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# Inside story

Rafael Viñoly shares his vision  
for Leicester's Curve



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## From the Editor

**W**

Welcome to the 2009 *Auditoria Annual*, which takes a sharp look at a number of innovative, new and frankly quite stunning venues, while also drawing together within its pages the insights of expert consultants and suppliers from around the globe, providing venue owners and operators worldwide with a unique source of information on everything from architecture, acoustics, lighting and seating through to stage systems, theatre planning and ticketing.

Similar to last year's lead feature – the much admired Oslo Opera House – this year's cover story – Leicester's Curve – has won praise for its bold design ethos that seeks to ensure the venue inspires and engages with a wider public. Whereas the Norwegian venue invited the public to clamber all over its concrete façade, the Curve simply asks only that they stare within its glass walls, allowing passers-by to glimpse rehearsals or set production.

Curve was designed by architectural superstar Rafael Viñoly, in response to a brief that set out to turn the traditional concepts of theatre inside out: "The client delivered a well defined description of how they saw the theatre working," says Viñoly. "They described Leicester's multicultural community as participatory and said the theatre must fully embed in its surrounding environment. Curve had to offer itself to the public in a multitude of ways, to be much more than a traditional proscenium arch theatre."

Another high-profile architect, Sir Norman Foster, has worked his magic on one of our other featured venues – the Winspear Opera House in Dallas, which is part of the sprawling US\$354 million AT&T Performing Arts Center complex. A hugely ambitious project – *Time Magazine* has compared it to New York's Lincoln Center – the AT&T opens in the same year as the city's new football stadium – also notable for its scale and ambition. However, the Winspear offers altogether more genteel distractions, providing a home for The Dallas Opera, as well as the Texas Ballet.

We also take a look at Toronto's Koerner Hall, a versatile 1,035-seat concert venue that is the centrepiece of a US\$120 million expansion of Canada's Royal Conservatory of Music. The new facility provides the perfect environment for the RCM's students to interact with and learn from visiting professional artists. "It nicely dovetails our music education programmes with our presentation business," says RCM president, Peter Simon.

Elsewhere we examine a new generation of convention centres; Arup profiles its new SoundLab software, which allows designers of buildings to listen to the built environment before it is even finished; and Melbourne Convention Centre's Plenary Hall is covered by a number of contributors. Overall, *Auditoria* shares the same mission as the entertainment venues we feature: to provide the most interesting, enjoyable and rewarding experience to the widest possible audience.



Anthony James,  
Editor

Editorial
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Assistant Editor: Izzy Kington
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Design: Louise Adams, Anna Davie, Andrew Locke, James Sutcliffe, Nicola Turner, Julie Welby, Ben White

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The views expressed in the articles and technical papers are those of the authors and are not endorsed by the publishers. While every care has been taken during production, the publisher does not accept any liability for errors that may have occurred.

Subscriptions £60 per annum

Published by UKIP Media & Events Ltd,  
Abinger House, Church Street, Dorking,  
Surrey, RH4 1DF, UK  
Tel: +44 1306 743744 • Fax: +44 1306  
742525 • Email: [auditoria@ukintpress.com](mailto:auditoria@ukintpress.com)



Printed by Nuffield Press, 21 Nuffield Way,  
Ashville Trading Estate, Abingdon, OX14 1RL, UK  
  
ISSN 1476-4105 Auditoria magazine  
This publication and its contents are  
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Cover image: Curve (Peter Cook)

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# Inside story

With a stage visible from the street, Leicester's Curve Theatre has been designed to erase the boundaries between the public and the theatre makers, with its beating heart, creative mind and living guts exposed to all who venture near

**A**t a cost of £61 million, Curve is a theatre of theatres, a unique design that combines and morphs function and form seamlessly. From its towering glass façade to its huge L-shaped removable walls, Curve offers a raft of new connotations to the theatrical term 'curtain up!'

Created by world-renowned architect Rafael Viñoly, Curve has already proved an exciting and brave, and sometimes controversial, response to Leicester City Council and Leicester Theatre Trust's brief for a new performance venue that would turn the traditional concepts of theatre inside out. "The client delivered a well-defined description of how they saw the theatre working," says Viñoly. "They described Leicester's multicultural community as participatory and said the theatre must fully embed in its surrounding environment. Curve had to offer itself to the public in a multitude of ways, to be much more than a traditional proscenium arch theatre."

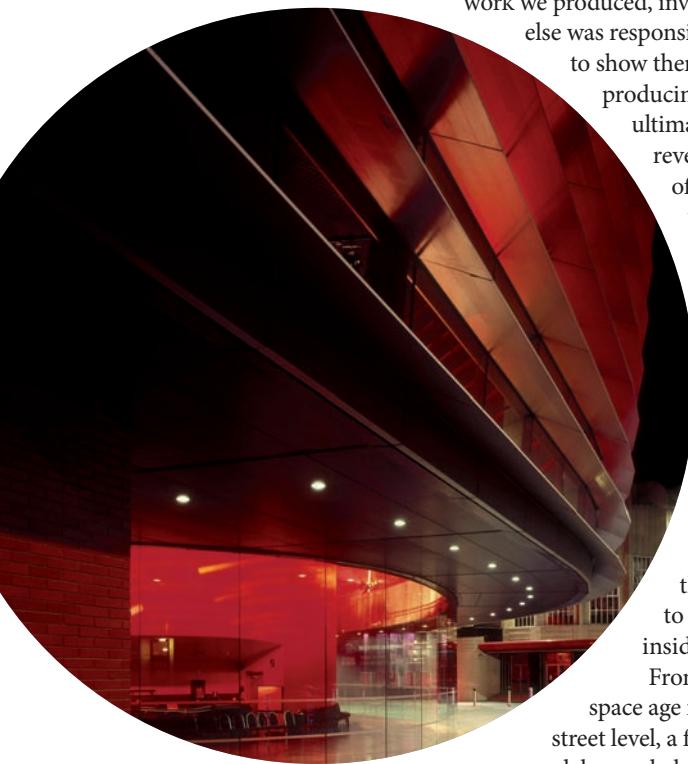




## "The brief reversed standard perceptions of traditional theatre and turned them inside out"

**Right: Performances can spill out into the foyer spaces**

**Below: Curve's curved glass façade envelops the red main auditorium and purple studio while still offering transparency to the street**



Responsible for the elaborate brief, in association with certain individuals from the City Council – primarily Councillor Ross Willmott – and Leicester Theatre Trust, were former artistic directors of the now defunct Haymarket Theatre, Paul Kerryson and Kully Thiarai.

Kerryson describes what inspired this 'inside-out' idea: "Our original vision was a direct response to everything we felt was wrong with the Haymarket. It was difficult to find. Worse still, our audiences never quite managed to make the connection between the Haymarket and the work we produced, invariably thinking someone else was responsible! We felt it was vital to show them the hive of creativity a producing theatre embraces. This ultimately led to a brief that reversed standard perceptions of traditional theatre and turned them inside-out."

### Come inside

Although imposing, the transparent nature of the architecture, the clever lighting, the brightly coloured interior walls, the street level walkways – almost a continuation of the street outside – and the all-day café combine to say: look at me, come inside, see what we do.

From the outside Curve is space age in design. Towering above street level, a four-storey, 22m-high, curved, louvred glass hall encapsulates two conjoined, freestanding, almost full-height, brightly painted pods – one purple, the other red.

These are the auditoria – a 750-seat (expandable to 800) main house and a 350-seat studio space. However, what makes the design even more exciting is that they are linked at the stage end of the main auditorium by way of two huge, acoustically effective safety curtains, which can be raised to open the main stage into the studio space. Not only that, two 32-ton, L-shaped safety curtains form the side walls of the stage house and can be opened directly onto the public

foyers. This architectural device presents such endless possibilities in staging configurations it's almost too dizzying to think about.

"The fact that the two performance spaces can become one and the stage can fill out into the foyers actually stands quite apart from the notion of whether or not you expose the process of the inner makings of the show to an audience," says Viñoly. "You can take it as far as you like or do nothing at all."

The first plans Viñoly drew up featured nothing more than two transportable stages at sidewalk level with a series of moveable curtains that could be deployed to offer almost infinite flexibility. Of course the acoustic cost of such a scheme proved prohibitive. However, what was born from that initial concept was inspired. After consultation with theatre consultants Ducks Sceno, it was suggested that the two spaces come together in the centre of the building and that the flexible curtains be replaced with solid safety curtains.

### Splendid isolation

Acoustics were obviously an important factor in the overall success of such a multiconfiguration venue. Early design discussions therefore included the thoughts of an acoustic consultancy, Kahle Acoustics. "We began with the question of how much – and when – acoustic isolation is required," explains Eckhard Kahle, acoustician. "In consultation it was decided only moderate isolation was required between the stage and foyer during performances. On other occasions, when the foyer becomes part of the show acoustic isolation is unnecessary."

The dividers between the two spaces and between the main stage and public areas had to be solid to ensure acoustic isolation between zones, as well as for health and safety reasons. "To achieve the specified acoustic isolation, we worked in close association with Delstar Engineering, the company that designed, manufactured and installed the curtains," adds Kahle. "The biggest challenge was the L-shaped curtains that separate the main stage house from the foyers – the side stage openings are 8m high," he continues. "The L-shape of the curtain made it all the more complex to guide their movement precisely. Ultimately we decided on a relatively lightweight door combined with a sophisticated



## "A lot of criticism came from having to take sets across public areas"

**Right:** *Lift Off*, the aptly named opening production at Curve

**Below:** The space around the auditoria is open to the public but is also used for processes that would traditionally happen behind the scenes



labyrinth seal around its edges. This labyrinth allows air to pass around the edges. However the route it takes is so complex that sound is attenuated as it passes through."

The end result was impressive – acoustic isolation of 38dB between the stage house and the foyer. A single 40dB safety curtain separates the stage from the auditorium, while the separation to the box is achieved with double shutters. To avoid structural sound transmission, the auditorium and the box are fully structurally separated.

Like Siamese twins, each venue grows from the central link, each featuring its own distinct character but equally sharing a common ground – the stage. The potential for the audience in the studio theatre to come face to face with that of the main house, or to give the main stage huge perspective, or to set up seating on the main stage and make the studio the stage are just a few of the possibilities made possible by the Curve's unique design.

One evening's activities saw a show in the studio theatre, a formal dinner on the main stage and an awards ceremony on the apron in the main auditorium. Each space separated, physically and acoustically, by the safety curtains.

### No more magic?

There is public access around both auditoria and no formal backstage. Above the studio theatre is a full-size rehearsal room and other conference and meeting rooms line the inner and back wall of the building. Dressing rooms line two levels of balconies on one side of the building. These balconies are open to the foyers and dressing rooms share space with open-plan offices, which reduces the usual separation between those who

run and manage the theatre and those who perform in it.

As a result, all the typical production processes that happen behind closed doors in most other venues are, to some degree, performed in public. Visitors can peer through huge glass windows onto the paint frame or the props workshop and observe, first hand, some of the processes that go into creating a show.

Actors and the set cross public areas – this alone has courted considerable controversy and raised the question of whether or not such a concept takes the theatrical 'magic' away. However, this is a theatre designed and built for Leicester, to a concise brief – it's never claimed to be the solution for all.

As Kerryson confirms: "A lot of criticism came from having to take sets across public areas, but this is all part of the fun and the original vision. The biggest criticism was actors having to come out into public areas. This has never been an issue for me or anyone else; it was part of the mission. Of course no matter how much you argue your point, only the end result makes it for you, the building has to speak for itself. Today it does that magnificently."

This is indeed a building where you can build people's anticipation with more than just a poster or a programme. It starts from the moment you buy a ticket. Part of the excitement is that for some shows people will not know what to expect. In particular for homegrown work not destined for touring. Kerryson is determined to nurture that element of surprise and push designers to take creative ideas to the edge.

The very fact that at the press of a button (or two) the perceived inner sanctum of the working theatre can be exposed to the general public within minutes is particularly exciting. It means the public can watch a show built from the ground up, that crew can work in daylight and that even those passing by outside can gain a quick glimpse of the inner workings.

Of course this level of transparency has implications in terms of performance: "When it comes to Curve, you can extend its potential to host a festival or carnival or any other form of performance art, as borne out by the spectacular opening production, *Lift Off*," says Viñoly.



## "It's sleek and aerodynamic on the outside but under its skin is this sophisticated machine"

**Below:** The building's transparency means even those outside can observe rehearsals and set building

"The theatre automatically swallows the stiff attitudes some people carry. People can perform on platforms that are still part of the venue, but not necessarily fixed to the actual stage or in the audience box itself. To me that level of extraversion has enormous value as it regenerates a sense of ownership for everyone."

For Viñoly it's like lifting the hood of an expensive car and looking underneath: "It's sleek and aerodynamic on the outside but under its skin is this sophisticated machine, which is also fascinating, complex and beautiful."

### Versatile space

System control and infrastructure for such a versatile space has to be supremely flexible. In terms of lighting, it had to be easy to set up and controllable in numerous complex scenarios and across different sites around the building.

"Curve has the technical flexibility to do traditional studio theatre or proscenium arch theatre or to experiment and go a little bit crazy," says Paul Moore, the Curve's technical director. "For lighting we have a network of connectors and nodes distributed all over the building enabling connection of lighting consoles pretty much anywhere we like."

The venue also features an impressive, integral stage automation system, incorporating a total of 76 winches to provide a versatile power flying system. Another 12 portable point hoists add extra resource. Flown rails frame the four sides of the main theatre and the 60 flying bars are managed using Stage Technologies' Chameleon software, controlled by two portable desks and two handheld consoles, which can be operated throughout the building. The stage floor can be removed, raised or lowered incrementally to allow any size or shape of object to be elevated anywhere on the stage.



Equally impressive are Curve's audio virtues: "The brief was that sound equipment had to be state-of-the-art and able to cater for every kind of production," notes Moore.

Oxford Sound and Media supplied loose audio equipment, which comprised various Yamaha digital consoles along with d&b speakers and amps. There is also a complex audio network throughout the venue, which makes for fast and easy turnaround of shows and means the venue has unprecedented levels of flexibility. In fact the main house and studio systems can be run seamlessly as one if required. Curve also has an impressive, fully equipped recording studio from which you can record input from anywhere else in the building.

"The whole building tie-lines back to one room, which can all be patched in one place allowing the venue to be used in any way a designer or director chooses," explains Moore. "I think this is amazing – it's not something that's particularly flashy or something that you can really show to people, it's just a load of wires. However the ability to make that exciting thing happen is made that much simpler with this kind of detailed design. Overall, I'm hugely impressed."

### Brave new tomorrow

By creating such a supremely flexible space, Rafael Viñoly, Leicester Theatre Trust and Leicester City Council have given Leicester a unique, technically sophisticated and utterly democratic venue, a blank canvas for many new performance art forms.

One can only hope that the powers that be ensure Curve is used to its full and exciting potential, and that the venue is allowed to develop a reputation for its own unique performance style. Curve's future success will rely on it becoming a destination venue, on breaking the bonds with conventional theatre practices, pushing creative possibilities to the limit and producing the kind of brave, groundbreaking shows this theatre was designed to deliver. ■

#### Author

**Sarah Rushton-Read** writes for numerous entertainment publications, including *Light and Sound International* and *Installation Europe*

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# Man of the people

Rafael Viñoly, the architect behind Curve, envisages his creations as democratic, open spaces that bring people together to share and reinterpret the arts

**Right: Rafael Viñoly**

**N**ew York architect Rafael Viñoly is respected the world over for his considered approach to building design. Yet surprisingly it's only in the last five years that he's really made his mark on British architecture. Curve is the first of five ongoing projects by Rafael Viñoly Architects to open in the UK, giving British audiences an opportunity to experience first hand the impact his buildings can make.

Born in Uruguay to a stage director father and an architect mother, by the time Viñoly was 20 he had set up Estudio de Arquitectura, which would later become the largest design studio in Latin America. Softly spoken with a distinctive accent that combines Latin American with New York, Viñoly comes across as a passionate and social man; he certainly loves to talk! With a central office in New York and affiliate operations in London and Los Angeles, Viñoly's unusually diverse portfolio, developed over a 45-year career, includes a number of landmark cultural and civic complexes – notably the Tokyo International Forum in Japan, Kimmel Center for Performing Arts in Philadelphia and New York's Jazz at Lincoln Center.

His philosophy for building design appears centred around a collaborative and interactive

relationship with both client and end user. It is Viñoly's belief that the essential responsibility of architecture is to elevate the public realm. Using Curve as an example, he puts great store in the end user – who they are, what they want, how they think and how they can benefit and develop from his design.

**Open space**

If Viñoly's buildings have any kind of signature it has to be the promotion of natural daylight; they literally burst with it. Often very open, they demand social interaction, remove traditional barriers and promote democracy. In theatres and places of entertainment Viñoly believes environments should encourage those people open to learning to mix easily with those who have something to share. It's about opening up the process, giving audiences unlimited, unfettered access to the art form and the people who produce it – it's about sharing.

"My fascination with designing theatres and performance buildings came from my father. He was a stage director and over many years he worked not only in the theatre, but also in opera and film. From an early age I harboured this curiosity about what went on behind the scenes. Of course I visited back stages throughout my childhood and it really made me appreciate the

A close-up portrait of Rafael Viñoly, an elderly man with white hair and glasses, smiling warmly at the camera. He is wearing a dark suit jacket over a light-colored striped shirt and a dark tie.

RAFAEL VIÑOLY

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**“Tradition is not a bad thing  
but it’s also not bad to try and be a bit  
more adventurous”**

places, embraced into general society. They should be made accessible to the public and have their doors open all day to anyone who cares to meander in,” he says.

**Shared experience**

For him the pleasure of live theatre comes from a collective, immersive and shared experience. “I believe there is a great future for theatre. Tradition is not a bad thing but it’s also not bad to try and be a bit more adventurous. I’ve always felt that the notion of secrecy when it comes to the process of production is something based on the ideas of magic and illusion – things that were really quite potent elements of the 18<sup>th</sup> and 19<sup>th</sup> centuries, but not so relevant today.”

If Viñoly is right then maybe the time is fast approaching where we will see the escalation of this, currently bubbling under the surface, natural revolution in live performing arts. Look hard enough and you will see it is actually happening all over the world. One of the greatest things about this impending evolution is that numerous barriers in the complex layer cake of celebrity; artistic interpretation and production will hopefully be smashed down to be reconstructed any way we like.

“To me it’s a hugely progressive idea to know how the play is set up and directed. It has tremendous appeal. I go to rehearsals and when I go back to see the finished production, as a member of the audience, I truly believe I’ve gained from observing the process, I understand the nuances of the production.”

Clearly then, for Viñoly, theatre production is not simply about two hours in a comfy seat, nice clothes and a gin and tonic in the interval! “A theatre production is not just a moment, completely diachronic and separate from the cause of life. That’s surely why we watch the classics over and over again? That type of re-addition and reinterpretation is really where the culture of performing arts has to go.” ■

rigour, risk and sense of elation people get from working in such environments, be it on the stage or behind it. When you watch someone being applauded, even from behind, you really feel some of that extraordinary bliss they experience.”

In his time Viñoly has also designed the occasional theatre set: “When you work on these productions you’re exposed to an environment and atmosphere that is so collegial, so wonderful and so improvisational. So many people don’t have a notion of that feeling. It seems to me that to increase the perception of the risk, which is very much part of the experience of art, particularly performing art, it is essential for audiences to understand it.”

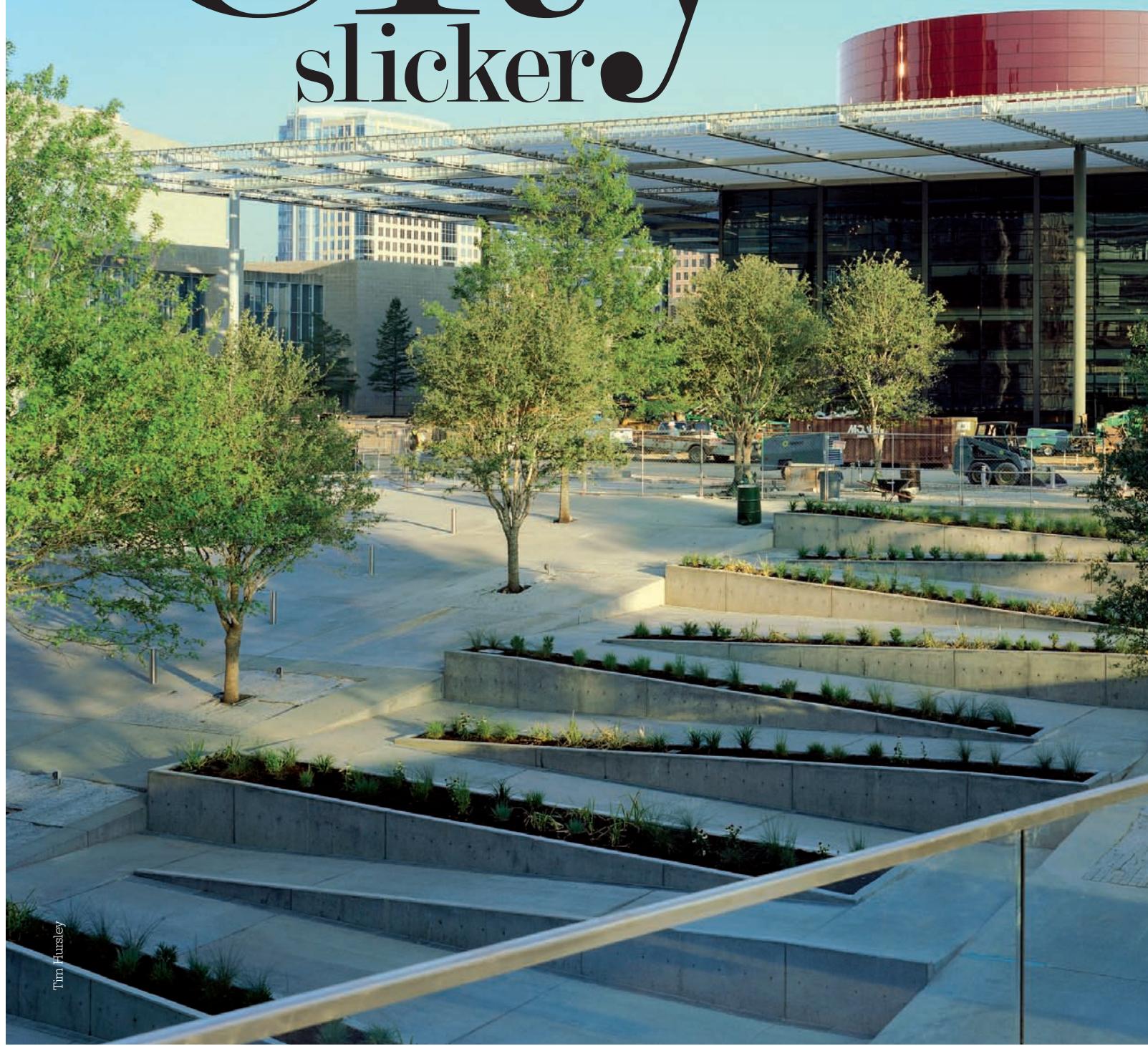
To that end many of Viñoly’s venues encourage that collegial feeling to spill out from the backstage and into the front-of-house areas. “In reality an informed and educated public make for a better public both in the form of critics and in terms of applause! The life of the theatre is so immensely absorbent, it is a community that has patterns and relationships and values that are not common in general society. I think exposing the public to this type of communal experience can have a tremendous sociological impact,” he says.

