We knew we needed a digital network solution, and Optocore seemed to have everything we needed," shares Jolliffe. "It's totally redundant, and each device in the chain has its own word clock, though we have (an Apogee) Big Ben master word clock in the

system as well. It's a synchronous network; the signal is immediately at every device and the latency is fixed and extremely low at only 41.6 µs."

The selection of a digital audio network was confirmed by the fact that there are two primary, independent power sources between the upper and lower squares, so to keep the technical grounds separate, optical fibre was a natural choice. Not only is the Optocore network MADI-based, but embedded in the data stream it can also host Ethernet and CobraNet (in this case, via Renkus-Heinz's RHAON technology) networks through the fibre backbone.

The network is comprised of two different rings: the Optocore fibre ring and secondary Cat-5-based SANE ring for the lower channel count on the amphitheatre system.

There are several access nodes for the fibre network – one at the main stage's FOH position, one onstage for monitors (foldback), one nearby for a broadcast or mobile recording truck, and another in the amphitheatre area. Being outdoors, the optical fibre node points use expanded beam connectors – an offshoot of military technology referred to as a "tactical connector" – to withstand moisture and dust.

The node at FOH, while it can accept connections from any MADI-based console with the appropriate interface brought in by a visiting production, will most frequently welcome input from a new DiGiCo SD8 desk purchased as part of the installation. Because of the length of such an installation from design to implementation, as well as the fact that the technicians who now oversee the systems hadn't yet been hired, Novita simply left a cash allotment in the budget for a console to be selected at a later date. With the incoming SD8, the City's existing Allen + Heath iLive console will likely see action at the monitor position.

A Crestron-based control system, programmed by Steve Svensson of PA Plus, ties together the entire system – the Optocore network, DSP for the reinforcement systems, zoning parameters, wireless systems, and media players. All are controllable via a handheld tablet.

The set-up allows the main stage system, amphitheatre system, and delay speakers facing towards and away from city hall to be used independently, all in tandem, or in any configuration in between. As Boutilier explains: "There are several locations where the programming can originate. We can coordinate all of the overflow areas with appropriate signal delays to synchronize the entire complex through presets in the control system no matter where the signal originates. We had some excellent programming."

The amphitheatre boasts its own sound system, though it's relatively humble as the stage will mostly be hosting spoken word or acoustic musicians. It's comprised of Fulcrum Acoustic enclosures for reinforcement and monitoring, which Novita specified for their success in theme park installations. The cabinets feature true coaxial drivers and are constructed of a plastic composite so they can be left out year-round, immune to the elements. There's also an analog production cart, centred around an APB DynaSonics ProRack

CELEBRATORY SYSTEMS

A list of equipment incorporated into Celebration Square, courtesy of PA Plus Productions.