Obviously then Viñoly is opposed to the concept of theatre as a temple of culture or a museum. “Theatres should be participatory

**WINSPEAR OPERA HOUSE**

MARK LOWRY, AUDITORIA

# City slicker



Tim Hursley

Texas is celebrated for its oil wells, unique fashion statements and football team – but a vast, new performing arts centre complex in Dallas aims to add culture to the mix



Dallas is one of several large cities in a state better known for its appreciation of beef, boots and ballgames than for ballet and Britten. But a new downtown arts complex is attempting to change that perception. That's the hope, at least, for Big D, which until now has been surpassed culturally by Houston and, in the art museum arena, by Fort Worth. 'Impressive' is an understatement in describing the AT&T Performing Arts Center – the new corporate name was announced a month before its October debut; the project had been called the Dallas Center for the Performing Arts since the early planning stages in 2002.

Unlike most new performance halls, this is not merely one architectural monument to the arts. The complex includes the 2,200-seat Margot and Bill Winspear Opera House, marked by a dramatic red audience chamber encased in glass; the Dee and Charles Wyly Theatre (*see separate box*), an innovative 'floating box' that will house one of America's oldest regional theatres, the Dallas Theater Center; as well as the 10-acre Elaine D. and Charles A. Sammons Park; the outdoor performance area Annette Strauss Artist Square (opening in 2010, with lawn seating up to 5,000); and an additional 750-seat theatre, City Performance Hall, coming in 2011.

All that's just the latest installment in an Arts District that already features the Morton H. Meyerson Symphony Center, Booker T. Washington High School for the Performing and Visual Arts and three art museums: The Dallas Museum of Art, the Nasher Sculpture Center and the Trammell & Margaret Crow Collection of Asian Art.

Of the project, *Time Magazine* said "there hasn't been a performing arts project this ambitious since New York City broke ground on Lincoln Center half a century ago."

How's this for ambition: The addition of Norman Foster (architect of the Winspear) and Rem Koolhaas (Wyly) helps Dallas boast the world's only arts district featuring the work of four Pritzker Prize-winning architects (the Nasher was designed by Renzo Piano, and the Meyerson by I. M. Pei). The price tag of US\$354 million – a large chunk of which came from capital campaigns, with US\$18 million from a

city bond package and an undisclosed amount from the telecommunications company now on the complex's name – reflects the size.

Finally, the famous motto "everything is bigger in Texas" applies to the fine arts and not just sports stadiums and chicken-fried steaks.

### Seeing red

Anyone driving by the arts complex on the nearby highways Woodall Rogers Freeway and Interstate 75, at the northeast end of downtown Dallas, won't miss the vibrant red structure that surrounds the Winspear Opera House's ovoid audience chamber. Known as the 'drum', this mammoth ruby is the predominant jewel in a crown of muted colours and sharp geometric shapes and striking angles.

## Quite an entrance

The Winspear Opera House's principal entrance features the Annette and Harold Simmons Signature Glass Façade that ascends 60ft and encloses the public lobby, creating a transparency between the opera house and the surrounding park. The transparent façade provides dramatic views of McDermott Performance Hall, which will be clad in rich red glass panels, as well as the Grand Lobby, the staircase and the Box Circle and Grand Tier levels. An 84ft-wide section of the glass façade is retractable to a height of 23ft, literally opening up the Grand Lobby, Cafe and Box Circle-level Restaurant to Sammons Park.

The opera house also features a solar shading canopy that radiates out from the building in all directions, providing shade over the Harold Simmons Signature Glass Façade and part of Annette Strauss Artist Square. The solar canopy's louvers will be arranged at fixed angles following the path of the sun, calculated to provide optimal shade for the glass façade and outdoor spaces throughout the day.

But while the exterior is dramatic in colour but sleek in design, administrators of the resident companies that will perform there are excited that the subtle flourishes inside the auditorium won't take away from the real attraction: the art. The largest organisation using this space is The Dallas Opera, for which the acoustics were specifically designed.

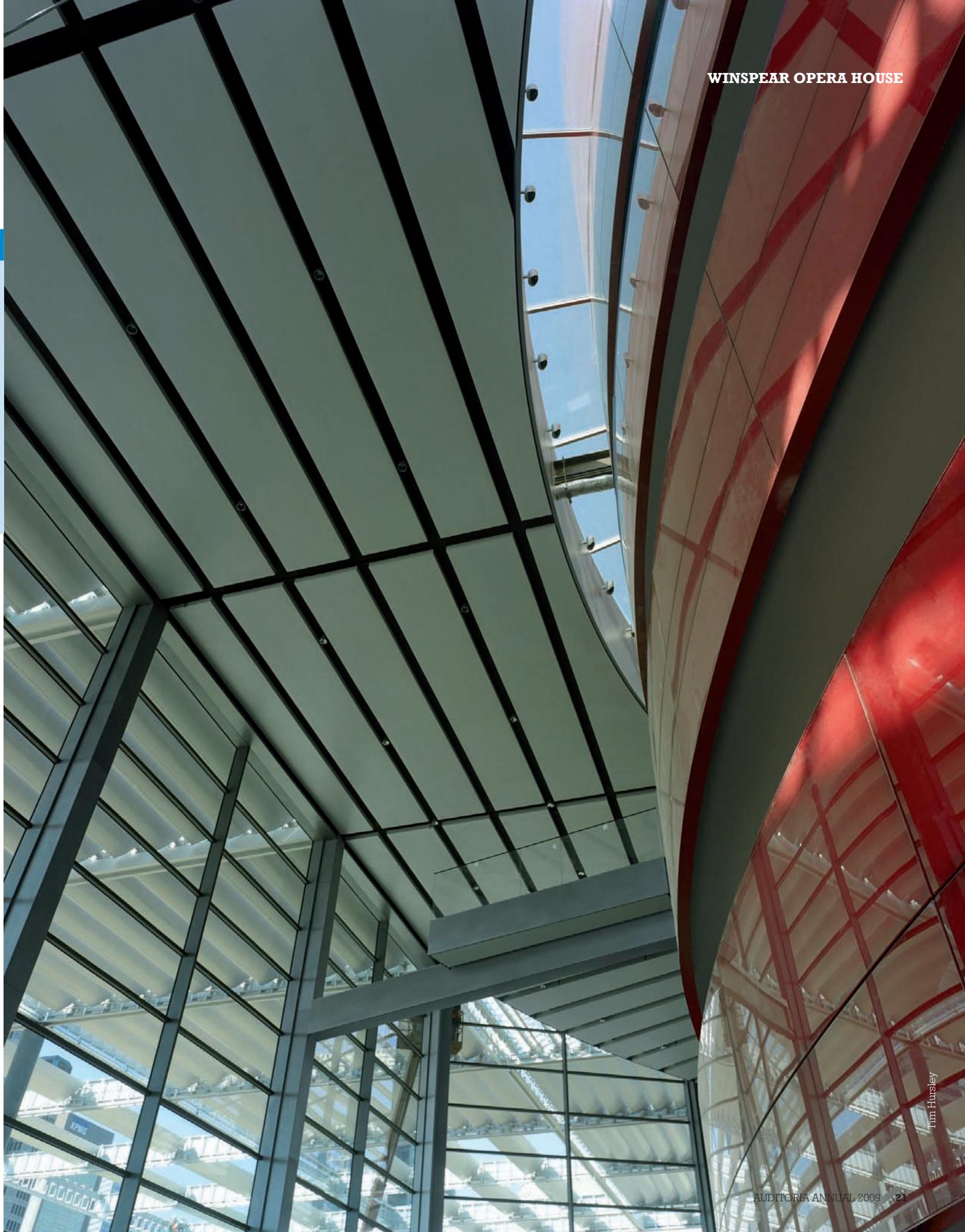
The other groups moving into this home are the Texas Ballet Theater, the Dallas Black Dance Theatre and Anita N. Martinez Ballet Folklorico. The Winspear also becomes the new home for resident fine arts presenter Texas International Theatrical Arts Society (TITAS), the new Jazz Roots series and high-profile lectures by Condoleezza Rice and Hilary Swank, among others.

These groups have used other venues in town for decades. The move to the Winspear is most notable for the Dallas Opera, the company that championed Maria Callas in the late 1950s and has had to use the cavernous and acoustically unsound Fair Park Music Hall, located on the grounds of the nearby State Fair of Texas.

The seat farthest from the Winspear stage is only 90ft away, which is still a shorter distance than from the stage to the first balcony seat at the Music Hall. The relative intimacy of the Winspear is just one reason the opera contingent has reason to celebrate. Finer acoustics, overseen by London-based firm Sound Space Design, is another.



The Winspear seats 2,200, with the furthest seat just 90ft from the stage

A photograph taken from the interior of the Winspear Opera House, looking up towards the glass roof. The ceiling is composed of numerous rectangular glass panels held in place by a black steel frame. To the right, a curved wall is covered in large, red, wavy panels. The overall lighting is bright, coming from the glass roof.

WINSPEAR OPERA HOUSE

Tim Hursley

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WINSPEAR OPERA HOUSE

Dallas Center for the Performing Arts

"I think the audience's experience will be dramatically enhanced by the intimate musical and theatrical performances that they will encounter in the Winspear," says the Dallas Opera's general director, Jonathan Pell. "The sightlines and acoustics of the Winspear will be extraordinary, and that *should* raise our audience's expectations."

Inside, the most obvious hint of opera-house opulence is a huge chandelier that rises to the ceiling before each performance. Unlike the giant lighting structures in European opera houses, this chandelier is composed of individual strands of energy-efficient LED tubes, hanging from cords that will rise in synchronicity. Robert Essert of the acoustics consulting firm Sound Space Design describes the attic above the chandelier as a "forest of pipes" in which each strand will be housed when out of the audience's sight.

The balcony fronts in the audience chamber are brushed in gold tints, which gives the hall the appearance of being larger than it really is. The proscenium arch is unadorned so as not to take away from the performances. Lighting and sound throughout relies heavily on green technologies, including the system for temperature control. Air ducts under each seat silently control the flow of cold and warm air, creating greater comfort for the audience. All this adds to the modernity of the design, which Pell doesn't see as too much of a break from the uppity traditions of opera-going.

"Although there is a modern aesthetic in the design of the interior of the Winspear Opera

#### Overview of the AT&T Performing Arts Center

House, it radiates such an elegant yet understated grandeur that I believe it will captivate the audience and create a wonderful sense of occasion," says Pell. "The colour scheme of the interior is not the traditional red and gold of 19<sup>th</sup>-century opera houses, but the charcoal brown and white gold of the audience chamber creates a dramatic atmosphere in which to perform great opera."

In the lobby, one staircase that wraps around the red drum features 12-carat gold leafing on the banisters and platinum in the multi-level walkways. While a fine-dining restaurant is scheduled for opening on the third floor, the ground level will boast a more casual cafe and a series of concession areas.

## Production Notes

**Name:** Margot and Bill Winspear Opera House

**Location:** Dallas, Texas, USA

**Cost:** US\$354 million (overall cost of AT&T Performing Arts Center)

**Capacity:** 2,300 (2,200 seated)

**Opened:** 12 October 2009

**Owner/operator:** The city of Dallas/AT&T Performing Arts Center

**Profile/features:** One of four venues that comprise the AT&T Performing Arts Center, the Winspear Opera House is a 21<sup>st</sup>-century interpretation of the classical horseshoe configuration. The Winspear also features flexible acoustics and stage and orchestra pit arrangements to accommodate ballet and other forms of dance. The building includes the Nancy Hammond Education and Recital Hall (200 seats), an indoor/outdoor café, restaurant, outdoor terraces and terrace bars. There's also on-site parking for 650 cars.

## Dee and Charles Wyly Theater

Another key component of the AT&T Performing Arts Center is the new Dee and Charles Wyly Theater, the new home of the Dallas Theater Center, which had previously resided for five decades at the Frank Lloyd Wright-designed Kalita Humphreys Theater. The Wyly, designed by Joshua Prince-Ramus and Rem Koolhaas, is an architectural wonder, not just for its intriguing cuboid exterior with tubular aluminum cladding (pictured, right) from Argentina, but for its appearance of floating above the ground, supported by six perimeter 'super columns'.

The audience chamber on the ground level (entered into from an underground lobby accessed from a sloping esplanade) can seat up to 575 and be adapted into myriad configurations by an intricate series of wireless controllers. For the opening show, *A Midsummer Night's Dream*, it was thrust and made use of the stage's electronically adjustable levels. The possibilities – which include moving and angling the balconies for better sightlines or flying them out of sight completely – would excite any theatre artist.

"The creative opportunities in the Wyly are nearly infinite," says artistic director Kevin Moriarty. "The building's unique architecture allows directors and designers to shape and mould the space to fit the needs of the play, rather than the design having to conform to the parameters of the space."

The audience might even include those outside the building, as passersby can look through glass walls, which can be shaded as the show inside dictates. Above the audience chamber, the administrative offices and artistic working spaces overlap and there's a black box for more intimate productions. "All of this is what we talk about when we say we like making happy collisions," says Benton Delinger from consulting firm Theatre Projects. "We can open the glass panels and involve the outside world if we want. It's the best outdoor theater built indoors."



**Below:** The Winspear (rear) and Wyly (foreground)



Tim Hursley

### United front

In fact, it's at the ground level where the designers hope to unite everyone who enters the building and create an aura of accessibility that grand opera houses too often don't achieve.

The Winspear's architect firm, Foster + Partners, and the site designers have imagined the buildings and grounds with the idea that every ticket buyer should have a shared experience that reaches beyond witnessing great art onstage. For example, the entry point into the Winspear is common for every audience member, accessible from the 650-space underground car park (another 250 overflow spaces are being carved out in the Arts District). Attractive landscaping, sculptures, native flora and free WiFi (from AT&T, of course) will help give the complex a sense of ownership – not just by the ticketbuyers, but by residents of and visitors to downtown Dallas.

The city's budget cuts, which were expected to slash nearly US\$2 billion (about 30%) from local arts funding, won't affect the centre itself, which is largely supported by private donations. But it will impact the companies that perform there and other cultural centres in the community, which doesn't send a positive message about the arts at a time when such a project is premiering.

But just in case there's any question about who has the big bucks in town, the names of all the donors who gave US\$1 million or more to the project are engraved at the bottom of a shallow reflecting pool on the grounds of the Winspear. Everything is bigger in Texas – including wallets. ■

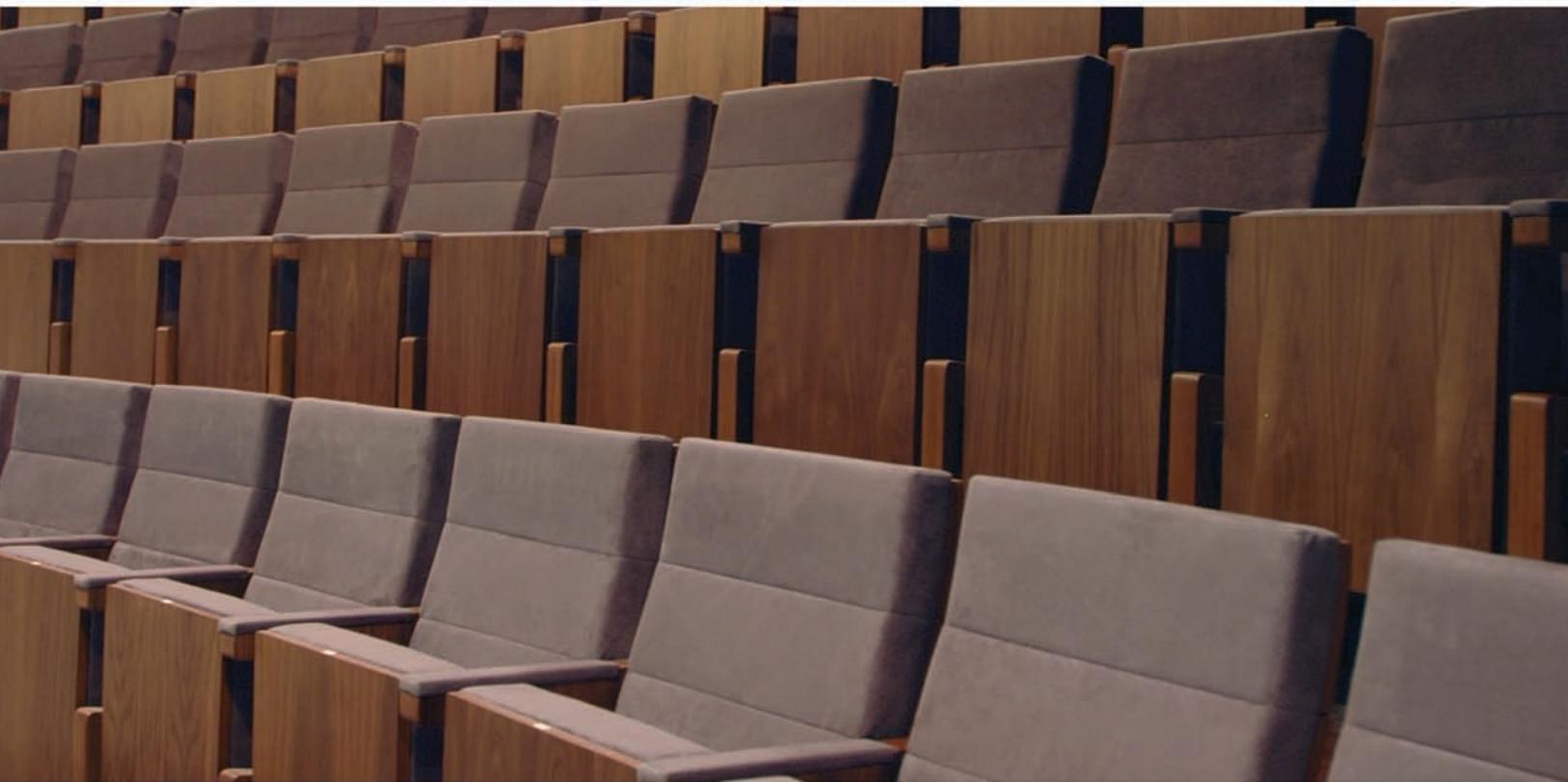
### Author

**Mark Lowry**, former theatre critic at the *Fort Worth Star-Telegram*, is now a freelancer covering the performing arts in North Texas

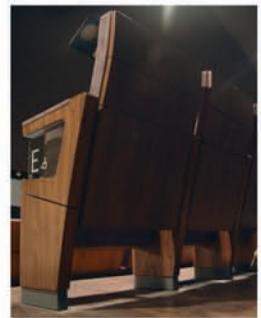


Margot and Bill Winspear Opera House  
Dallas TX, USA - 2187 seats

Architect - Foster + Partners  
Consultant - Theatre Projects Consultants



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## CONVENTION CENTRES

RICHARD VAUGHAN, AUDITORIA

# Breaking with convention

Convention centres needn't always be cold, poorly lit and miles from town – a new generation of buildings suggests change is in the air

Christine Radecic

**Phoenix Convention Center**

## CONVENTION CENTRES

When we think of convention centres, an unhappy image is conjured. Anyone who has spent any time in these yawning, air hangar-like spaces knows they can be an uncomfortable place to visit. They are generally cold, echoing boxes that exist in the extremities of a city's limits. Or perhaps they are the sole remaining living venue sitting in a former Olympic park – the one building that still draws people out to their forgotten corner of the city without the need of some sporting event or other.

Those who regularly visit these buildings know only too well of the lack of any natural light, the shabby banqueting areas and, worst of all, the endless corridors of strip lighting that you have to walk to get to your next meeting.

But there is a new breed of convention centre that is shaking the tired and beleaguered image. It is cropping up more and more in North America and developing nations, one that sits in the heart of the city, a destination of its own.

Two key players behind this renaissance are two American practices in the shape of Populous (formerly HOK Sport) and LMN Architects.

### Light relief

A leading example of the new type of convention centre in Populous's portfolio is its 2,200,000ft<sup>2</sup> of building in Phoenix, Arizona completed in December 2008. Senior principal Todd Voth said it is his dislike of the usual convention centres that drives him on each day.

"I hate convention centres, and I'm on a mission to change them," he says. "What it all comes down to is the overall customer experience. We're seeing a move towards these places becoming a destination. It has to appeal on all levels – it's not just a convention centre, you have to have hotels, retail, the right dining and cultural experience in place. When you speak to people who use these buildings often, the one thing they cannot tolerate is the lack of natural light, they say 'You trap us in these rooms so give us an environment that is comfortable'."

To achieve this with the Phoenix Convention Center, Populous flooded the building with natural light and even provided people with outside meeting rooms.

Phoenix's striking exterior is inspired by the nearby desert





But perhaps the greatest challenge is trying to integrate a building of this scale into the heart of the city: "It creates a difficult challenge," says Voth. "These are big, modern buildings with all of these facilities – they would go block after block and that would kill the city."

To get around this, Populous decided to sit a large proportion of the centre underground, which provided the team with a number of added benefits in terms of sustainability and with the operation of the building.

The first exhibition hall is 70ft below the surface but this also allowed the practice to hide the trucks so the building's users never see all the activity that goes behind running the centre. By digging down, Populous was able to stack the convention centre without creating a building too tall, which would have been out of keeping with the urban context of that part of the city.

"Above the first exhibition hall is where all of the banqueting areas are. This is where the highest traffic of people is – they are located around the edge of the building bringing the city into the centre," explains Voth.

The portion of the building above the surface is what Voth calls a 360° building, one which knits the surrounding city into it.

A second exhibition hall is located on the top of the building, serviced by a hidden road, again keeping the trucks out of sight, and the truck depot itself is hidden by screen walls.

By elevating the second hall it allowed Populous to create a different type of space with column-free rooms providing users to stage "super meetings" of up to 10,000 people.

### Where am I?

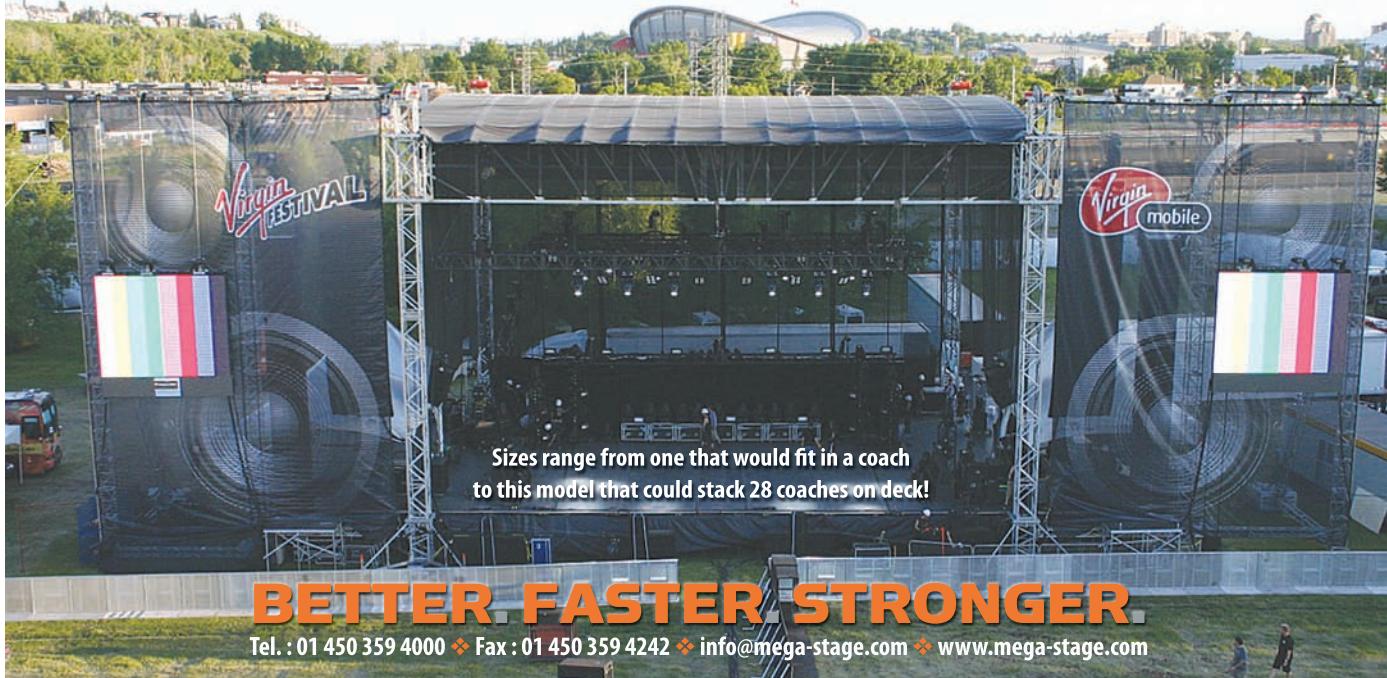
Expressing the building's design through its context was integral to making the convention centre feel part of the city. A main criticism of convention centres, says Voth, is that they often give you no idea of the city you are in.

"The building needs to say something about the location, the people and the culture," he says. "When you are in Berlin you need to know that you are in Berlin. More often than not the experience you have from other convention centres is that they are all the same."

The inspiration for the centre came from the desert in which the city sits. The building

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## CONVENTION CENTRES



echoes the striated rock formations of the Grand Canyon and it was the heat of the desert environment that gave Populous the idea to go underground, providing the building with natural cooling.

"Arizona is home of the Grand Canyon, striated rock formations created by a river long since gone, and the intensity of the heat in the desert creates these different colours. All of those factors – the memory of water, the colours – are all articulated in the building abstractly," Voth says. "You look at the animals in the desert, the reptiles go underground, so that solved a variety of problems. We also used sun screening to take the direct sun off the building and used a highly efficient glazing system. We also paid a lot of attention to the building so it was properly insulated. We wanted to put a planted roof on there but it is hard for anything to grow on there," he adds.

### Green shoots

A planted roof is the distinguishing feature of Vancouver's new convention centre, designed by LMN Architects. Opened in April this year, the Vancouver Convention Centre boasts a six-acre 'living roof' that acts as both a natural ecosystem for a variety of animals and plants as well as providing insulation and a water filtering system.

Located on the city's waterfront, the building was created by 40 different collaborators, who worked together to integrate the building into the surrounding city.

Practice partner Mark Reddington says the building must at once act as part of and for the community it serves: "It has to work as a piece of public realm for the community. When a person

## Pastures new

Developing countries, such as India, are becoming an increasingly important market for convention centre designers. The convention centre market in the US is rumoured to be 20% down as a result of the global recession, and global practices such as Populous are moving further afield.

The firm's new DLF International Exhibition and Convention Centre in Delhi, India, is currently in its design stage. The building is central to a major regeneration project taking place in the city and will provide more than 210,000ft<sup>2</sup> of exhibition space, a 10,800-seat plenary hall as well as an art museum and three luxury hotels.

goes to a convention centre it should integrate as being part of the civic and cultural life of the city," he says. "First off we started to think about the city, the public realm there, the culture of the community and asked how we design a building so all of these factors are served well."

The building is designed as an expression of Vancouver's unique surroundings – it incorporates the water, the mountains, the landscape and the urban core but at the same time it looks unlike any other building in the city.

Sustainability plays an integral part in the centre. Its roof, the biggest of its kind in North America, provides vital cooling during the summer months, while also controlling storm water, which is used to irrigate the roof and provide grey water for the building's use, primarily to flush the toilets.

It is even home to 60,000 bees, which produce honey that is sold in centre's shop downstairs.

Reddington says: "You could ask the fundamental question, should we be getting on aircraft and travelling there in the first place? It is

**Populous is designing the new DLF International exhibition and convention centre in Delhi**

## CONVENTION CENTRES



Studio 216

### San Jose Convention Center Expansion

Although currently on hold, LMN's 294,000ft<sup>2</sup> of San Jose expansion continues the practice's ethos of building integration. The practice says the new centre's design is built on the city's world prominence in technology, while being equally informed by the city's landscape and Mediterranean-like climate.

A key feature of the new centre will be its new ballroom, which will become an interactive "smart building", located within landscaped public spaces and courtyards.

Practice partner Mark Reddington says: "We are really looking forward to this project. I think it will create a totally different building and a new kind of place. The 21<sup>st</sup> century is all about the city. What we are becoming more interested in now is urbanism and how the city is evolving and how that can inspire how we create convention centres."

**Above:** Proposed San Jose expansion

a basic human need for people to want to interact with one another. It is not something the internet will replace. Community gathering is not just on a local level so there will always be a need for the convention centre. If you accept that, if you accept that people have to be there, then you create a place that allows them to do all the things that you would go to a city to do."

**Below:** The Vancouver Convention Centre's living roof



Tomas Cho Jr

To negate the effects of this need to travel, LMN's main aim is to lower the energy consumption of their buildings throughout the building's lifespan. But while the planted roof, specialised glazing and other factors make the building less energy hungry, they also act to "acoustically isolate" the building.

The convention centre is located next door to an airport that serves small seaplanes, so the building has to be as sound tight as it is airtight. This was best demonstrated on the building's official opening night, according to Reddington. "They were showing off the building's sound system, and played the sound of a helicopter flying around," he says. "Then at the side of the building a real helicopter appeared right next to the building. They then cut the sound and you couldn't hear a thing, the glazing and roof meant the building was totally soundproof."

The building's opening attracted 65,000 members of the public, which, Reddington believes, is a good sign of a building's acceptance into the community.

"One thing we think is vitally important for convention centres is that it is integrated into the city, having the right public realm, it wants to feel of that place, so people in the city think of it as being part of that city," he says.

The new breed of convention centre is nothing like what we think of when we imagine those cold warehouses with strip lighting. Instead, they are living, breathing pieces of the city, providing spaces for art shows, live music gigs and even the odd trade show.

Perhaps the time has come to start to think of a new name for them, because the new breed of convention centre is anything but conventional. ■

#### Author

**Richard Vaughan** is an architectural writer and journalist based in London



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MICHAEL CRABB, AUDITORIA



# Boxing clever

Toronto's TELUS Centre for Performance and Learning hopes to square the circle for those educational institutions looking to make a few bucks on the side



The 1,135-seat Koerner Hall at  
Toronto's TELUS Centre for  
Performance and Learning

**O**n 25 September, a gala audience gathered in downtown Toronto to celebrate the official opening of Koerner Hall, a versatile 1,135-seat concert venue of understated elegance and the crowning jewel in an ambitious US\$120 million expansion of Canada's Royal Conservatory of Music (RCM). Even before it opened, the hall was garnering media praise for its sophisticated design and for the ingenuity required to construct it on a tight footprint.

The hall's interior is warm and welcoming. Honey-stained oak abounds. The seating by the Slovakian company Seda has chocolate brown cushioning. Gypsum wall tiles with a rough, burlap-textured finish are designed to reflect and disperse sound waves, but their undulating pattern and dark grey tone provide a pleasing visual contrast and echo the building exterior's Turkish facing stone.

The stage is wide enough for a full orchestra and is extendable. The three front rows of seats can be lowered and shunted back beneath the hall, leaving a space that can serve either as a small orchestra pit for semi-staged lyric theatre or be elevated to expand the stage area.

The room's box shape, slightly tapered in a reverse fan, is softened by the convex curves on the front of two wrap-around balconies, and its 60ft-high ceiling is disguised by a stunning architectural flourish. Described as a 'veil', it consists of curved and twisting wooden 'strings' that originate behind the chorus gallery, swoop over the stage – where they discreetly integrate with an acoustic reflector canopy – and continue through the chamber. This wooden veil is a unifying feature that pulls the room's elements together and gives Koerner Hall an unmistakable visual signature, one the RCM hopes, since the hall is wired for television broadcast, may soon become known nationally and beyond.

Koerner Hall is yet another feather in the cap of the award-winning Canadian architectural firm, KPMB, and its design collaborators, London-based Anne Minors Performance Consultants, and Sound Space Design's founder, Robert Esett, who was already a local cultural hero for his acclaimed acoustic design earlier this decade of Toronto's opera house, The Four Season Centre.

With Marianne McKenna, co-founder of KPMB in 1987, as lead architect, the team's priority was to create an intimate space for



KPMB Architects/Norm Li & Q Studio



the performance of classical instrumental and vocal music – from solo recital to full orchestra. The RCM's educational mandate, however, embraces a wide range of musical genres and its programming ambitions require a hall that can cater to the amplified sounds of jazz, pop and world music. The RCM also views the hall as an attractive venue for film screenings, lectures, and educational conferences.

Koerner Hall's 10-concert 'Grand Opening Festival' was an apt declaration of musical diversity. Classical tastes were catered to with performances by The Royal Conservatory Orchestra with the Toronto Mendelssohn Choir, the Emerson String Quartet and mezzo Frederica von Stade on her farewell recital tour. The festival also featured more eclectic music, such as a reunion of cross-genre jazz trio Chick Corea, Stanley Clarke and Lenny White; Cantopop stars Frances Yip and Anthony Lun; Delta bluesman Keb' Mo' and legendary sitarist Ravi Shankar who performed with his daughter Anoushka Shankar.

The hall is the first of its scale and acoustic refinement in the heart of Canada's largest city. The 16-year-old, 1,036-seat Eb Zeidler-designed George Weston Recital Hall at the Toronto Centre for the Arts is widely admired for its superb acoustics but is under-utilised. Its location almost nine miles north of the city core places it off most downtowners' radar.

Koerner Hall is one of two performance spaces included in the RCM's new TELUS Centre for Performance and Learning – named for the major Canadian telecommunications company that in 2004 contributed US\$10 million towards what was then a modestly targeted US\$55 million 'Building National Dreams' campaign.

The other venue, known as the Conservatory Theatre – until a generous multimillionaire donor can be charmed into naming it – is a lofty, windowed, 900ft<sup>2</sup> space with flexible seating for as many as 150 people and acoustics designed to match those of its larger neighbour. Its primary function is educational but it's already being used for small-scale public performances and talks.

### Getting down to business

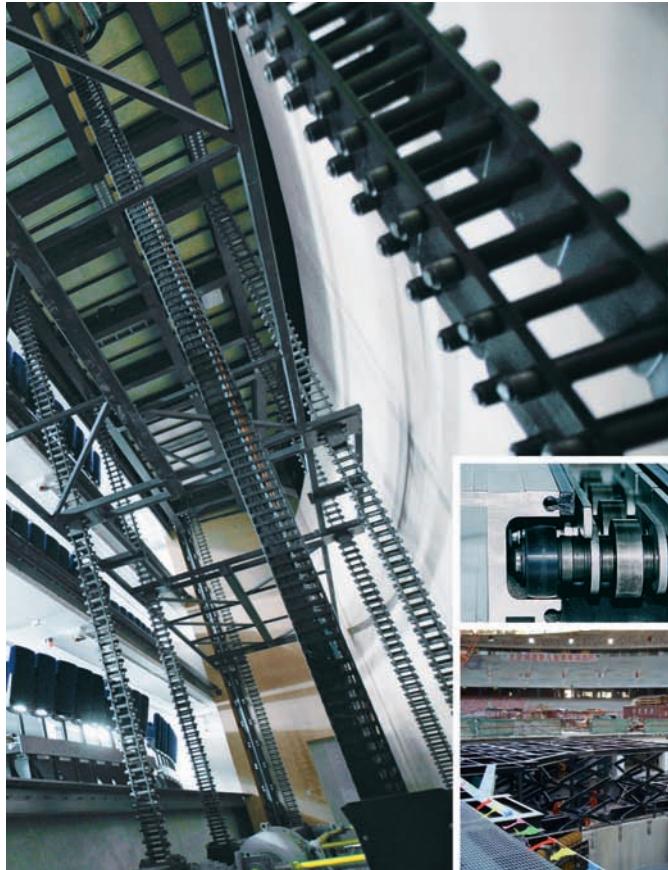
The opening of Koerner Hall, named for loyal RCM benefactors Michael and Sonja Koerner, is a historic milestone for the venerable educational institution. It marks its entry into the financially precarious concert presentation business.

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PUSHING AHEAD



In April this year the RCM successfully lured Mervon Mehta from his job as vice president, programming and education, at Philadelphia's Kimmel Center to become executive director of the conservatory's new performing arts division. Mehta, the first son of Canadian soprano/voice teacher Carmen Lasky, spent his early years in Quebec when his renowned father, Zubin Mehta, was music director of the Montreal Symphony. Mervon Mehta's career as an actor continued in Canada before his move into arts management 15 years ago.

The day-to-day operations and programming of Koerner Hall are Mehta's responsibility and, with little lead time – "I started the job sprinting," he jokes – but an impressive Rolodex, he's already booked a first season of almost 70 concerts, of which about 20 are staff/faculty presentations and the rest outside musical attractions. Visiting artists will also give master classes, helping bring the RCM's students into more intimate contact with professional musicians. "It nicely dovetails our music education programmes with our presentation business," says RCM president Peter Simon.

Meanwhile, Mehta has also begun building working relationships with local companies such as Opera Atelier and Tafelmusik and with such other presenters as the Toronto Blues Society, Soundstreams Canada and Massey Hall. His goal is to cooperate not compete. "In this business none of us make a dime," notes Mehta, "so let's help each other or stay out of each other's way."

Yet, making a dime, or not losing too many, is a very real concern. The first year comes with many unknowns. Mehta is convinced the era of fixed season subscriptions is on the wane. "I didn't want to be on the tail end of that," he says. Instead he's offering patrons as much as a 15% discount if they buy tickets to multiple concerts. He's also aiming to acquire a name sponsor for each concert, not

**The Koerner Hall's glass lobby affords generous views of the surrounding city**

necessarily an easy task while the RCM remains in full capital campaign mode. Apart from box office and sponsorship revenue, Mehta is also hoping the facility will attract outside users, whether for a concert, a business meeting or bar mitzvah. His objective is to make Koerner Hall at least a revenue neutral business and to prevent it becoming a drain on the larger institution.

**A long journey**

The US\$40 million annual budget and multidivisional operations of today's RCM would have seemed unimaginable to those who in 1886 founded the Toronto Conservatory of Music (its Royal charter came in 1947). The conservatory pioneered a graded music curriculum and rigorous examination system that for decades has permeated the musical life of Canada, both amateur and professional.

With a mission "to develop human potential through leadership in music and arts education", the RCM has grown from its community school roots to include several divisions: the Glenn Gould School, founded in 1997 to prepare talented students for professional careers; a far-reaching Learning Through the Arts programme; and a new computer-based music education and multidisciplinary creation initiative.

Since 1963 the RCM has been headquartered in an 1881 heritage building, a stone and brick Victorian pile, owned until 1991 by the University of Toronto. The RCM gained its independence from the university and title to the property, but with the stipulation that it must undertake significant upgrades to a badly dilapidated facility. It was then that Dr Peter Simon, a former RCM student, Juilliard-trained pianist and music educator, left his job as head of the Manhattan School of Music to return to Canada to become the RCM's president.

The RCM's property – close by the condos, hotels, eateries and designer stores of Toronto's ritzy Yorkville – fronts northward onto busy Bloor Street. To the immediate east is the iconic Royal Ontario Museum, given a controversially jutting, 21<sup>st</sup>-century facelift by star architect Daniel Libeskind. To the south, west and east the site is confined respectively by the University of Toronto's arena, stadium and Philosopher's Walk, a park-like pedestrian thoroughfare.



Tom Arban Photography

Marianne McKenna had already developed a master plan for the site, but in 1991 Peter Simon's priority was to fix the leaks in the old McMaster (now Ihnatowycz) Hall. The next step, with funding support from the Ontario government, was the renovation of a former chapel – from the building's Baptist college past – to make it a 237-seat chamber music performance space, Mazzoleni Hall.

McKenna's master plan evolved in step with the conservatory's rejuvenated ambitions and in 2002 the RCM successfully applied for matching federal/provincial capital funding through a Canada-Ontario Infrastructure Programme that has kick-started several major cultural renovation and construction projects in Toronto.

With US\$20 million of government funding and a vigorous capital campaign in full swing, the RCM's goal was now a renovation of its entire heritage property and a physical expansion to provide much-needed additional practice studios, classrooms, offices and what initially was to be a 600-seat performance hall. But as the money came in the RCM decided in 2004 on a bolder plan, "a defining step" as Peter Simon puts it, to build a 1,000-seat facility – a state-of-the art hall for the presentation of public concerts.

### **Major league player**

Some of the details, such as the range of intended usages, changed along the way, but Simon was clear about what the RCM fundamentally wanted, "a major league hall", with superb acoustics and

**Koerner Hall's signature roof is part of the acoustic plan and also helps hide equipment**

an intimate interior that optimises the connection between audience and performers. And although the new hall, with its broad programming ambitions, is equipped with sophisticated sound, lighting and rigging systems, Simon didn't want the audience to be distracted by visual clutter. The technological wizardry should somehow be hidden. McKenna's 'veil' achieves that goal.

Given the site's space constraints – a daunting challenge for PCL Constructors Canada, the project's general contractor – the design team had to locate the new hall on an east-west axis to the south of the RCM's heritage building. This meant the hall would essentially be invisible from the street but also spurred design solutions that integrate old and new and transform the RCM into a more vibrant public facility.

KPMB's corporate hallmark is a holistic awareness of urban context, a functional design-focused approach that without eschewing aesthetic distinctiveness is the antithesis of the blaring, look-at-me buildings of today's celebrity architects. The TELUS Centre is very much an expression of KPMB's values.

Koerner Hall's glazed east side affords magnificent views of the ROM and leafy Philosopher's Walk. It is linked to the Victorian building by an atrium that symbolically unites the RCM's educational function with its new initiative in professional music presentation. The Atrium, equipped with café and catering kitchen, is open to the public throughout the day and gives the RCM unprecedented visibility.

The new, six-storey education block sits to the west, wrapping around Ihnatowycz Hall to front onto Bloor Street. This is where concert-goers will enter the complex before progressing, one level up, alongside the atrium to access Koerner Hall's generously scaled main lobby at its east end.

As a physical achievement, the built project is a testament to the benefits of collaborative design. The hall's inaugural season reflects the imaginative programming strategy that will animate the hall in the years ahead. Now, the crucial question – which hardly anyone dare voice – is simply this: "Will people come?" For the RCM, a lot is riding on a positive answer. ■

### **Author**

**Michael Crabb** is a Toronto-based freelancer

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# Spanish steps

Auditoria & Performing Arts Centres Executive Summit 2009, held in Barcelona's beautiful Palau de la Música, provided delegates with a fascinating insight into the many challenges facing venues around the globe

**A**s you can see from the photos opposite, the Auditoria & Performing Arts Centres Executive Summit 2009 (AES 2009) held earlier this year in Barcelona's beautiful Palau de la Música, which celebrates its hundredth anniversary this year, was a roaring success. Delegates were treated to a comprehensive conference programme in one of Europe's most impressive venues, which itself has undergone a radical transformation in recent years with the addition of the Petit Palau – a modern, subterranean 538-seat auditorium that proved the perfect location for the conference.