- 1 x APB DynaSonics H1020 ProRack mixing console
- 1 x Apogee Big Ben Master Word Clock
- 2 x BSS London BLU-120 digital signal processor with CobraNet
- 2 x BSS London BLU-800 digital signal processor with CobraNet
- 2 x BSS London BLU-BOB-2 breakout boxes
- 8 x BSS London BLUDIGITAL-IN AES-EBU input cards
- 3 x BSS London BLUDIGITAL-OUT input card
- 4 x BSS London BLU-OUT Output card
- 2 x BSS London BLU-PS power supply
- 2 x Crestron CEN-UPS1250 1250-watt uninterruptible power supply
- 2 x Crestron C2ENET-2 Ethernet card
- 2 x Crestron AV2 Central control system processor
- 2 x Crestron TPS-6X-DSW 5.7" wall-mounted wireless touch panel
- 2 x Crestron CEN-HPRFGW wireless gateway
- 3 x Denon DN-C640 Professional CD Player
- 1 x DiGiCo SD8 FOH digital console
- 2 x Fostex RM-2 Rackmount stereo powered monitors
- 4 x Fulcrum Acoustic DX896 compact loudspeaker
- 2 x Lab.gruppen C28:4 4 channel amplifier, 700 watts per channel
- 1 x Marantz PMD371 5-disc CD changer
- 1 x Marantz PMD580 Digital solid state recorder
- 1 x Meyer Sound Galileo 616 Loudspeaker management system
- 4 x Meyer Sound M1D Ultra-compact curvilinear loudspeaker
- 8 x Meyer Sound M3D-SUB Directional cardioid subwoofer
- 12 x Meyer Sound MILO Curvilinear array loudspeaker
- 8 x Meyer Sound MILO 60 Curvilinear array loudspeaker, 60 deg.
- 2 x Meyer Sound MLK-3D Link kit for M3D-SUB subwoofer
- 2 x Meyer Sound MLK-MILO Link kit for MILO loudspeaker
- 2 x Meyer Sound MTF-MILO/MICA Custom mount for UPQ to MILO
- 4 x Meyer Sound MYA-UPQ Cradle-style mounting yokes for UPQ
- 28 x Meyer Sound Rain Hood Weatherproof covers for MILO & M3D-SUB
- 1 x Meyer Sound RMS Remote monitoring software
- 2 x Middle Atlantic BB-44-1 copper bus bars
- 6 x Middle Atlantic D4LK 4-space locking drawer
- 2 x Middle Atlantic DWR-24-26 24-space wall mounted rack
- 2 x Middle Atlantic ERK-4425-AV 44-space equipment rack w/locking rear door
- 2 x Middle Atlantic FD-44 Locking front door
- 2 x Middle Atlantic Misc. Miscellaneous lacing bars and saddles
- 2 x Middle Atlantic PDT-2015C-NS Isolated ground power distribution bars
- 3 x Middle Atlantic USC-6R Sequencing controllers
- 1 x Middle Atlantic USC-KL Remote keyswitch wallplate
- 2 x Middle Atlantic WL-60 Switch operated interior light
- 4 x MotionLabs 1300-POWERDISTRO Portable power distribution
- 1 x Optocore DD2FE Dual MADI I/O network module
- 2 x Optocore DD32E Digital I/O module
- 2 x Optocore DD4MR Dual MADI i/o
- 4 x Optocore LCB-4 Loop back connector
- 1 x Optocore OptoCable4/4.05 Tactial quad optical fibre cable, 0.5m
- 1 x Optocore OptoCable4/4/100 Tactial quad optical fibre cable, 100m with reel
- 2 x Optocore OptoCable4/4/20 Tactial quad optical fibre cable, 20m
- 5 x Optocore OptoCon4/4/1 Rack panel
- 2 x Optocore OptoCon4/4/2 Rack panel
- 2 x Optocore X6R-FX-1Dual mic 16ch mic pre with Optical
- 1 x Optocore X6R-FX-8LI/8LO 16 AES/EBU converter unit
- 1 x Optocore X6R-TP-16LI SANE converter
- 1 x Optocore X6R-TP-16LO SANE converter
- 1 x Optocore X6R-TP-16MI SANE converter
- 2 x Optocore X6R-FX-16LI Fiber converter
- 4 x Optocore X6R-TP-Dual mic SANE converter
- 2 x Renkus Heinz ICL-FRDUAL-WR Digitally controlled column loudspeaker
- 8 x Renkus Heinz ICL-FR-WR Digitally controlled column loudspeaker
- 1 x Shure 514B Push-to-talk microphone
- 6 x Shure A13HDB Mounting bracket for UA860-SWB
- 1 x Shure UA221 splitter/combiner
- 6 x Shure UA830-WB Wide-band in-line antenna amplifier
- 1 x Shure UA844-SWB Wide-band antenna combiner
- 6 x Shure UA860-SWB Wide-band omni-directional antenna
- 6 x Shure ULX1- Beltpack transmitter
- 2 x Shure ULXP124/BETA58 Dual channel system with handheld BETA58
- 2 x Shure UR1 Bodypack transmitter
- 3 x Shure UR24D/BETA 87A Dual channel system with handheld BETA87A
- 2 x Shure WA302 TA4F to TRS adaptor cable
- 4 x Shure WA302 TA4F to TRS adaptor cable
- 4 x SurgeX SX1115 Rackmount power conditioner

FAR LEFT: Mobile production cart with APB ProRack mixer hooked into network at amphitheatre position.
LEFT: Renkus-Heinz ICONYX IC Live arrays mounted onto light fixtures.
BOTTOM LEFT: DiGiCo SD8 at FOH, connected to fibre network via access node.

mixer, that can be used to mix any sources needing more than one or two microphones. The cart boasts an Optocore line-out device which feeds the console inputs and a line-in device which takes the console's output and lets it connect to the main network.