"As we know, change is the only constant in the entertainment sector and – even with a century of entertainment experiences in hand – the management of the Palau, a UNESCO-World Heritage Site, are embracing the latest technologies and programming ideas to reach out beyond their traditional audience," said Ian Nuttall, event director, during his opening speech. "Traditional ticketing and subsidy finance are giving way to customer-centric marketing, coupled with a healthy dose of commercial pragmatism. New sales and marketing channels are allowing the best venues to reach into new markets and capitalize on their major assets – the venue, its content and its environs," he continued.

"AES 2009 is all about the industry meeting at a time of economic turmoil, falling audience numbers, rising competition from other forms of

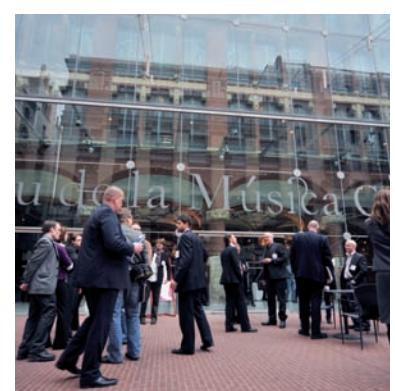
leisure, against a changing demographic, including a youth audience that has little or no appetite for simply watching performances, and looking for answers. How do you keep audiences coming back? How do you engage with new audiences? And, irrespective of the performance on the stage, how do you make your venue better, more memorable and more compelling than other places?"

Answers were provided by leading managers of some of the world's most exciting and innovative venues, including the Jean Nouvel-designed DR Byen (Danish Radio Musikhuse), Copenhagen, Denmark; Melbourne Recital Centre, Australia; the rejuvenated Wexford Opera House, Ireland; the Lincoln Center, New York, USA, which has recently undergone a multimillion dollar transformation; and the O<sub>2</sub>, Dublin, Ireland to name just a few.

Beyond the conference, an exhibition and evening networking events ensured over 200 delegates gained the maximum value from a truly informative, enjoyable and valuable summit in one of the world's most beatiful buildings.

"It has been a success and an experience that will help place the Palau on the international world circuit," said Clara Millet, the Palau's international department director. "The summit is just one step in the Palau's internationalisation plan, which includes partnering with other auditoria, the Palau's presentation in the USA, and an educational and social choral singing project in Mumbai, in collaboration with Maestro Zubin Mehta." ■





# Sound check

Arup's SoundLab allows clients to fine tune the acoustic qualities of their buildings – before construction even begins!

**Top: Constellation Center's SoundLab in Cambridge, Massachusetts, USA**

**Bottom: An Arup SoundLab in Hong Kong**

A few weeks ago, David Taylor, leader, Arts and Culture, Arup Americas, sat with lighting designer Toby Sewell in the Sydney Opera House's lighting pre-visualisation suite, carved out of an old usher's store room at the rear of the opera house. Both men were fascinated by this essential tool, which is used to relieve production time on the Sydney Opera House's stages by accurately visualising the lighting plan and levels. This time saving allows for greater creativity and safer working conditions – but imagine if such premonition could actually affect the design rather than just respond to it.

Arup's SoundLab is an immersive design tool that not only allows designers of buildings to listen to the built environment before it is finished, but also to hear and understand the changes that finishes, materials and design make to the acoustic success of their creation. A number of signature cultural buildings have benefitted from the use of Arup SoundLab in design, and Arup is using the facility to provide early design input and testing for high-profile performing arts buildings currently on the drawing board.

## Greek gathering

Earlier in the summer, Renzo Piano and his design team from France, Italy and New York sat quietly in the Arup SoundLab in New York as acousticians Alban Bassuet and Raj Patel moved them, sonically, around a number of key new and historic opera houses from Europe. Emboldened by its aural experience of great halls, the eager group focused on the options for the new home of the Greek National Opera in the Stavros Niarchos Foundation Cultural Center (SNFCC) project in Athens that Arup is helping create.

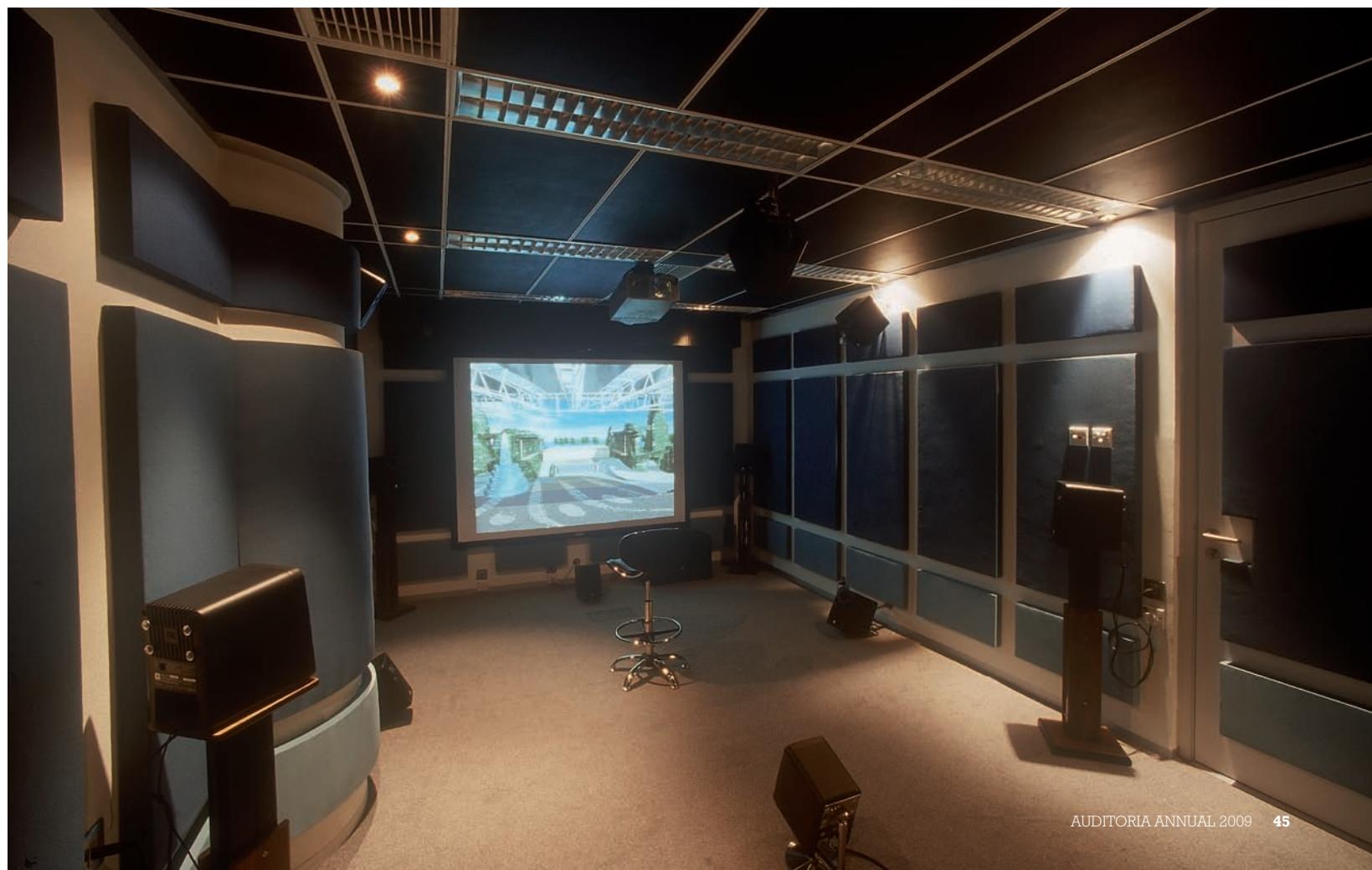
Moving at the speed of sound between opera houses in Italy, Germany and Arup's new lauded opera houses in London, Oslo and Copenhagen, Renzo and his creative team were immersed in the actual sound of the opera houses from various seats. Fast forward to the new SNFCC Opera House and the team's desire to explore the gross arrangement of the balcony rings and their relationship to the singer and orchestra. Although the building is years from completion, the gathered team were able to experience the beauty and challenges of the different balcony arrangements as if they were sitting in the seats of the hall after opening. Specifically the team compared the acoustic proximity of a forward-leaning balcony with the intimacy and envelopment that could be heard if the balcony addressed a more vertical alignment.

When an audience experiences music in a concert hall or speech in a theatre they hear a distinct sequence of sound components – firstly, the direct sound from the performer arrives at their ears (discernible as coming from the artist). Following this, a series of reflections arrive from the wall and ceiling surfaces of the room, each with a directivity and time for travel to the audience ears. Acousticians understand this sequence as the 'impulse response' of the theatre or concert hall, and each hall has a unique response or 'acoustic signature'.

Arup's SoundLab uses this signature as the basis of a playback and adaptation system, through a sphere of focused loudspeakers that replays the exact timing, strength and directivity of the impulse response to the enveloped listener. These variables can be recorded from an existing room or predicted from computer models developed from drawings of new halls or ones undertaking renovation. Clients, musicians, architects and stakeholders in the acoustic



André Costantini



## ACOUSTICS

Keith Paisley/Spring House Design Associates



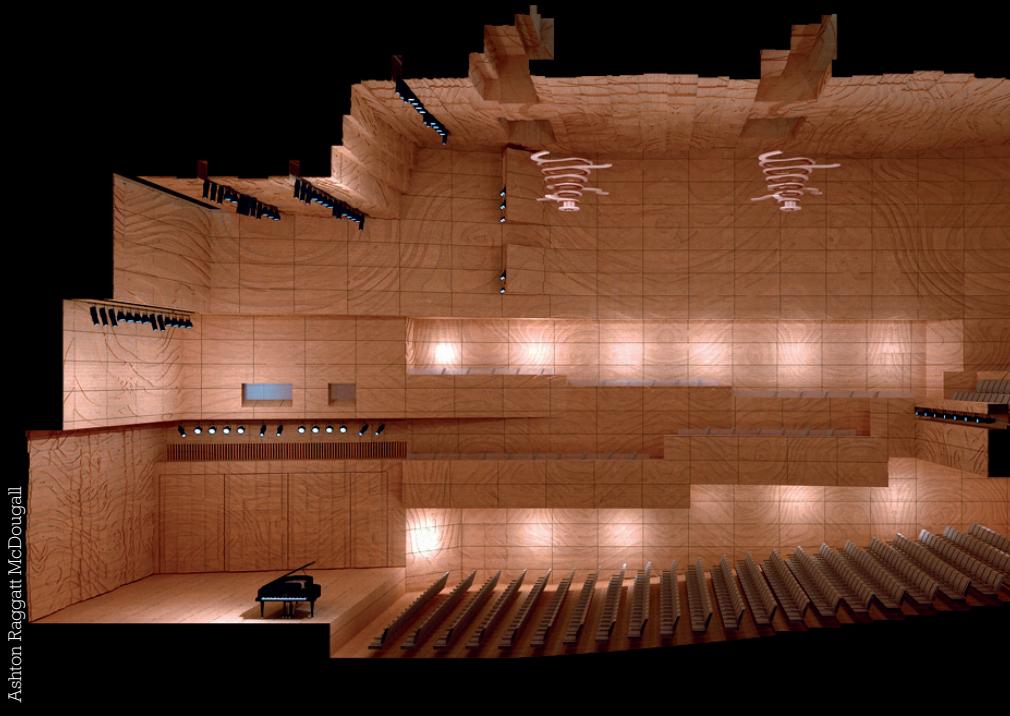
**Arup SoundLab has been used to predict the acoustics at both the concert hall at Kings Place (left), and the Melbourne Recital Centre (right)**

success of the space can understand through hearing the way in which different aspects of the built environment – finishes, materials, width, height, mass, etc – can affect the sound. In the latest iterations of the Arup SoundLab in New York, Los Angeles, San Francisco, Melbourne, Sydney, Hong Kong, London and Glasgow, changes to architectural components can be manipulated on the fly, helping designers make more effective and sustainable architectural choices, and freeing the design team from the ‘wait and see (listen)’ approach previously required by conventional building practice and acoustic design.

### Game, set and match

In Australia, the Arup SoundLab enabled choices in shape, dimension and finish to be explored in the virtual aural environment during the early design phases of the Melbourne Recital Centre, a new national music venue, which comprises the 1,000-seat Elisabeth Murdoch Hall and the more intimate 130-seat Salon recital hall. Both rooms celebrate indigenous art and culture in their tessellated timber wall and ceiling finishes, complex surfaces that both draw the eye and drive the acoustics. Auralisation of the opportunities and challenges of the wood shapes enabled the team and client to gain comfort with the design choice, but also to adapt and refine the motif in both rooms to effectively support the musical programme, now and as it adapts in the future for new audiences. The ability to listen to the room in a calibrated and accountable way was key to the successful integration of the

Ashion Raggatt McDougall



rooms' designs and acoustics. The Arup SoundLab accurately predicted the sound quality in the finished room (and, as in most jobs, the Arup team compared an accurate surround recording of the finished room with the final design auralisation model, to confirm the match).

This successful digital prediction was also at the core of the development of the Sage, in Gateshead, UK (where Arup's digital model has recently been used to understand staging challenges in the hall, five years after opening), and also the concert hall at Kings Place, the first new concert hall in central London since 1982, where the hall options were analysed and auralised at the very outset of design and enabled the much admired acoustic design to evolve along with the beautiful architecture.

Kings Place and the SNFCC Opera House are both good examples of new thinking engaging new architecture to support new audiences. Both rooms will embrace music, media and technology in new ways, and the design process has similarly drawn upon Arup's cutting-edge technology to crunch numbers and algorithms, data and research to distill the process of good acoustics to a simple experience for the architect, artist and designers – an experience of listening. Good listening and honest comparison, early in the design process, and undertaken interactively, cannot help but lead to better buildings for music, the voice and the drama and experiences that will excite and engage existing and new audiences into the future. ■

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# Stage managed

Artec has pioneered and refined a number of design solutions for the zone between the artists and audience



**Above and below:** Thrivent Hall, part of the Fox Cities Performing Arts Center

The shaping of the front edge of the stage area of any hall is key to defining the contact between the audience and the artists. It also significantly affects the architecture and budget of the venue – making it an essential consideration at the outset of any project.

Three of the following case studies will illustrate how lifts have been designed to meet project-specific needs in accommodating a range of ensemble types, while ensuring optimal audience and performer experience. A fourth example will show how a manual system achieves the same goal with a lower capital cost, but higher changeover time.

These examples are restricted to the incorporation of lifts to shape performance spaces and do not cover examples where lifts are used to move material or as part of an artistic concept.

## A multi-use theatre

Multi-use theatres need to accommodate a wide variety of performance types, from theatrical performances (drama, Broadway musicals, dance, ballet, and opera) to music performances (symphony, choir, and pop music). Artec's pre-design planning process defines the requirements that will make the facility particularly effective operationally, artistically and acoustically.

At the 2,100-seat Thrivent Hall within the vibrant Fox Cities Performing Arts Center in Appleton, Wisconsin, USA, the specific design of the forestage area and its lifts responds to programme requirements in an innovative manner. The facility was designed by Zeidler Partnership and Artec, with construction by the Boldt Corporation taking just 38 months.

During the pre-design phase Thrivent Hall was defined to be a roadhouse (or receiving) facility, but the operational economics required the seating capacity of the theatre to be maximised to enable it to host touring Broadway performances, and therefore earn extra income.

In such a situation, Artec recommends that the incorporation of a mechanised forestage lift or lifts should be considered. The surface of the lift has multiple functions – an extended stage surface, an orchestra pit, and extended audience area for seating. The use of the lifts allows all functions to happen while also ensuring changeover from one configuration to another is both time- and cost-effective. "Although lifts do come at a cost, the manpower and time saved can make this a valid investment," says Ed Arenius, partner at Artec.

Traditionally forestage lifts extend along the front of the stage parallel to the proscenium. In Thrivent Hall, Artec chose to cut the forestage lift perpendicularly to the proscenium in three sections. Travelling Broadway musicals using live music rarely travel with more than 20 musicians. Dividing the lifts into the three sections allows a smaller centre section to be used for a pit band





while maintaining two seating sections on either side. When a larger pit is needed for opera or ballet ensembles, all lifts can be deployed in the pit position. For symphonic music performance, the acoustic design places part of the orchestra on the forestage lift surface. This same surface will also often be used for conferences or corporate events.

Dividing the forestage area in this way posed some minor technical challenges for Artec. The centre lift needed to be provided with telescopic guides at the front edge (closest to the audience) so the under-stage area can be column-free for orchestra pit use.

The line between audience and performer is thus shaped differently depending on the type of performance, either by extending the stage out into the audience chamber, or by using the orchestra pit in different configurations to maximise seat capacity. Careful collaboration between Artec and the architects ensured that each configuration makes aesthetic sense and also meets all requirements for disabled access (in accordance with the Americans with Disabilities Act), audience safety, sightlines and quality of experience.

#### A concert hall

"In a concert hall there is no proscenium, which makes the line between the audience and the artists easier to deal with architecturally," says Arenius. "However, there is a need for the stage size to be adjusted to accommodate the acoustic and physical needs of each performing ensemble." Such changes in stage size are dictated

by the programmatic needs of the hall and the method of creating this changeover is decided by the budget, as well as the operations plan. In its concert hall projects, Artec also provides for this space to occasionally be used as an orchestra pit – for semi-staged opera performance or film with live orchestra.

In the Béla Bartok National Concert Hall in Budapest, Hungary – designed by Artec and Zoboki Demeter Architects – the programme dictated that all types of non-amplified acoustic performance be accommodated, from chamber music and small chamber orchestras to 110-piece orchestras with 240 chorus members. The difference in stage size required from chamber orchestra to large orchestra with choir is dramatic. Creating an acoustically acceptable stage size for each type of ensemble led Artec to incorporate two lifts – an 'extension' lift and a 'reduction' lift – into the design of the line between the audience and the artists. There is also a third lift, the 'work/choir' lift, incorporated at the rear of the stage.

The most commonly needed stage configuration has the reduction lift at stage level, the choir lift at stage level with seating wagons deployed, and the extension lift at audience level with audience seating deployed. For smaller musical ensembles, the reduction lift is moved down and a wagon with fixed auditorium seating is deployed on it. This increases the seat count and reduces the stage size to an acoustically appropriate size while keeping the audience close to the performers in an intimate environment. A stage that is sized for 110 musicians is enormous

**Above and below: The Béla Bartok National Concert Hall**





### The Stockey Centre

and empty when there are only 12 musicians. In such a situation, it is very difficult for the auditorium designers to ensure an intimate environment where the performer/audience connection is optimised. For the largest ensembles, the extension, reduction and choir lifts are all set at stage level with the various seating wagons stored away.

Concert halls are single-volume spaces where the audience surrounds the orchestra. Since the audience surrounds the stage, the flexible stage sizes do not have the same architectural impact as it does in a multipurpose theatre. However, the designers still have to ensure that all configurations look aesthetically coherent.

### A small black box theatre

Small seat count 'black box' theatres can be changed dramatically by a simple lift. The Stockey Centre in Parry Sound, Ontario, Canada, designed by Artec and Keith Loeffler McAlpine Architects in Toronto, Canada, is a good example of the transformational nature of a simple rectangular lift.

In pre-design, the Stockey Centre was defined as a simple flat-floor space with a telescopic seating bank and two levels of surround seating that create a courtyard-type space, seating up to 500 depending on the type of performance.

The space was required to accommodate all types of performance from small-scale drama and musicals, classical and pop music, dance,

jazz, film, banquets and lectures. However, the budget for the project was limited, and a traditional theatre auditorium with stage tower was not possible. Artec therefore proposed a rectilinear flat-floor auditorium that could nevertheless meet the usage needs.

A single lift is positioned at the front edge of the stage area. It can be used to create an open orchestra pit, a flat floor condition, and a stage 'edge' when needed. In the last configuration, the lift is lowered 42in and a stepped wagon with permanent seats is rolled onto the lift to continue the stepped seating from behind and consequently create a stage by sinking the audience instead of building up the stage. This also simplifies circulation requirements between the backstage and the hall, enabling cost savings in a budget-constrained project.

The same concept was employed at the Artec-designed Royal Bank Theatre in Mississauga, Ontario, Canada. However the end result was achieved using different means. As the budget would not allow for a mechanised lift, the changeover between configurations is managed through the use of manual platforms.

### The pre-design phase

Artec's design and planning process for new venues or renovations starts with a pre-design phase in which the needs of the community and stakeholders are explored and defined in a way that is most informative to the design team.

"The integration of technology, although it represents some initial capital investment, can result in savings in operations cost and/or lower changeover time between events, thus increasing utilisation and the income-generating potential of the facility. For this reason, technology options are carefully examined and reviewed with the client for value and cost-effectiveness," says Arenius. "A key factor of the cost-effectiveness of technology is not only in making the right choices regarding the specific systems to be incorporated, but also the more subtle choices regarding their architectural incorporation and shaping. Successful design choices are always in response to those needs and parameters determined in the pre-design process." ■



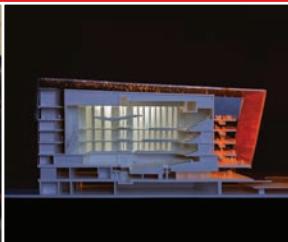
The Icelandic National Conference & Concert Centre, Reykjavík, Iceland

"I believe that the acoustics will be very good, given that that project is in the hands of the world's most skilled acoustics experts."

Vladimir Ashkenazy

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# Shining star

The newly renovated Starr Theater in New York's Alice Tully Hall features above-stage reflectors designed to improve the acoustics while harmonising with the project's aesthetic aims

**Right: The Starr Theater  
features four above-stage  
acoustic reflectors**

For audience members in an auditorium – and even for performers – little thought is usually given to the above-stage reflectors that enhance acoustics while complementing aesthetics. But the recently renovated auditorium in Alice Tully Hall demonstrates how crucial these can be.

Since opening in 1969, Alice Tully Hall evolved into one of the most heavily used and flexible venues in New York City's Lincoln Center. Its main auditorium featured ample seating capacity (1,096) and lacked any major constituent occupying its schedule. But the auditorium wasn't designed to do all the things for which it was being adapted.

When a major renovation of Alice Tully Hall was planned, a primary concern was the amount of time spent by stagehands setting up and taking down the various stage hardware systems in the catwalks above the fixed auditorium ceiling. The catwalks provided above-stage access for lighting, microphones and 'strong points' that allowed rigging of film screens and other stage hardware.

Larry King, senior consultant with JaffeHolden Acoustics, says the project's evolution included preparing a wish list of functions and operating systems for the renovated auditorium, to be called the Starr Theater. "The design team recommended mechanised rigging equipment above the stage, so that settings could be done quickly with minimal stagehand time," he recalls.

A logical solution was employing tip-and-fly acoustic reflectors, which could adjust between

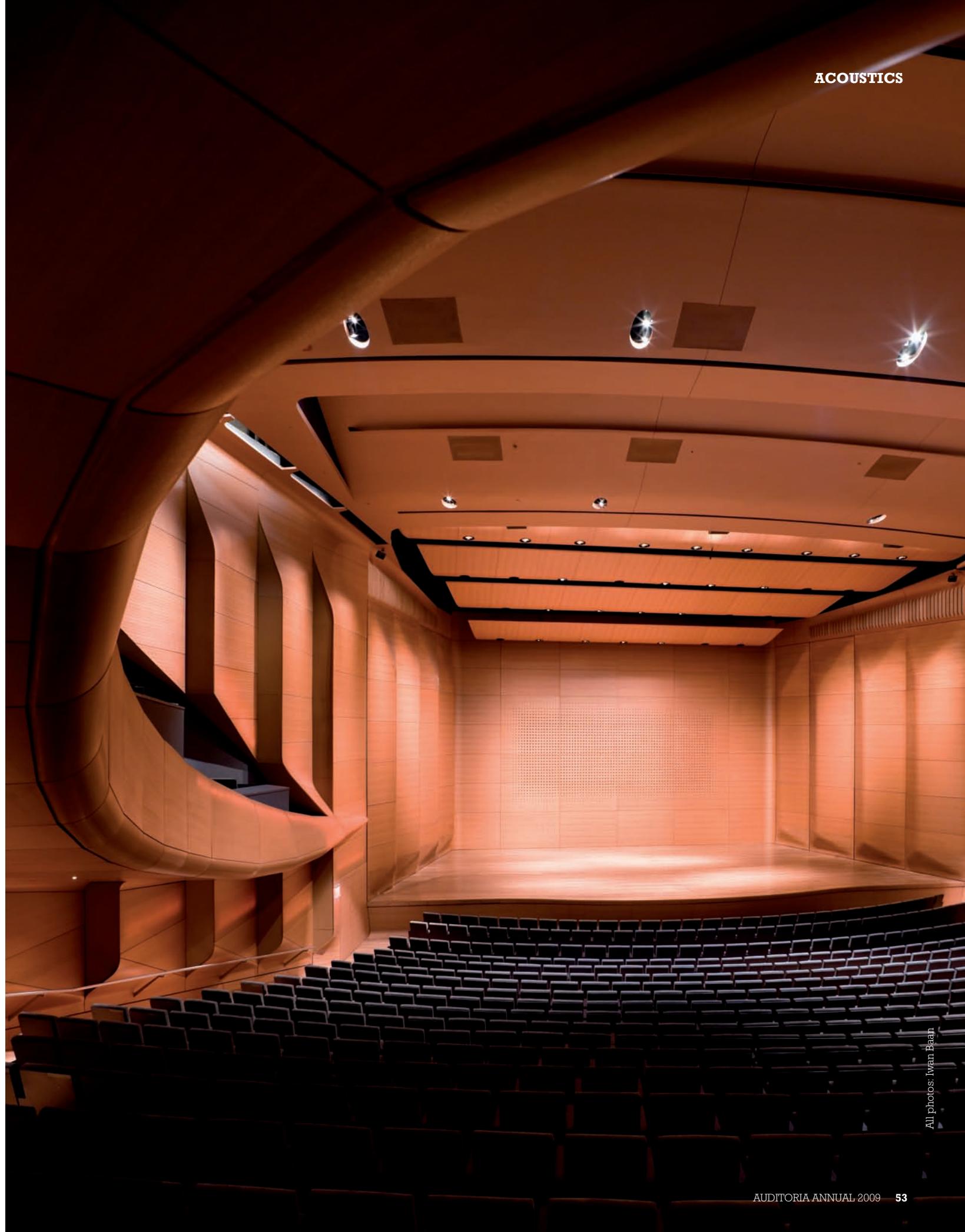
a fixed and open ceiling. The thinking was that this would save time compared to storing reflectors offstage – where space was scarce – and moving them into position. "The decision to use tip-and-fly reflectors pointed right to Wenger," notes King. Along with reflectors, Wenger has a distinguished history of crafting acoustic shells and related products.

## Space constraints

Creating a renovated theatre within the original building's shell meant that one of the greatest challenges for the reflectors was the limited space available. As the project progressed, the clearances got even smaller when the deconstruction work revealed existing concrete in locations that varied from original drawings.

"The space constraints overall were extreme," explains Barbara Pook, partner with Pook Diemont & Ohl (PDO), the project's stage equipment contractor. This specifically impacted the fourth reflector. PDO reengineered the motorised rigging and Wenger redesigned the reflector to collapse into even less space than originally allowed. "Wenger was instrumental in solving problems and they readily accommodated the changes the design team requested," says Pook.

Replacing the original catwalks over the stage is a complex system of motorised stage-rigging equipment that includes the tip-and-fly reflectors, electrics/scenic battens, house curtain, speaker clusters, and film screen/masking system. There are 25 motorised axes over the stage. "It's an incredibly dense configuration in a





**The reflectors had to complement the look of the theatre's walls, which feature African Moabi tree veneer**

rather small space," says Peter Rosenbaum, senior associate with Fisher Dachs Associates (FDA), the project's theatre consultant. "We all pushed each other to find an approach that would fit the fourth reflector into the available space."

Because of tight space constraints, the design team also needed to be very aware of the clearance around each reflector as it rotates through its entire rotational envelope. "We had especially tight clearances between the first reflector and the mounted concert lighting fixtures," says Rosenbaum. 3D modelling and mock-ups were used to ensure this reflector would never clip or bang into any light fixtures.

Along with space constraints, other design features were driven by fire code requirements. In case of fire, all four reflectors had to rotate into the vertical position so that the water from overhead sprinklers could reach the stage. At a signal from the fire panel, the reflectors rotate under motor control. But if power is lost, the reflectors will rotate vertically purely by gravity when a manual release cord is pulled, or a fusible link opens due to heat. "It's a very sophisticated, yet very simple arrangement of both motorised and mechanical devices," says Rosenbaum. "It's the first time we've ever done anything like this."

The design architect was Diller Scofidio + Renfro (DSR), and project leader Anthony Saby agrees that the acoustic reflectors posed some unique challenges. "We ran the gamut with Wenger from an engineering, fabrication and finishing perspective," says Saby. "A good percentage of the reflector project was a hybrid or customised standard."

DSR also worked closely with FDA and Wenger on the lighting arrangement in the reflectors. Lights were not placed in the centre, but arranged to strike a balance between theatrical and architectural requirements. "We wanted lighting coverage for the stage and also to create a perspective in how this lighting relates to the rest of the theatre," says Saby.

The Starr Theater's interior walls consist of resin panels sheathed in veneer created from a single African Moabi tree. LED lights embedded in the wall panels help illuminate the theatre with rosy hues. The reflector furthest downstage features a compound curve hardwood edge or nosing, created by precision computer-controlled machinery. Wenger worked to ensure the finish and stain on this nosing – and all four reflectors – was consistent with the theatre's other veneered surfaces.

From a visual perspective, Saby believes that having all these elements come together was one of the greatest architectural challenges. "It was a collaborative effort between Wenger, us, the primary millworker, the veneer supplier and Wenger's own millworker," he says. "There was a lot of direct interaction between the different trades and the end result turned out fantastic."

Wenger reports that audience members, performers and critics alike share Saby's enthusiasm for the finished space, and have praised the Starr Theater's improved acoustic clarity and warmth, and more intimate visual experience. ■

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# Future sound

The acoustic design for an experimental space had to plan for the unknown technologies and functions of the future

**Right: EMPAC's 1,200-seat Concert Hall**



Polytechnic Institute in New York, USA, was that each of the four primary spaces – the 1,200-seat Concert Hall, the 400-seat Theater, 3,500ft<sup>2</sup> Studio 1, and 2,500ft<sup>2</sup> Studio 2 – would have a primary function, but would also be able to expand into regions beyond the traditional, and accommodate future technologies as they arise.

The design team included design architect Grimshaw Architects; architect of record Davis, Brody, Bond; structural and mechanical electrical and plumbing engineer Buro Happold; theatre consultant Fisher Dachs Associates; and acoustic consultant Kirkegaard Associates.

## The Concert Hall

The Concert Hall is designed in the classic shoebox style, but updated. "It retains the relatively low seat count, proportions, mass, and volume needed to make a hall acoustically exceptional, but includes a modern interpretation of sidewall diffusion, recessed galleries in lieu of side balconies, a full-ceiling fabric reflector, and subtly curved walls," says Zackery Belanger, associate at Kirkegaard Associates.

The hall is designed to handle even the loudest of environmental noise. It sits in the centre of the main building, buffered by lobby space, and separated from the lobby by a cedar-clad hull with structural void, a 16in concrete wall, heavy interior surfaces, and acoustic isolation joints. The hall's roof consists of an 8in concrete slab; a 14ft-high void housing winches, acoustic banner

key part of the vision for the Curtis R. Priem Experimental Media & Performing Arts Center (EMPAC) at Rensselaer

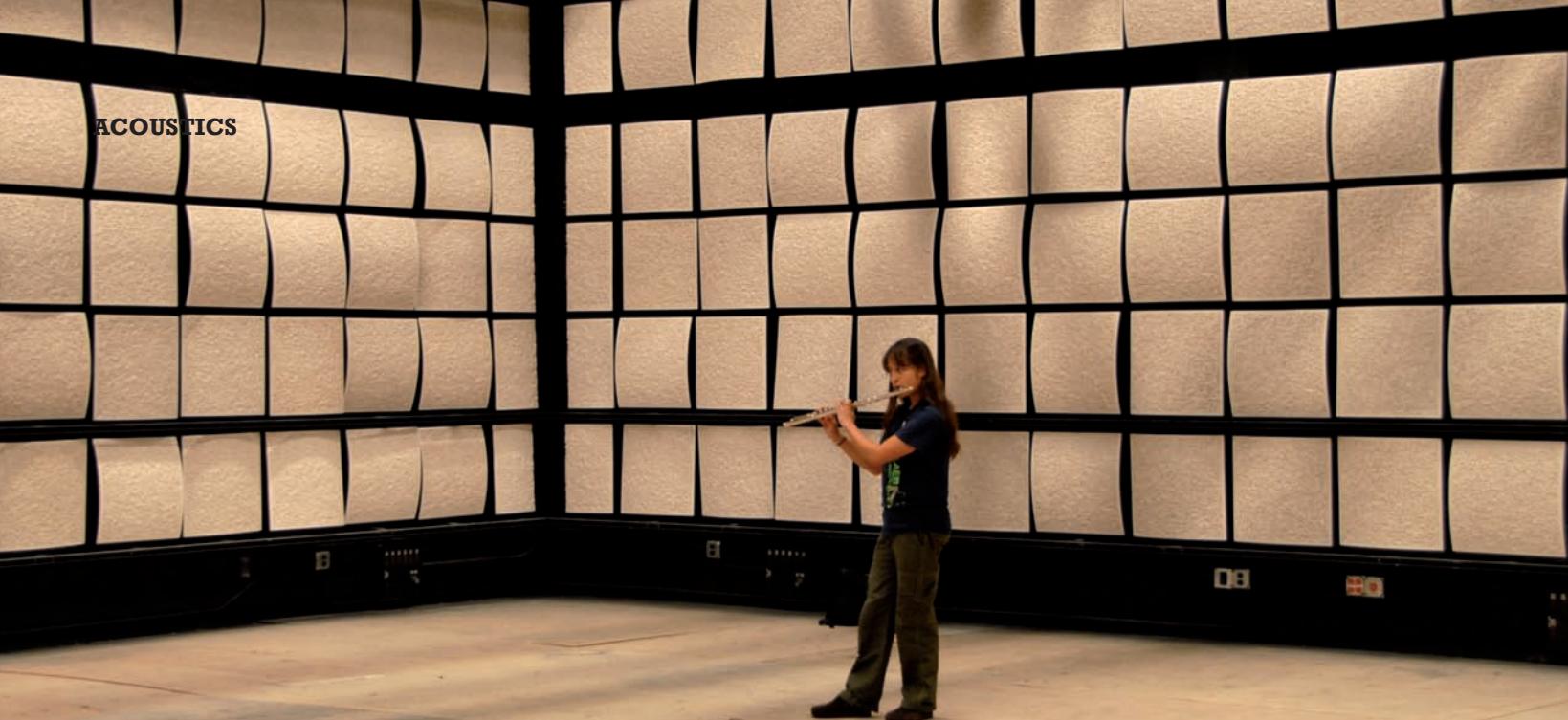
systems and ductwork; and a concrete roof slab to the exterior.

Of equal importance to keeping the background noise down – it is below room criteria (RC) 15 in the Concert Hall – is the careful design of mechanical systems. "The mechanical noise control is the unsung hero of the Concert Hall design, paying attention to mechanical units, duct materials, mounting hardware, penetrations from space to space, linings, air delivery speeds, balance, and even grilles at the delivery point," says Terry Tyson, associate at Kirkegaard Associates. EMPAC's mechanical room lies directly below the Concert Hall. The air handling units serving the hall were selected based on stringent acoustic criteria, and are connected via attenuated and acoustically lined ductwork. Conditioned air is delivered to the hall via a large plenum under the seating, rises silently and is collected and returned via large acoustically attenuated openings above the ceiling.

The hall's shape is composed of inverted curves, designed to eliminate flutter echo with a minor amount of diffusion. The upper sidewalls and rear wall are clad in cast stone elliptical panels with shaping of varying depth. The deepest and most prominent of these are the most diffusive, and a computer-generated layout was used to order them in a weighted random fashion from front to rear. "This allowed the placement of a greater number of the more diffusive elements near the front of stage where the curves of the sidewalls are parallel to each other and where energy build-up is most likely," says Belanger. The upstage wall has alternating maple and wenge layers, the former creating a diffusive undulating pattern. Above this the undulations are carried into a cast stone 'frozen curtain'.



ACOUSTICS



**Above:** Studio 2's walls are covered with diffusive panels

**Below:** EMPAC's 400-seat Theater includes extensive adjustable absorption and a large fly tower

The ceiling is nearly covered in a doubly curved fabric reflector that emulates the curve of the sidewalls. The fabric was developed by Kirkegaard Associates with the help of the North Carolina State University College of Textiles to serve musicians and audience with early reflections. The fabric is composed of Nomex – a flame-resistant synthetic fibre that Kirkegaard Associates says is naturally white in colour, resists sagging, and needs no flame treatment over time. The fabric in the Concert Hall is woven to attain an air permeability and weight that reflects mid- and high-frequency sound while transmitting low- and low to mid-frequency sound to the volume and the thick concrete lid above. “When supported by such a hard monolithic surface, the fabric allows a way to provide early reflections to musicians and patrons without the sacrificial loss of volume,” says Belanger. “This has advantages over the hard reflector array approach because of the monolithic nature of the fabric and the resulting lack of overlap in reflection coverage areas – a situation that commonly results in phase interference effects.”

The balcony is large and open, but with a very small overhang. Side galleries replace traditional side balconies, providing unimpeded access for sound to the sidewalls. Black adjustable absorptive banners raise and lower along the walls, varying reverberation time and reflection structure to help accommodate the wide array of programming.

### The Studios

Studios 1 and 2 are designed with some semblance of black box theatre and rehearsal room, respectively, boasting background noise levels of no more than RC 15 and box-in-box

construction to stop low frequency sounds. “Since it is impossible to anticipate the use of such rooms in the future, they are designed with homogenous and infinitely flexible wall surfaces,” says Belanger. Each room is clad entirely in arrays of 2ft x 2ft panels developed in a collaborative effort between Grimshaw, RPI and Kirkegaard.

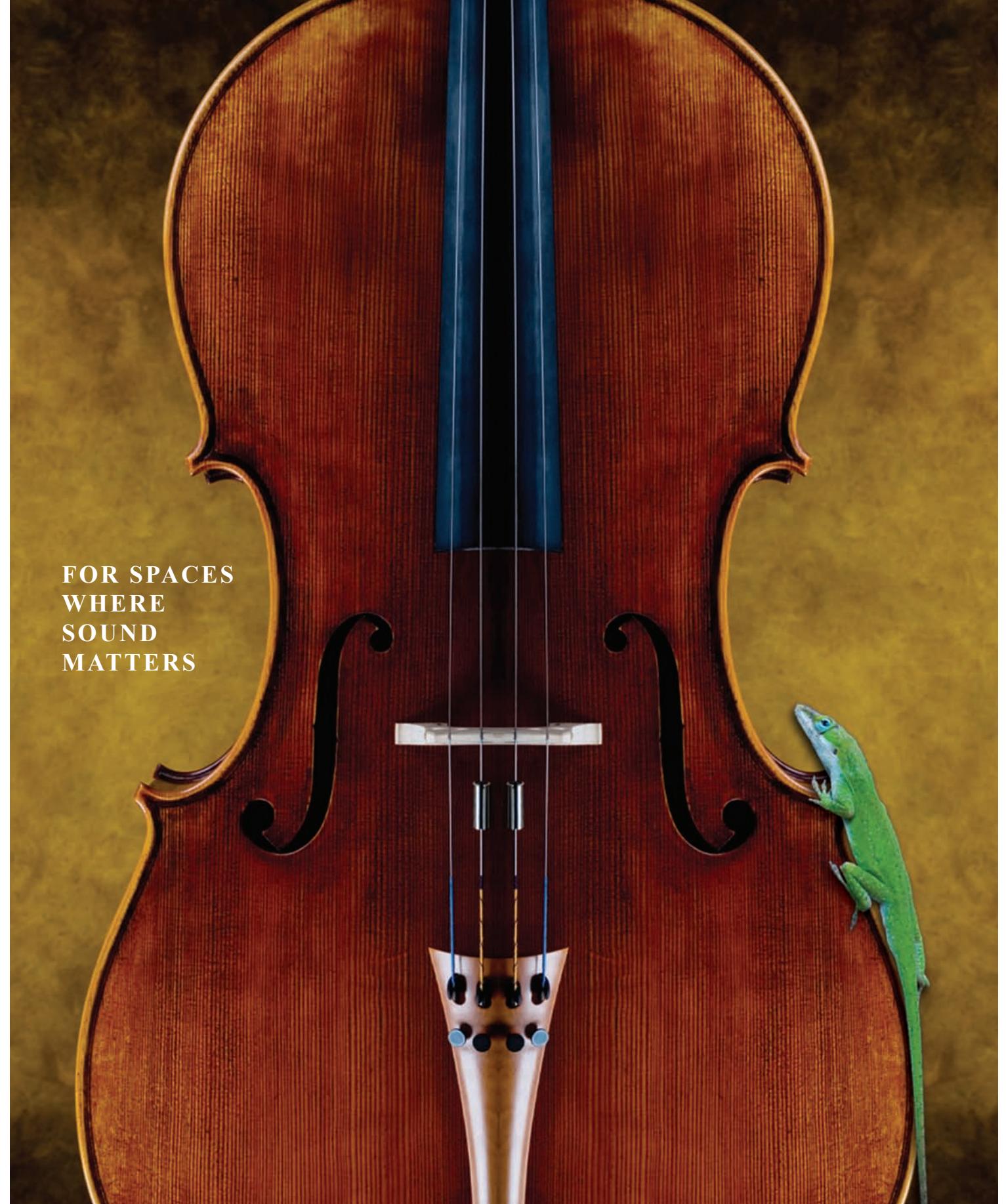
Studio 1 uses two panel types – a sound-diffusive panel in integrally coloured black (made from cast glass fibre reinforced gypsum), and a perforated metal and fabric sound-absorptive panel in anodised black. The diffusive panel is the result of hundreds of hours of development including multiple prototypes and vast testing exercises. The surface texture was created using a custom code developed in the MATLAB programming language. The layout of the holes is based on a mathematical function known as the partition function, but acoustically the pattern only needs to be random in character.

The absorptive panel consists of three layers – a back layer of coarsely perforated metal, a middle layer of carefully chosen fabric, and an outer layer of finely perforated protective metal. “The back and middle layer combine to form air permeability favourable to sound absorption,” says Belanger. “Unlike standard porous absorbers, this metal and fabric combination absorbs 50-60% of sound incident upon it over a very wide frequency range.” To absorb the low frequency sound expected for audio installations, the panels hide custom resonant bass absorbers.

Studio 2 includes only the diffusive panels – this time in white – although absorptive panels can be added if the need ever arises. ■

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# Linked in

Convention centres can become the embodiment of a city, linking people and environments

**T**oday's convention centre market is a highly competitive realm, with event planners being wooed by facilities boasting the latest technology and guest amenities. LMN says that for a facility to be truly successful, it needs to offer not only a highly functional building, but offer visitors a rich experience of, and connection to, the city itself.

This connection is both metaphorical and literal – physically integrating the venue with the surrounding urban and natural environment and creating vibrant pedestrian linkages to the retail core and cultural attractions, while promoting a rich dialogue between the two realms.

"It was around 25 years ago that convention centres began to be seen as important civic places; no longer just big boxes situated at the edges of a city, with loading docks backed up against freeways for easy access," says Mark Reddington, design partner at LMN. "Recent changes to our cities have created the opportunity for an exciting evolution of the traditional model. Cities themselves have become popular – there is a renewed interest in making cities culturally rich centres of community interaction. Their continued growth has caused them to surround existing convention centres, introducing the need to activate these facilities on all sides for the first time."