Finally, an outfit of Shure wireless products can float around the facility, already programmed into the Crestron system with auto-mixing capabilities. For a yoga demonstration, for example, the instructor can play music and, when wanting to address the crowd, can speak into the mic with the music's volume adjusting accordingly. This keeps operation easily-accessible for the community groups taking advantage of the various spaces and systems at Celebration Square.

The team from PA Plus behind the installation and programming of the gear was overseen by VP Liz Woods and headed by Systems Engineer Mark Radu and the aforementioned Steve Svensson. Svensson handled all of the SoundWeb and Crestron programming while Radu captained the optimization of the Optocore network and tuning of the Meyer boxes via the company's Galileo management software.

Svensson speaks to some of the more customized details of the network, explaining that once a signal enters the Optocore network, either from a mixer, line-in plate, or direct-patched wireless mic, it hits the fibre network, comes out via AES, and then enters SoundWeb. From there, it comes out as AES for the main concert system, analog for the smaller amphitheatre system, or via CobraNet for the Renkus-Heinz delays.

"From the ground up, the design of this installation is very customized," shares Svensson. "With the Crestron system, there are several different modes of operation. From the concert stage, there's a live mix configuration where a console is hooked up digitally to the network. All that's happening there is the audio is going into the fibre network, passing through the BSS network unaffected, and then going through Galileo into the Meyer rig." The delays are all preset on the touch panel for the various configurations.

"We didn't want to go through too many Optocore patch changes," begins Svensson about the signal routing. "We wanted to leave the system relatively static."

To go to the rink system, PA Plus has the CobraNet going into the Ethernet port on one of the Optocore devices. Because it's using standard Ethernet packets, the Optocore network is being employed in this case as a CobraNet extension, getting the CobraNet signal onto the fibre network and back off at the far end unaffected. "That was a neat solution that gave us the extra channels we needed and simplified the system from a user point of view," offers Svensson. "Now the signal routing is there, always selectable when needed, as opposed to having larger global recall situations that affect the whole system. It's essentially like un-muting a channel instead of reconfiguring the matrix," he offers as a simplified example.

"Mark and I went through a fair bit of head scratching on some of these routing issues," shares Svensson. "It's very tricky when you're dealing with a large number of channels, plus the end users' capacity to reconfigure the system so they can run in different combinations. There are several small details you need to be aware of with regards to delay time, EQ, and where that signal can pass through."

The Crestron system was programmed with several different user levels, from a basic operator interface for simple volume mixing through to full administrative options and all managed through different passwords.

It's a sophisticated system – very complex in nature but, at the end-user level, very accessible thanks to its programming and integration. "As we drew closer to the end of the project, we had some one-on-one time with the end users, and the ability to get that first-hand feedback to put the polish on the end programming was incredibly helpful for me," says Svensson about the final few stages. "There were a lot of things discussed and implemented into the system, but when we really started getting specific about the way it would be used, I went through a few major revisions on the interface to make it as friendly as possible for those specific needs."

Novita's Project Manager Brandon Booker credits Svensson with a "remarkable job with the programming," also adding that Radu and the rest of the PA Plus team "deserve serious commendation for keeping everything to schedule considering how massive of a job this was." They also share credit with PCL for their overall management of the project.

Svensson echoes similar sentiments, noting: "I think Novita had a very difficult task in meeting the needs of this space – it's a very public area and capable of very high SPLs, but its location required some serious calculations and planning to deliver what was desired in a controlled environment. I'm proud of what we've done and they should be, too." ■

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