The size of convention centres has also grown significantly, with larger versions interrupting several streets and impacting the urban fabric in major ways. "We have evolved new ways to develop them as a result," says Reddington. "Too big to

think of simply as a building on a site; it is instead a piece of the urban fabric, a fragment of the city itself. What makes cities great and interesting is their diversity, and the many different layers of meaning, activity and perspectives that intersect in the life of the city. It is this idea that we bring to the design process, embedded in an approach that we call hybrid design."

## Hybrid design

LMN's hybrid design approach involves the simultaneous examination of a project's architectural design and functionality, interior design, urban design, landscape, graphics, signage and public art. The result is a project that embodies these different layers of activity and life, and ways of seeing and experiencing the city.

This year LMN completed the Vancouver Convention Centre West [pictured right] in Vancouver, Canada – working in partnership with DA Architects & Planners and Musson Cattel Mackey Partnership. The building is designed to frame public open space and extend the city's urban life to the waterfront. Connecting to an existing harbour greenbelt, it continues a public promenade and bike trail across the site, completing an important link in the city's park system, originating from Stanley Park to the west.

The exterior is a visual expression of the diverse elements that define the place – the land, the water and the city. A series of sculpted forms echoes the neighbouring natural landforms and building geometry, culminating with a six-acre green roof. "This project brings together the





Vancouver Convention Centre



**Above: The Duke Energy Convention Center**

**Right: The San Jose Convention Center**

complex ecology, vibrant local culture and urban environment," says Reddington.

A current LMN project is the San Jose Convention Center Expansion in California, USA. Spaces are organised to achieve the highest degree of flexibility, while perimeter transparency allows the activity within to participate directly with the surrounding urban context. Moveable walls throughout the building can be positioned so that the meeting spaces are on the exterior of the building, which in turn can be opened onto the garden terraces of the adjacent public spaces. Similarly, the ballroom and its prefunction spaces are separated by a moveable wall, which can be repositioned to allow the edge of the ballroom to extend to the perimeter of the building. Then not only is it possible to connect the street life to the lobby, but it becomes possible to connect it directly with the activities of the ballroom. The ballroom's view connects it to the downtown core while pedestrians are made aware of event activity from street level.

The design turns two major city blocks into a signature public place and integrates urban elements – paving, landscaping, environmental graphics, and transit stop – into a single civic space. The treatment extends into the ground floor of the building, with a series of movable walls that allow for enclosed meeting spaces, ballrooms, or if left open can be used for exhibition and event space. This area opens onto the public plaza, which has a garden-like feel.

LMN was also involved (together with Cincinnati Architects Collaborative) in the expansion of the Duke Energy Convention

Center in Cincinnati, Ohio, USA, which was completed in 2006.

The expansion brings the facility to the western edge of downtown Cincinnati, so that the centre now fronts on the major north-south freeway through the city, and frames the principal vehicular gateway to downtown Cincinnati. The façade, a block long, integrates sculpture, environmental graphics and architecture with a series of metal panels set at angles forming the word 'Cincinnati'. From within the public spaces of the facility, the piece is perceived in abstracted increments, while at the pedestrian scale, the hovering panels form a sunscreen on the western side of the building, experienced by the pattern of light and shadows created by the sculpture. The sculpture is designed to connect those inside the building with those viewing it from a distance – from the hills, freeways, and surrounding neighbourhoods, even as far away as aircraft entering the city.

### Well connected

"No longer simply a functional necessity, today's convention centre has the potential to be among a city's finest cultural assets," says Chris Eseman, partner at LMN. "Instead of an isolated box, it can serve as a vital connector of environments – interior to exterior, private to public, and urban to natural, as well as serve as an authentic, celebratory embodiment of a city's unique personality, values, history and aspirations towards the future." ■



# Trial by television

EAE had no room for delay when upgrading the stage technology at a Swiss television studio

**Right: Using modern scissor lifting platforms every show in Studio 1 can be produced individually and flexibly**

**S**tudio 1 in Zurich is the largest studio at Swiss TV channel Schweizer Fernsehen (SF) and is equipped with stage technology – both fly systems and substage machinery – that is unusually complex in the world of television. It is the studio at SF where all the large Saturday evening shows are produced. Understandably, requirements regarding the stage systems are particularly high, since they have to meet the high demands of these long, live productions, and flawless technology is a basic prerequisite for performing these shows. The Stage Technology division of the EAE Group is therefore particularly proud to have been commissioned to upgrade this stage.

The contract was procured by Swiss company Planungsgruppe, an architect's office for auditorium and stage technology based in Leutwil. EAE had worked with this company before, on the renewal of the control system at the Culture and Convention Center in Lucerne's concert hall. The success of that cooperation, and in particular EAE's efficiency and adherence to deadlines, led Planungsgruppe to recommend EAE for the modernisation of SF's Studio 1.

## Safety first

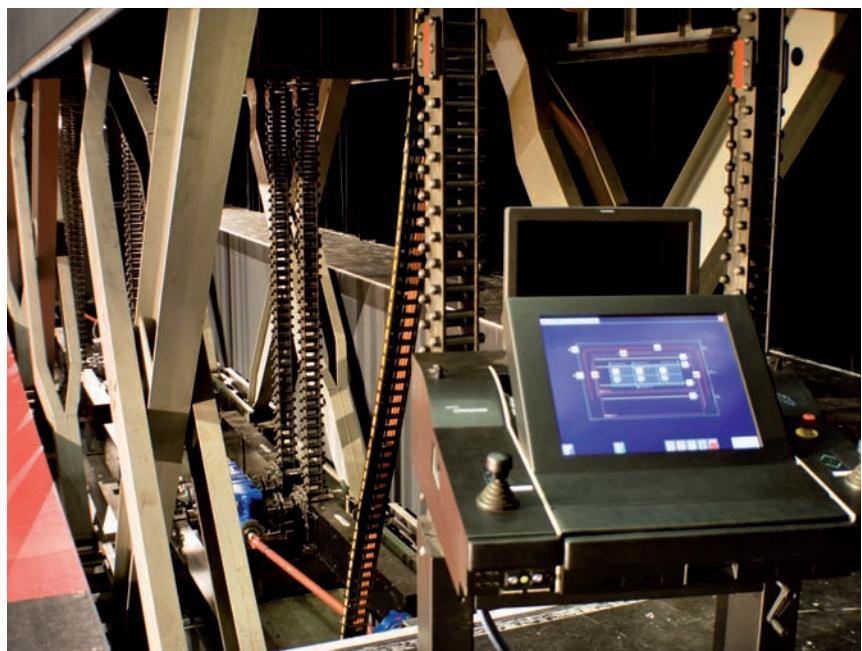
The aim of this project was to replace the drive systems for the stage's platforms and to upgrade the control systems to meet functional and safety requirements. The safety standard used at SF for the electrical and electronic systems is safety integrity level (SIL) 3. The SIL standards range from SIL1 to SIL4. SIL1-certified components are

only used for systems that, if they failed, would entail either a small risk or none at all, whereas SIL4 components are more suitable for high-risk systems. The SIL classifications and corresponding measures for risk reduction are defined in the European standard EN 61508. Basically this means that the higher the risk, the more reliable the components and the measures taken to minimise risk must be.

The EN 61508 standard takes into account the safety of a system during its entire lifecycle – including the initial concept, start-up and testing of safety functions, maintenance and repairs, decommissioning and dismantling. This standard is always applied to the electrical and electronic system as a whole and includes possible errors made by the staff.

Apart from rebuilding the six scissor lifting platforms, the project at the SF studio also involved upgrading three machine hoists and five curtain rigs. In the existing scissor lifting platforms, sluggish hydraulic lift drives were replaced by reliable motor-driven rigid chain lifts with low-noise three-phase motors. Each of the six stage platforms measures 3m x 6m, and their lifting height can vary by up to 3m at a speed of 0.2m/s. In addition the plate floor directly adjacent to the platforms has been replaced by steel beams and elements. Extreme precision is required here to prevent the platforms from colliding. The machine hoists and curtain rigs are now integrated in the new control system, and can be positioned precisely.

All the switchgear has been installed below the stage, including all components for the





**Studio 1 had to be completed  
to a strict time schedule**

power and control electronics. The system can be operated from a stationary varioCOMMAND control desk, or flexibly at different locations via a mobile classicCOMMAND desk, both from EAE. The mobile console can be connected to three terminal points in the studio as required, enabling flexible operation that can be adjusted to the requirements of individual productions.

**Broadcast schedule**

A particular challenge on this project was the tight deadline. The studio had to be completed in time for a new show, *Benissimo*, which was due to be broadcast immediately after the project had been completed. This meant the EAE team had to adhere precisely to extremely tight planning, production and assembly deadlines.

*Benissimo* is a Saturday evening live lottery show that has been broadcast more than 80 times since 1992 and has a share of up to 60% of the Swiss TV market, i.e. about one million viewers. Each show, in which eight candidates compete for CHF1 million, features a mixture of music, comedy, and variety, with contributions from top international artists. If the show – which costs approximately €60,000 a minute to produce – had failed to take place, this would have been a serious financial blow and a major image loss to all those involved.

Fortunately the show was broadcast as planned on 11 October 2008.

"Not only could SF's largest live show be produced on time, but the expectations and requirements of the broadcasting station were also carried out on schedule because of the constructive, target-oriented cooperation of all parties involved, and EAE's stage technology team was rewarded with a highly satisfied customer," says Richard Ewert, founder of EAE.

After completing the project, EAE's stage technology team received a letter from Herbert Maag, director of stage technology at the studio: "From June to August 2008 some of you were involved in upgrading our six scissor lifting platforms and part of our fly systems in Studio 1 in Zurich. You worked long, hard hours," Maag wrote. "It was fascinating for us to watch your daily progress. And then you did in fact manage to hand over the new system on schedule, in perfect working order. Several productions with this new technology have already been performed since, to our utmost satisfaction. It was very pleasant to work together with you. We came to know and appreciate you as an innovative firm and I'm sure this will be taken into account next time we upgrade our stage systems." ■

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# Local heroes

Martinez+Johnson Architecture has been working simultaneously on two community-driven projects – renovating a storm-wrecked theatre in New Orleans, and designing a new home for the performing arts in Annapolis

**Clockwise from top:** The Saenger Theatre's auditorium; the original theatre front; and the renovated entrance

**M**artinez+Johnson Architecture is simultaneously developing designs for two performance centres in the USA that are grounded in their locales. Although the Saenger Theatre in New Orleans, Louisiana, and the Maryland Theatre for the Performing Arts (MTPA) in Annapolis, Maryland, are of comparable size and mission, their appearance and organisation is separated by roughly 80 years, which has had a profound effect on the architect's design and implementation.

MTPA is a new multi-use venue designed to serve the cultural and performing arts community in and around Annapolis. The primary intended users of the venue are the symphony, ballet, dance companies, as well as travelling and community music and theatrical productions. The primary house in the complex is a 1,500-seat hall, with two smaller halls including a black box. The theatre, occupying a site in a new but historically inspired mixed-use complex, reflects in its appearance the contemporary essence of the vibrant community that Annapolis has evolved into.

Meanwhile the Saenger's way of providing a fully functional, multipurpose performing arts facility is to renovate and expand the historic theatre, which was severely damaged by Hurricane Katrina in 2005. As one of several theatres (all closed) on Canal Street in the centre of the city, it is an important part of New Orleans architectural and cultural history. Its rebirth is intended to revitalise the immediate vicinity into an active arts-oriented district. The two critical components of the project are the renovation

of the theatre itself, including the interior arcades, foyers, lobbies, and other spaces and elements, and the expansion of the Stagehouse (a project actually started before the storm). The programme removes and replaces the existing Stagehouse, provides a load-in area for large trucks, increases performer support areas, and connects front- and back-of-house through new vertical circulation.

## Symbol of rebirth

Enlarging the Stagehouse allows the theatre to present a wide range of programmes, such as touring Broadway productions, dance, theatre, amplified music and special events. The Saenger renewal project will result in a multifunctional facility similar to MTPA, accommodating highly diverse programming. "As New Orleans emerges from its cataclysm and begins anew, it looks for symbols of rebirth," says Gary Martinez, president of Martinez+Johnson Architecture. "Housed within an historic theatre, the reborn Saenger becomes a new kind of icon and, with regards to performance, is just as contemporary and functional a theatre as MTPA is."

The differences in the experience begin at the street. At the Saenger, patrons access the theatre through the Saenger Building arcade, which pre-dates the theatre. A formal arrival sequence replete with classical detailing sets up the experience of entering Emile Weil's atmospheric auditorium. Restored to the US Secretary of the Interior's Standards for Rehabilitation, the historic character is painstakingly recreated even while modern technology and building systems are seamlessly integrated and actually





**The entrance (above), foyer (top right) and main auditorium (bottom right) of the Maryland Theatre for the Performing Arts**

hidden where possible. It is interesting that patrons were offered a glimpse of mechanical and electrical equipment through small portals in 1927, made otherwise invisible by architectural exuberance. Martinez+Johnson Architecture says this richness in finishes would be impossible to recreate in contemporary design, but grandeur and eloquence may be recalled in a different way, through spatial quality and technology itself. At MTPA, technology is on display all of the time and virtually defines the aesthetic. "The entire shell with its exposed systems, self-supported glass, and screens and projection devices becomes a lantern – a huge technological wonder and new image for the city," says Tom Johnson, partner at Martinez+Johnson Architecture.

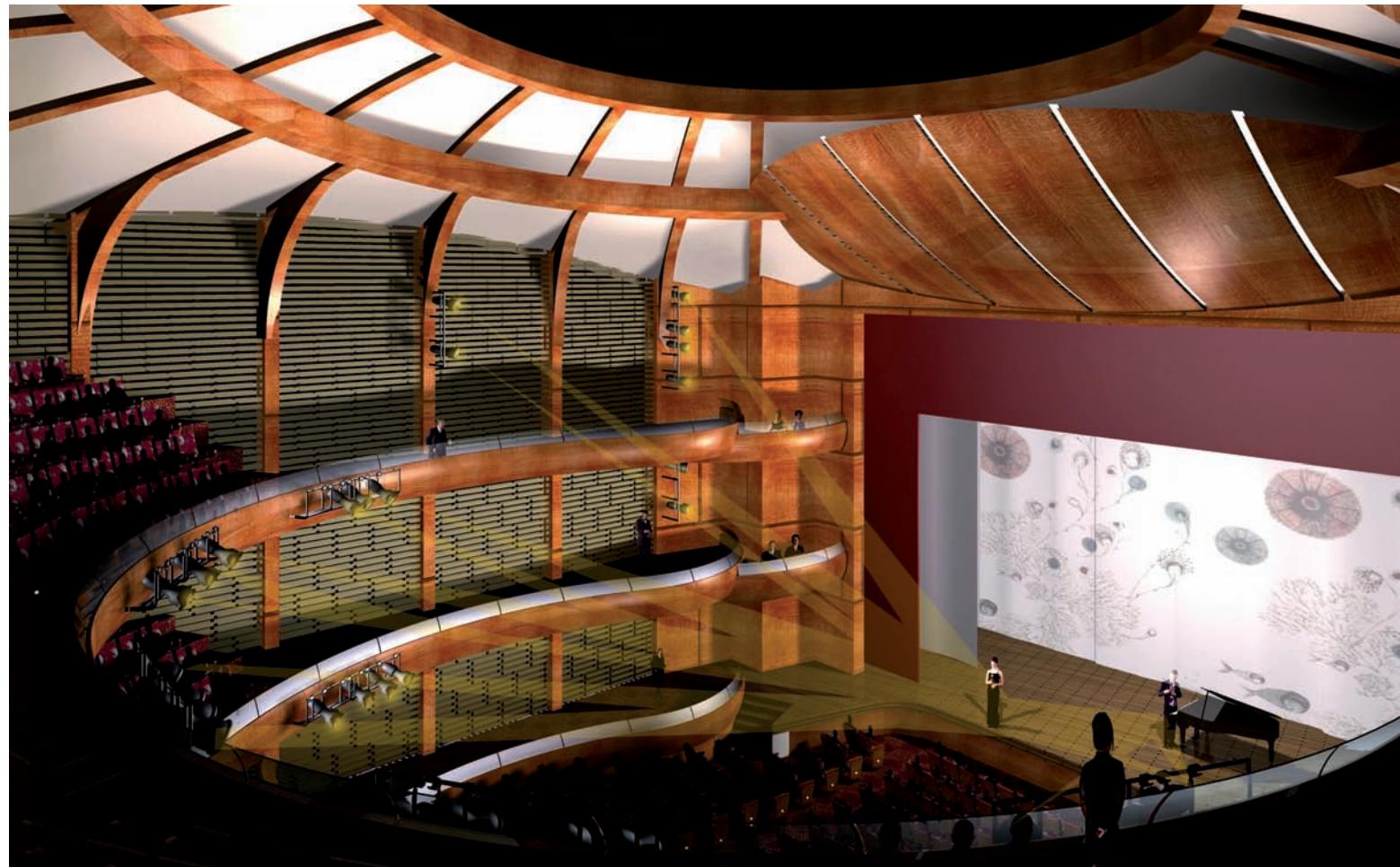
The Saenger's original acoustics were adequate but one-dimensional – designed for silent movies, it attracted performances by a house orchestra and organ. As Martinez+Johnson Architecture planned the chamber to perform well acoustically for a wider range of events, acoustic enhancement was achieved through purposefully unobtrusive devices and systems. Absorption capability and sound reinforcement systems were added to allow for some virtual variation. As the company has done at other atmospheric theatres, complex speaker systems are hidden behind a night sky in the decorative ceiling. At MTPA, the variable acoustics are physical, with adjustable panels, curtains, and baffles in plain sight, using high-tech materials that would be out of place in an historic venue.

The Saenger's Stagehouse shows the most dramatic shift of thinking. The stage (and loading

area) is on a gradient, there is no more available street space for expansive wing extensions, there were no existing connections between front- and back-of-house, and the height of the auditorium's proscenium arch constrained what could be done. A street had to be closed to expand the Stagehouse to usable depth, while obsolete mechanical space and repurposed support areas were employed to establish connections and generate more stage space, respectively. Movement patterns dramatically improved, but there will still be competing uses for spaces, especially in the loading areas. To improve patron movement, Martinez+Johnson Architecture expanded lobbies, created more patron support facilities, and expanded circulation capacity largely by annexing an adjacent building.

At MTPA, the urban site was also constrained, but the auditorium and inner workings of the theatre could be oriented to an efficient disposition offering increased flexibility with separated front- and back-of-house functions. Even on a dramatically sloping site, optimum stage and loading levels could be established on a blank canvas.

"Two new contributions to our nation's cultural milieu move forward. In each, specific parameters force translations to similar issues," says Martinez. "Although we have had considerable experience with both new theatres and renovations, it has been instructive to have the same design team work on these two exciting initiatives on a parallel track and to see how they inform each other." ■



# Friends in high places

How an atrium lift became part of the essential 'toolbox' for maintaining the star of the Lone Star state



**Above:** There was less than 0.5in to clear the wall when erecting the main boom in the 20ft-wide rotunda

**Right:** The lift had to reach over 80ft in the air

The Lone Star is not only the nickname for the US state of Texas, but also more formally the name of the Texan state flag. The single star on a blue background signified Texas as an independent republic, a reminder of the state's struggle for independence from Mexico in 1836.

When the Fort Worth Convention Center in Fort Worth (a neighbouring city to its more famous sibling Dallas in the central part of the state) completed its renovation, nothing was more appropriate than to top it off (quite

literally) with that very symbol, the Lone Star – which was used for the ceiling design of the centre's rotunda, a beacon for the facility.

"There was only one problem," says Ebbe H. Christensen, president of ReachMaster. "While everything is usually big around here, the width of the more than 80ft-tall rotunda was a mere 20ft and a few horse hairs wide, shaped like a decagon [a polygon with 10 sides]. And at the top a highly complex design of steel beams that made window cleaning and changing light bulbs a nightmare for maintenance and facility managers."

Not only did they need to set up a lift within a highly compressed space and reach over 80ft in the air, they also needed to reach above and beyond the steel beams, while still protecting the rotunda's highly delicate terrazzo and marble floor, in a busy facility.

## One for all

Several solutions, including scaffolding, were considered and tested, but the main obstacles remained the same. In addition there were other areas of the facility – inside and out – that called for aerial lift solutions. "Tax money is considered a privilege in Texas, not a given, so the tradition is to spend it scarcely and wisely," says Christensen. "So the goal was to find one solution that could solve all the challenges."

Finally, the solution that presented itself was an atrium lift – a compact lift that is narrow enough to pass through a single door, yet light enough to travel safely on the different floor types in the facility, which included terrazzo, tile, marble and carpet. It would have to be battery



## MAINTENANCE



**Above: The ReachMaster Falcon FS95 is also used elsewhere in the Fort Worth Convention Center**

**Right: The facility needed to reach to the top of the rotunda for maintenance tasks such as cleaning the windows and changing lightbulbs**

driven, given its indoor use, provide a footprint small enough to fit in the rotunda, and most importantly, provide the needed reach capability at the very top of the rotunda.

The ReachMaster Falcon FS95 from compact lift specialist ReachMaster just barely complied to all these requests, and on paper the boom system and the basket would have to clear the wall in the initial stage of erecting the main boom with less than 0.5in (12.7mm) to spare. Consequently, prior to final decision making, a test and demonstration was performed, and to the relief of everyone, the lift was able to not only set up within the limited area, but also able to reach up and over the steel beam construction at the top thanks to an advanced double jib system – which comprises two 10ft individual arm systems at the end of the main boom that can be deployed in both vertical and horizontal directions.



"After the test, and back on the ground again, the operator presented the facility with a small gift – an empty soda can and dirty towels, left by someone at the top," says Christensen. "As if testimony was needed to understand the importance of being able to reach every part of the facility to maintain safe operation!"

The Falcon FS95 is also used to maintain other parts of the building, including light fixtures in the entry ways, and reaching over staircases. "It has become a vital part of the facility's toolbox," says Christensen. It also serves as a back-up for emergency situations, for example if a sprinkler head or a sensor is malfunctioning prior to or during an event.

"The ability to respond immediately to any aerial work area of the building provides optimal daily use of the facility, peace of mind, and most importantly it saved the facility not only money, but hardship and time using extensive scaffolding," says Christensen. "It continues to help protect the investment in a facility that has to last for decades and bring revenue to a sparkling city, be it trade shows, concerts or other professional events." ■

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# On the turn

The installation of a revolving circular stage at the new congress centre in Tashkent, Uzbekistan

**The revolving stage at the  
International Forums Palace  
Uzbekistan**

Tashkent, the capital of Uzbekistan, gained independence from the Soviet Union in 1991, triggering cultural, economic and architectural changes. Soviet-era buildings have been replaced with new, modern buildings, particularly in the downtown region, which includes the 22-storey NBU Bank building, an Intercontinental hotel, International

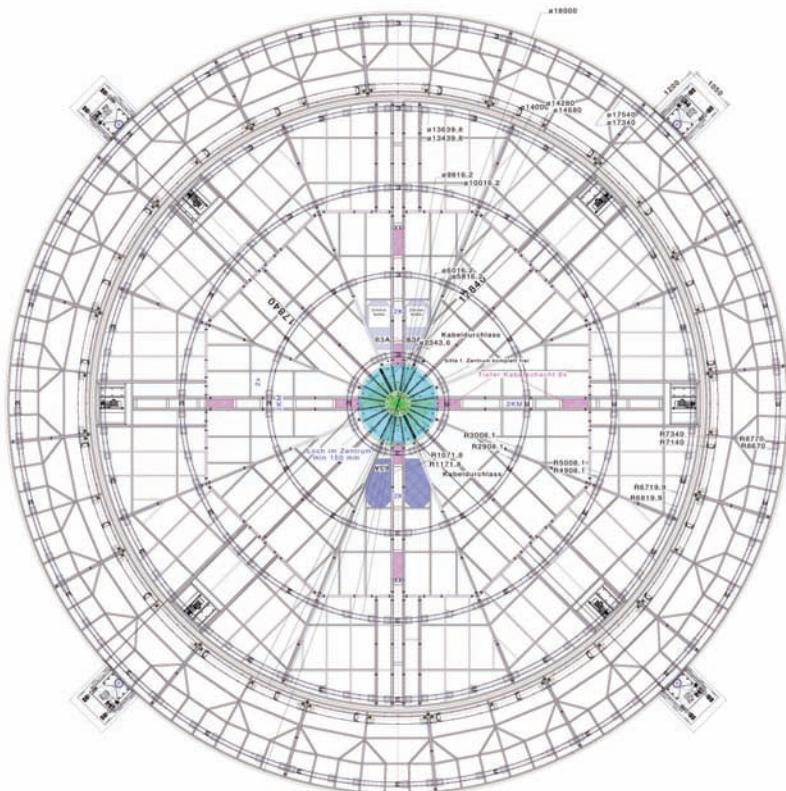
Business Center, the Plaza Building and now a new multipurpose congress centre – the International Forums Palace Uzbekistan.

The centre is designed to hold large international forums, and cultural and other events. The 48m-high building, built by Neftgazmontaj, features a 53m-diameter dome and marble columns on the exterior. Inside it contains a 300-seat conference hall, a 300-seat banquet hall, and a 1,800-seat congress hall.

The congress hall features a huge main stage (50m wide and 15m deep), a forestage, and a proscenium that can be adjusted in height from 8-13m and in width from 15-27m. For added flexibility the stage contains an integrated revolving stage with an extra outer ring. Extended fully, the revolving stage reaches into the forestage, with a total diameter of 18m (a 4m-deep outer ring and 14m diameter inner turntable). The outer ring runs independently (from left to right) from the inner turntable.

## Time flies

Construction started on the building in 2008, with opening planned for 1 September 2009. In June 2009 the contractor for the stage technology contractor, SBS Dresden, assigned Hoac, well known as a planner and supplier of mobile aluminium staging constructions, to supply the turntable. "The most challenging part of this project was to match the extremely short time schedule," says Gabriele Högg, commercial director of Hoac. "That of course also affected the planning, construction and installation of the stage technology."







**Above:** Both parts of the revolving stage are integrated into the main stage

**Below:** Construction work on the International Forums Palace Uzbekistan

The revolving stage was designed in accordance with the technical demands of the stage planner, Teapro. The turntable and revolving outer ring had to share basic structural features so as to form one unit. The overall height of the unit, including a 45mm wooden top layer and casters, is 250mm, however it is embedded into the concrete ground so that it is flush with the rest of the stage. The static load capacity of both turning elements is 500kg/m<sup>2</sup> and the dynamic load capacity is 250kg/m<sup>2</sup>. For the welded aluminium frames Hoac-Zarge 16 2/3, which has a profile height of 140mm, was chosen.

To enable the turning elements to do their job – and do it quietly – Hoac placed steel rings on the ground to take the level for the casters. The steel rings were fixed by injecting a high-resistance mortar underneath, which took approximately 48 hours to dry.

#### The ring cycle

The inner turntable is driven by four 1.5kW decelerated-friction wheeled motors, powered through a central slip ring that ‘floats’ in the concrete stage floor. The turntable also features two DMX connections for light control and two normal 230V connections for power supply. The outer ring is driven by four 1.5kW friction drives in the stage floor. Two encoders ensure accurate path measurement. The revolving construction is wired to an external computerised control system, supplied by SBS Dresden.

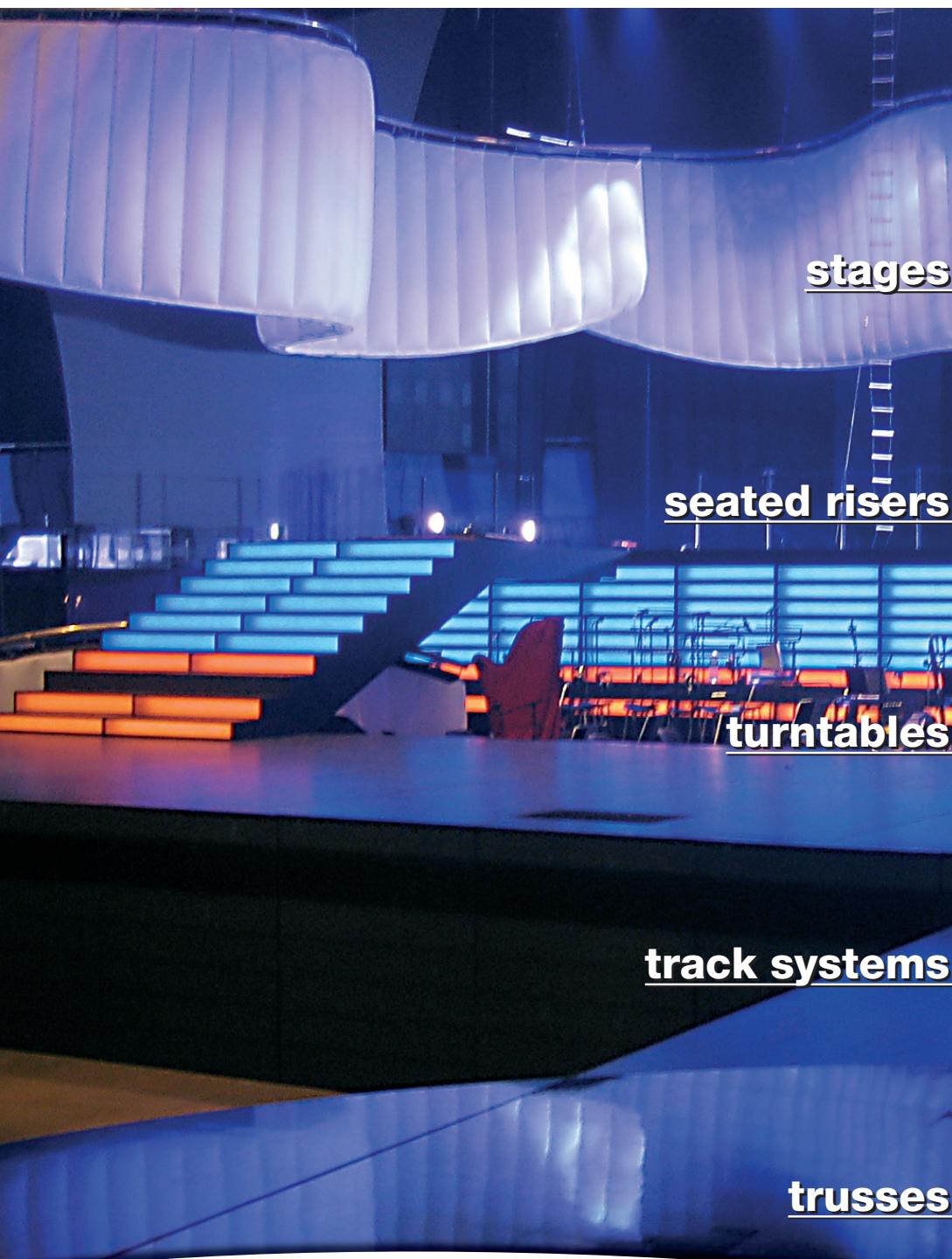
Hoac realised the installation of this special construction in a very short time period – from the first drawings on 24 June 2009 to the final inspection of the work on 3 August 2009, in time for the opening, as planned, on 1 September. “The revolving stage was installed in time because of the cooperative collaboration between all the building enterprises on site, an engaged client and contractor, and the installation knowledge of Hoac,” says Högg. ■

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# Silent light

While automated luminaires can give extra flexibility, theatres and opera houses are also under pressure to reduce the ambient noise made by technical equipment

**Right:** Glyndebourne Opera House, which uses Warp/M automated profile spotlights

**Below:** The New York Metropolitan Opera uses ADB's Warp Daylight 575W Zoom Profile Spotlight

**W**hile bleepers and mobile phones increasingly intrude into theatrical performances, the noise made by technical equipment is also a thorny issue for theatre and opera houses. "Auditorium operators are themselves increasingly subject to demands from conductors and orchestra leaders that the background/ambient sound level in the house should be as close as possible to zero – in particular with the house's own technical systems," says Christian Léonard, CEO of ADB Lighting Technologies. "A modern opera house, theatre or television studio now demands the operational slickness of precise repositioning and refocusing of luminaires directly from the control desk, allowing the house to reconfigure its lighting system in minutes, rather than the traditional, lengthy process of manual refocusing each light." But that requirement is also obliging manufacturers to think harder about how to reduce the noise emissions from every piece of

equipment – audio systems, staging equipment and even the stage lighting rig – an area in which technology is now helping to produce true silence in the house.

## Classical music

Noise is of great concern to all classical music houses, and was one of the principle reasons that the Glyndebourne Opera House in East Sussex, UK, turned in 2005 to ADB's silent, fan-less Motorised Warp/M, an automated profile spotlight, following a head-to-head luminaire shoot-out organised by Keith Benson, Glyndebourne's lighting manager. "Automated luminaires, which have ruled the rock 'n' roll world since Genesis famously débuted them in 1981, have had a much tougher time in classical houses because the sound of motors, gear mechanisms, and especially cooling fans means the average moving head is unusable for operatic and symphonic works, which include key moments of silence," says Léonard.

ADB's solution was to design an automated profile spotlight (and a manually operated companion version) specifically for classical music houses, although the Warp's brightness and beam purity has also found favour on shows where the sound system volume means the product's low-decibel virtues are not so vital.

Two months before the official UK launch of ADB Warp/M at PLASA 2005, Glyndebourne Opera House joined its Italian counterpart, La Scala in Milan, as one of the world's first major locations for the Warp/M. "We've used generic lights for years because I never felt that the moving light for opera was there, although we have tried a few. But using automated lights makes sense to save time in refocusing, and we have some awkward lighting positions to get to," said Benson at the time. "Bearing in mind that noise is a huge factor for us, I did a luminaire shoot-out and put them all through their paces



Jonathan Tichler/Metropolitan Opera





**Above:** The ADB Phoenix console and ADB Mentor/XT back-up desk at Fusionopolis's Genexis Theatre

**Below:** London's Barbican Concert Hall uses 19 Warp/M spotlights to make quick changes between around four events a day

– and at the end of the day the Warp/M proved totally silent and was as bright, if not brighter than, the competition.”

A similar tale was told at the New York Metropolitan Opera (the Met). This year it became the first US opera house to purchase ADB's Warp Daylight 575W Zoom Profile Spotlight, citing the unit's combination of brightness, beam quality, silent operation and individual, 360° ring control of focus, zoom, iris, gobos and shutters – again after a competitive 'shoot-out'.

In Prague this summer, Ivo Dankovič, chief electrician of Narodni Divadlo, the Czech national theatre, specified Warp Zoom Profile spotlights to help accommodate a large production that extended over the orchestra pit at Prague's Estate Theatre. The production had created a lighting headache as the central front-of-house lighting position there is limited to just a few lights. Dankovič's solution was to use Warp Zoom Profiles, placing them close to the orchestra pit on the second balcony left and right, where their silence would make them audibly unobtrusive to the musicians while simplifying the process of focusing on the awkward stage locations. “The Warp is outstanding not only in its innovative ring control, which makes everything easy to manipulate, but in the company's philosophy of profile lights in principle,” says Dankovič.

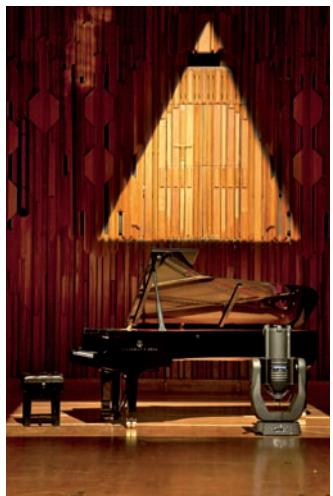
Similar characteristics appealed to the Genexis Theatre at the Fusionopolis complex in Singapore, the work of Arup, with consultants

Theatreplan and Singapore architects WOHA. The main house lighting console is an ADB Phoenix 10/XT with 512 channels/instruments, with an ADB Mentor/XT back-up desk, while the lighting system is fully networked using ADB's Netport/XT and an ArtNet digital network. ADB says that the 12 Warp Zoom Profile Spotlights used again bring the advantages of silent operation and ADB's patented endlessly rotating four-blade shutter, fingertip control and high light output.

London's Barbican Concert Hall also opted for Warp/M automated spotlights – 19 in total – which provide the multipurpose concert hall's main controllable profile lighting from the two front-of-house bridges, allowing the lighting team to re-focus the profiles remotely in brief breaks between up to four concerts and events a day.

The lighting department is well versed in using automated lighting – the concert hall has employed automated fixtures for many years. But as the schedule of classical shows, opera, jazz concerts and corporate events grows year on year, this places ever greater demands on the lighting technology, with the daily requirement to change over from two morning classical concerts or rehearsals to an evening jazz event, with maybe a graduation ceremony in the afternoon as well. “Silent operation is vitally important to us, and silence was indeed one of the key reasons behind our choice of the Motorised Warp,” says Mark Bloxsidge, technical supervisor at the Barbican Centre. ■

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# Master of disguise

A moving floor allows Melbourne Convention Centre's Plenary Hall to transform itself into a myriad of configurations, each designed to look like its true, permanent self

**Top: Melbourne Convention Centre's Plenary Hall with the movable seating section retracted for a flat-floor configuration**

**Bottom: Spiralift units underneath the Plenary Hall's moving floor**

**W**hen brainstorming the possible features for Melbourne's new convention centre, aspirations were grand – trade exhibitions, concerts, sporting events, live theatre, cabaret, television events, banquets, corporate seminars, dance performances, direct accessibility to loaded 40-tonne trucks, and remarkably, all of it transformable in less than an hour.

To allow such multifunctional use the centre's Plenary Hall was designed – a 5,000-seat space that can be divided into three self-contained, acoustically separate theatres. GALA Systems provided the equipment to make this possible, enabling the operators to maximise the usage of the space while creating a stage that allows the public to be as close to the action as possible.

Property of the Victorian State Government and managed by the Melbourne Convention and Exhibition Trust, the Melbourne Convention Centre is internally linked to the Melbourne Exhibition Centre to create the Melbourne Convention and Exhibition Centre (MCEC).

## Green gem

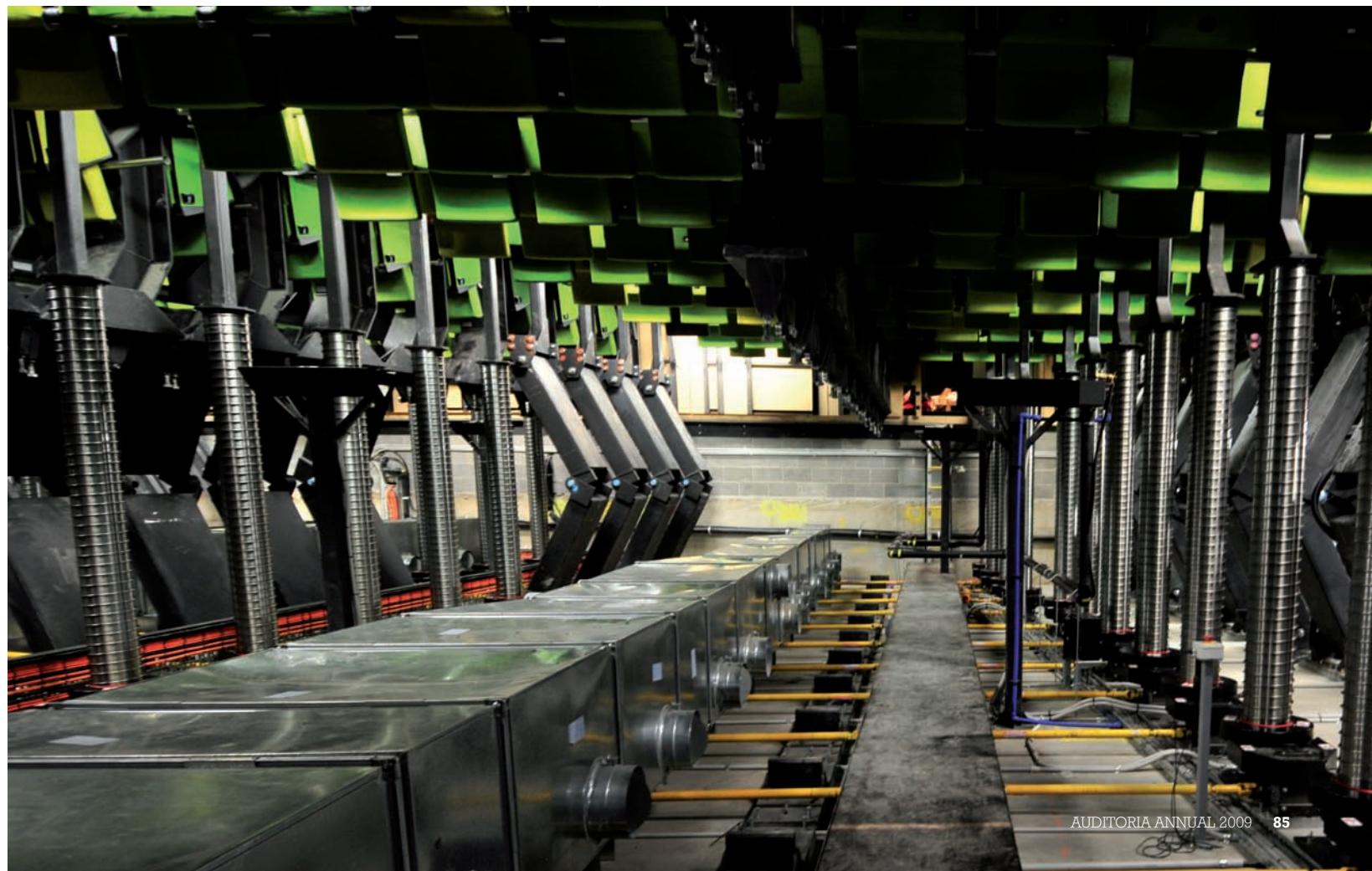
Located in the heart of Melbourne, in South Wharf on the banks of the Yarra River, the Melbourne Convention Centre opened its doors for business in June. With plenty of fresh air and natural light, the venue was designed to be Australia's greenest convention centre and the world's first to achieve a 6 Star Green Star environmental rating from the Green Building Council of Australia. The convention and

exhibition facility also boasts a Hilton hotel and a vibrant riverside precinct with cafés, restaurants and retail stores at its doorstep.

Offering a wide variety of options in event planning, the convention centre includes 32 meeting rooms of various sizes and a grand banquet room as well as the Plenary Hall. Developed with GALA Systems' technology by project consortium leader Plenary Group, architects Woods Bagot and NH Architecture, consultant Marshall Day and contractor Multiplex Construction, the Plenary Hall had to fulfil many specific needs. Not only would it have to provide the flexibility to be configured for multiple events, but each configuration would need to look seamless, as a permanent venue designed for a specific event.

This kind of request (for highly flexible automated spaces) had been partially fulfilled before by GALA in venues such as Jonquière Cultural Centre in Quebec, Canada; the River Rock Conference and Showroom in British Columbia, Canada; the KVS Cultural Center in Brussels, Belgium; and the Bilbao Cultural Center in Bilbao, Spain. But GALA says the size of the MCEC Plenary Hall, the truck loading requirement (20kPa capacity), as well as the goal of a 6 Star Green Star environmental rating brought with it a whole new set of challenges.

These challenges were met by creating a moving floor that allows approximately 1,600 of the 5,000 seats to be automatically reconfigured – more than 1km of rotating rows of seating. Without any manual handling, the 42 rows have an automated seat rotation system for storage





**Above:** The Plenary Hall in a full auditorium configuration

**Below:** The Melbourne Convention and Exhibition Centre

under the floor in under 10 minutes. While strong enough to load and lift trucks, the floor itself provides ventilation – the trough-floor positive displacement ventilation is integrated for energy efficiency. Air is delivered at a low level and exhausted at a high level, providing effective fresh airflow with low energy consumption. For easy accessibility, the floor conceals service outlets for power, water and gas.

Powered by GALA's patented stainless steel Spiralfit system, the floor, stage, seating risers and lift systems are precisely engineered for accuracy and stability. The multiple stage configurations are achieved by two independent orchestra lifts and four independent stage lifts, using 42 of GALA's largest Spiralfit units. The Plenary Hall's entrance passages are also defined by an elegant telescopic skirting system designed by GALA. The movable seating area requires 194 Spiralfit units, self-contained guiding mechanisms and concealed equipment to make each setup virtually indistinguishable from a single-purpose facility. This permanent feeling is strengthened with the stability and solidity of the floor, and auditorium-quality seats (with A3-sized trays) from Cematic Seating.

Although many new configurations can easily be added, the touch-screen electronic system that was developed based on GALA's parameters by Control IT, a local supplier, has already been programmed with several configurations. These include the full hall (with or without sound and lighting desks), sports hall, conference (small or full), cabaret, and a flat floor for events such as banquets and exhibitions.

For each configuration the seat rake can be adjusted to allow for a completely clear view of the stage from any seat. "The Plenary has been carefully designed. Its fan-shaped design means all delegates will have an unobstructed view no matter what the convention mode, something no other centre in the world can do," says Nik Karalis, director, Woods Bagot.

The MCEC has been built and contracted for a minimum 25-year operational duration. Because of the high complexity of the truck loading, and the flexibility of the seating rows, GALA completed rigorous tests on the mechanical system. A 10-day continuous operation systems test was performed prior to installation at the plant of Metaltec, the local manufacturer in Melbourne. Along with this preoccupation for longevity, maintenance too had to be carefully planned. There are no wear parts and a fully trained local team can maintain the hall within a week each year.

Despite the complex solution, the mechanism is completely hidden. In addition, all the Spiralfit units are lubricated with an odourless lubricant generally used in the food handling industry.

"Our goal was to provide high flexibility to the Plenary Hall with a quick conversion time, seamlessly changing into different configurations. We know now that this system will make it easy for the MCEC to provide an array of ideal high-quality spaces and never say no to hosting any event," says Robert Heimbach, vice president of GALA Systems. ■



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# Sitting pretty

Great care was taken over the development, selection and installation of more than 2,200 customised seats for the Winspear Opera House in Dallas

**Right: Seating at the Winspear Opera House includes seats with a hinged end panel to enable easy access for people with disabilities**

**S**eries Seating has succeeded in developing, manufacturing and delivering – on time – more than 2,200 customised seats for the Margot and Bill Winspear Opera House in Dallas, Texas, USA.

The opera house, part of the AT&T Performing Arts Center, was a passion for Canadian-born businessman and philanthropist Bill Winspear. His US\$42 million gift was the largest in the US\$338 million capital campaign. Winspear, until his death in 2007, involved himself closely in the hall's development.

The opera house's architect, Foster + Partners, responded accordingly. Working with Theatre Projects Consultants (TPC), contractors The Linbeck Group and the owners, they made the chair design a high priority, launching a long and exhaustive supplier selection process to ensure that whoever got the contract would be able to meet exacting design ambitions.

"First we wanted to see what was out there," explains TPC's John Runia. Some 30 suppliers worldwide were invited to offer samples of their best theatre chair model with 'basket' mount air diffuser. Series Seating was among 15 suppliers who submitted seats. These were displayed in Dallas Opera's rehearsal hall where the design team, as well as Winspear and some of his seating committee members – people large and small – tried them out.

Meanwhile the design team worked on the criteria for a prototype, by which time acoustician Robert E sass of Sound Space Design had agreed to the substitution of floor

air outlets for basket mounts, making way for a cleaner-looking seat envelope. Four or five suppliers were then selected to respond with a two-seat mock-up.

The finalists were rigorously interviewed and scrutinised for their design approach, testing methods and ability to deliver a quality product at the right price, on schedule. "It was a very tight race," Runia recalls, "but there was this sense that Mauricio, one way or another, was going to make it happen."

Mauricio Olarte, founder and owner of Series Seating, studied industrial design in New York, taught in Mexico and then Colombia where, still in his late twenties, he became dean of the design school at La Universidad de Bogotá Jorge Tadeo Lozano. Meanwhile, he bought a small furniture company, the first step towards founding Series Seating, more than a quarter of a century ago.

Thomas Boyd, director of performing arts projects at Series Seating, worked hard to put Olarte's company in the right position on the project and manage it through the approval stages. Boyd leads an expanding performing arts business that complements Series Seating's worship, educational, and restaurant seating markets. Past projects include Atlanta's Cobb Energy Performing Arts Center, the new Guthrie McGuire Proscenium and Wurtele Thrust stages in Minneapolis, the Adrienne Arsht Center for the Arts in Miami and the Durham Performing Arts Center in North Carolina. Future projects Boyd has Series Seating working on include Macau's City of Dreams Dragone Theatre in China, Carmel Performing Arts Center in



## SEATING



Indiana and the Hylton Performing Arts Center at George Mason University in Virginia.

Olarte's passion for the perfect seat permeates his company. Design team members who made multiple visits to Series Seating's factory returned with glowing accounts of the staff and the speed with which modifications could be made to mock-ups. "This is a company that really gets stuff done," says Runia.

Olarte admits he normally likes to drive the design process, so the Winspear project, with Foster + Partners taking the lead, was a departure. "Frankly, knowing that Mauricio is a designer, we thought he might try to throw too much at us, but he didn't. And we listened to his advice on a number of points," says Bjørn Polzin, associate at Foster + Partners.

Olarte describes his role as that of an interpreter, implementer and engineering problem solver. "They were very clear what they did and didn't want," he explains. "They aimed for a very clean, contemporary look with no exposed anything. We found the solutions to make it work."

The finished seats, with their American walnut veneer and grey, perforated Ultrasuede-covered cushioning have an unfussy, modern appearance. Series Seating matched the seats up for colour consistency within the hall's various seating areas.

The seats are so unobtrusively secured that it's hard to figure how they're so rock-solid. On the orchestra level the tapering support panels are screwed directly into the hardwood floor. In the upper ranges seats are cantilevered out from the concrete riser face in a 'floating' mount. For complex seat installations, Series Seating sub-contracts Florida-based Joe Diebold. The results have been consistently excellent. "Joe did an amazing job," says Polzin. "The seats are incredibly well aligned."

The support panels have cutaways to maximize seat area. The strong yet seemingly

slender plywood padded armrests are cantilevered out and engineered in multiple layers to exceed code weight-bearing specifications. In an unusual design flourish, the row-end panels feature glass inserts to match the cutaway design. Row letters on the glass almost seem suspended in thin air yet are readily visible, illuminated by LED aisle lighting recessed beneath the armrests.

### Staggering

Because of the raked floor of the stalls seating and stepped risers in the hall's tiers, Series Seating also had to modify many of these complex end panels accordingly and produce four unique chair widths to provide the correct staggering of seats, achieving clear sightlines and even row widths.

Ensuring the seats were compliant with the Americans with Disabilities Act was a major challenge. Olarte and his team of engineers in Chía devised a hinged, magnetically secured end panel with a discreet latch release. The glass and its wooden framing swings out at seat-pad level for easy access without compromising the design's visual integrity.

TPC affiliate Carol Allen is equally admiring of the way Series Seating designed removable seating for wheelchair placement: "Removable seats in theatres tend to be ugly. They came up with a very neat design," she says.

These are just some of the ways Series Seating came up with imaginative solutions to a variety of design challenges. "I bet we nearly drove them mental on certain points," says Polzin, "but they were responsive to all our design requests. I couldn't recommend them more highly." Polzin is echoed by his associate James McGrath – Foster's partner-in-charge on the Winspear project. "They've done a wonderful job down to every last detail," says McGrath. "They're fantastic people to work with." ■

**Left: Series Seating produced four different seat models to facilitate the staggering**

**Main: The seats are finished with American walnut veneer and Ultrasuede cushioning**



[www.seriesseating.com](http://www.seriesseating.com)



# Track record

Copenhagen's new concert hall features acoustic curtains and an elaborate track system from Gerriets

**Right: Danish Radio  
Koncerthuset's 1,800-seat  
concert hall**

**O**n 17 January 2009 Danish Radio's new concert hall (Danish Radio Koncerthuset) in Copenhagen, Denmark, was inaugurated. Jean Nouvel's architectural masterpiece features a 1,800-seat concert hall (Studio 1), along with three smaller studios for radio and television broadcasting. All Danish Radio's departments, formerly spread over Copenhagen, are now concentrated in one building.

The acoustic concept, developed by Yasuhisa Toyota, allows multifunctional use – including classical concerts, jazz, pop and rock events. The concept has two main components – an acoustic ceiling cover and a six-piece, 1,500m<sup>2</sup> acoustic curtain manufactured by Gerriets, a company based in Umkirch near Freiburg, Germany.

Right from the planning stage, Gerriets was included in the team by the stage designers from Ducks Scenó. "Because of our long-term positive cooperation with Gerriets we knew that Gerriets would be the qualified partner for a project that complex and innovative," says Stefan Abromeit, project manager with Ducks Scenó. "A 3D bended track system like that – with its extreme requirements on the motors – had never been realised before."

The acoustic curtains and track systems were finally installed in November 2008 in close cooperation with Priebe of Denmark, approximately three years after work started.

## Track system and motor

A Gerriets JOKER 95 track system is designed to offer soundless, flexible and reliable curtain

movements. The tracks are curved horizontally and vertically. Set at a height of 30m, the motors have to overcome altitude differences of up to 4.2m with an average incline of 20°. This performance is achieved by Gerriets' drive-wheel FRICTION-DRIVE motors, with two motors mounted on one track system.

The custom, curved tracks were tested and pre-mounted before leaving Gerriets' workshop, making the installation (at 30m height) easier. As the tracks swing up and down as well as left and right, Gerriets' FRICTION-DRIVE motors required – similar to mountain railways – an elaborate system of counter weights and pre-tensioning, to minimise the stress on motors and brakes and to reduce wear and maintenance.

Low and easy maintenance and reliability had already been major points in the planning phase. To maintain or repair a system at a height of 30m, a scaffold would have to be built every time maintenance technicians needed to reach the track system – meaning an enormous time delay in the daily routine. The solution was to store the motors in small storage spaces where they can be reached and maintained from above.

The wheel-runners are connected to each other by custom-made joints to ensure a defined distance between them. The festoon cables for motors' power supply are adjusted to these distances, and sewn in bags of non-flammable fibreglass fabric, so in the event of fire, the curtains can be driven for as long as possible.

To allow the spotlights to light the stage if the curtains are closed, acoustic curtain panels are hung 1m below the curtain tracks. Custom-made





**Besides its concert hall, Copenhagen's Danish Radio Koncerthuset also features three radio and television broadcasting studios**

steel wires with adjustable spacers were used for this – they needed to be strong enough to hold the weight, but delicate enough not to be seen.

#### **Acoustic curtains**

Hidden in storage gaps, the acoustic curtains – formed of six panels that can be moved independently – change the room acoustics in only a few minutes. After extensive research the acoustic designer Yasuhisa Toyota chose 1,500m<sup>2</sup> of Gerriets' WOOLSERGE fabric to complete the acoustic concept for Studio 1. Gerriets WOOLSERGE 500 was chosen for its sound absorption properties, and is a flame-retardant wool fabric that reduces reverberation. With a total length of 200m the curtains weigh nearly one tonne.

The bottom edges of the acoustic curtains had to be sewn so that they have a neat bottom

edge from both sides. The fabric was provided in three custom-dyed colours, all shades of red, to match the interior design, which features a hand-painted flame motif.

The inauguration of the concert hall was attended by members of the Danish Royal family, the Danish government and a number of national and international VIPs. During the festivity Danish cultural politician Erik Asmussen could not hold back with his proud statement: "We will place ourselves on the cultural world map."

Gerriets points out that it was the creative cooperation of various international parties – the architectural team of Jean Nouvel, Ducks Scénô, Priebe and Gerriets – that brought about the successful completion of this complex project. ■

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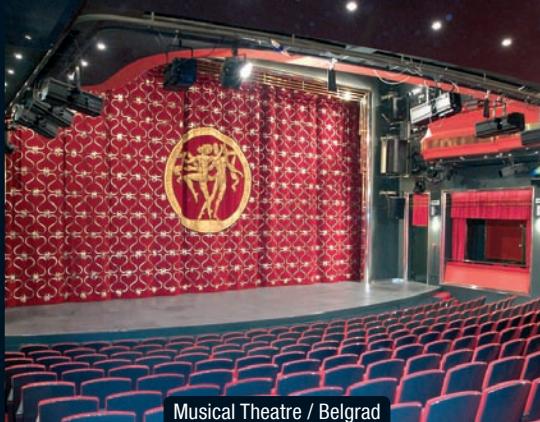
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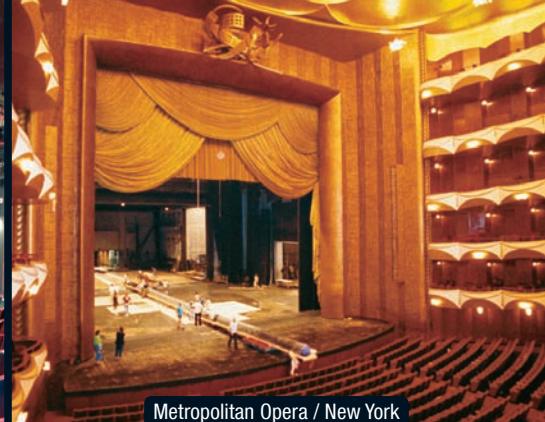
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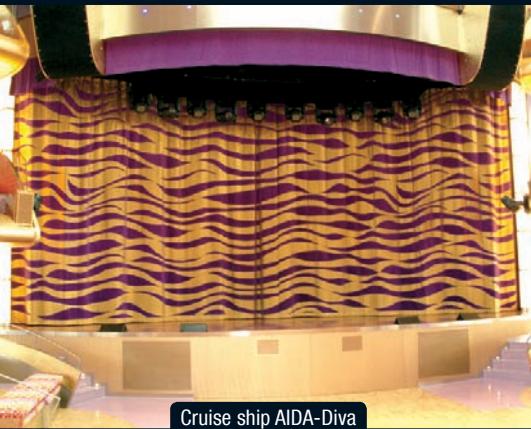
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# The show must go on

The renovation of the New York City Ballet's and New York City Opera's David H. Koch Theater had to be completed with minimal disruption to the companies' artistic programmes

**Top: The New York City Opera performing *Madama Butterfly***

**Bottom: A performance of *The Nutcracker* by the New York City Ballet**

Over the last year, when audiences left after a performance at the Lincoln Center for the Performing Arts' David H. Koch Theater in New York, USA, little did they know that a show of a very different kind was getting underway – the US\$100 million renovation and refurbishment of the theatre, which is home to the New York City Ballet and the New York City Opera. Soon to reopen, it introduces an impressive array of features and a spruced-up auditorium that updates what was formerly known as the New York State Theater.

While the building, designed by renowned architect Philip Johnson, had almost instant landmark status, over the years each company assembled its own wish list for upgrades and in 2007 they came together to start planning. In spring 2008 the companies announced the first phase of an ambitious renovation programme.

Taking advantage of current technology was an important goal. The upgraded lighting system includes a sophisticated new light board, additional positions for stage lamps and a new system of lighting ladders. A few levels below the theatre, a complete on-site media suite has all the equipment necessary for the capture and distribution of high-definition images and digital sound from performances and rehearsals, to be used to produce DVDs and similar products. The theatre itself has been outfitted with robotic, remote-controlled cameras, and approximately 60 broadcast service plates provide maximum flexibility for temporarily installing and changing camera positions as needed.

The expanded orchestra pit accommodates a larger orchestra – up to 100 players – and can now rise and fall on a compact lift designed to increase the presence of the orchestra's sound in the theatre, and allow opera singers a clear and direct exchange with the conductor and orchestra.

Visually obvious changes include the removal of carpet from the auditorium, new seats that have been carefully tested for acoustic properties, and the introduction of two side aisles on the orchestra level. New signage announces the theatre's name change following philanthropist David H. Koch's US\$100 million gift to the theatre's US\$200 million capital campaign. A further US\$25 million came from The New York City Department of Cultural Affairs. Not visible but certainly felt is the upgraded HVAC system.

Accomplishing all this meant a shared commitment from both tenants as well as their landlord, the City Center of Music and Drama, which leases the building from its owner, the City of New York, and runs the facility. Once that commitment was made, the companies then had to implement it, which is where Landair came in.

An international project management firm, Landair is known for orchestrating complex and often very public design and construction projects such as the memorial competition for the World Trade Center site, and the renovation of landmark theatres during the reclaiming of New York's 42nd Street.

At the David H. Koch Theater, Landair had to work out a full scope of work and coordinate the efforts of all the consultants within a few months. The construction was scheduled to begin in June



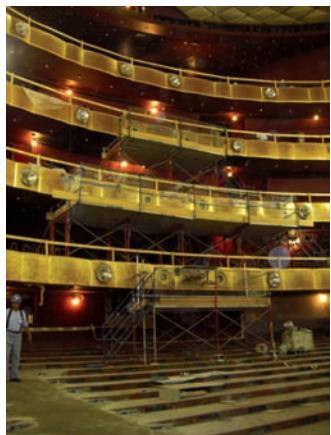
Carol Rosegg



Paul Kolnik

**Renovation work on the David H. Koch Theater**

2008 and conclude on 1 October 2009, with the theatre available on a continuous basis for only portions of that time. "Any fast-track schedule calls for virtuoso coordination and timing, and the peaks and valleys that came with this one were an extra challenge," says Leith ter Meulen, president of Landair.

**Around the clock**

The City Opera agreed to give up its autumn 2008 and spring 2009 seasons so that construction could take place around the clock during those periods and through the summer. The New York City Ballet however had full performance seasons, so construction started after the final curtain and concluded in the morning when the opera and ballet administrative staff came to work. There had to be a thorough clean-up each morning, especially because construction dust can be dangerous for dancers performing in toe shoes. "Over the last two years, our staff has lived through the constant stress of a renovation so that the public could have a better experience at the theatre, and the outcome demonstrates it was worth it. This wouldn't have worked without the contributions of a large team that made it possible," said Ken Tabachnick, general manager of the New York City Ballet.

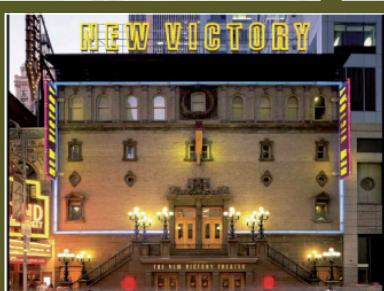
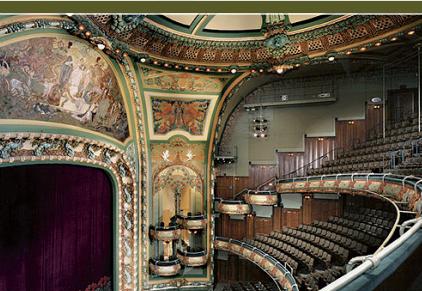
The uneven schedule also called for a more complex sequencing of projects. Major undertakings such as the expansion of the orchestra pit, which could only take place during the months when the theatre was closed, had to be mixed with less invasive projects that could be resumed after each evening's performance. "We had to get a lot done in relatively short periods,"

says John MacKay, Landair's vice president and the project executive leading the renovation effort. "Our design and construction team brought an extraordinary amount of energy and dedication when the opportunities were there. The trick was maintaining that momentum during the downtime so that when full construction began, they were ready to go full tilt."

Equally impressive was the coordination among the New York City Ballet, City Opera and City Center of Music & Drama. "While the New York City Ballet and City Opera both have strong individual identities, it was their combined vision and love of the building, supported by City Center of Music & Drama, that drove the project and made it easy for us to work so efficiently," says ter Meulen. "The two organisations spoke with one voice about their goals and we structured the job to meet them."

City Center of Music & Drama will rent out the theatre when it is 'dark' for corporate events and not-for-profit fundraisers. Being able to raise the orchestra pit to stage level will allow lessees to have speakers and programmes in front of the curtain, without using the entire stage.

"This project has required a tremendous collaborative effort from partners and supporters, staff and trustees, and all the skilled people who have done the hands-on work," says George Steel, New York City Opera's new general manager and artistic director. "Now comes the exciting part – when we step onto the stage for our 2009-2010 season, and the audience gets its first experience of the renovated David H. Koch Theater." ■



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# Multi-talented

Steeldeck outlines the staging and seating choices available to meet the growing demand for flexibility in performance spaces

**Right:** The 888 World Snooker Championships at the Crucible in Sheffield, UK

**Below:** The Abbey Theatre in Dublin, Ireland, where an entire 500-seat auditorium structure was installed in just over two weeks

**W**hen plans are being discussed for a new performance space, conflicting requirements and future uncertainties (not to mention budget pressures) are commonplace. “Not so long ago I was invited to visit a school to discuss a performance space and found myself in a meeting,” says Philip Parsons, owner and founder of Steeldeck. “The request for a multipurpose space was clear. But after that... Was the requirement for straight drama, did it include music or dance? The head of department was about to retire, the syllabus was uncertain and there was talk of a sixth form being added. Fixed seating seemed appropriate, retractability would be welcome and a sprung flat floor was suddenly seen as essential – clearly they needed a theatre consultant before they needed a contractor!” Hence why so many people can struggle for their space to be ‘flexible’ – even if current dilemmas can be resolved, future requirements can be hard to predict.

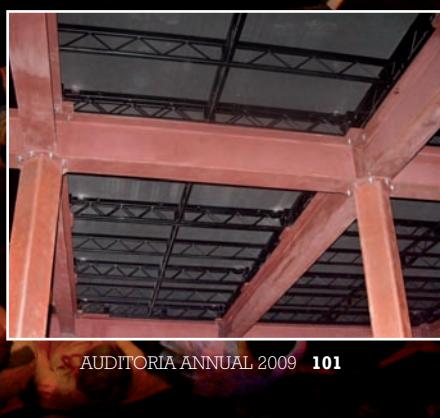


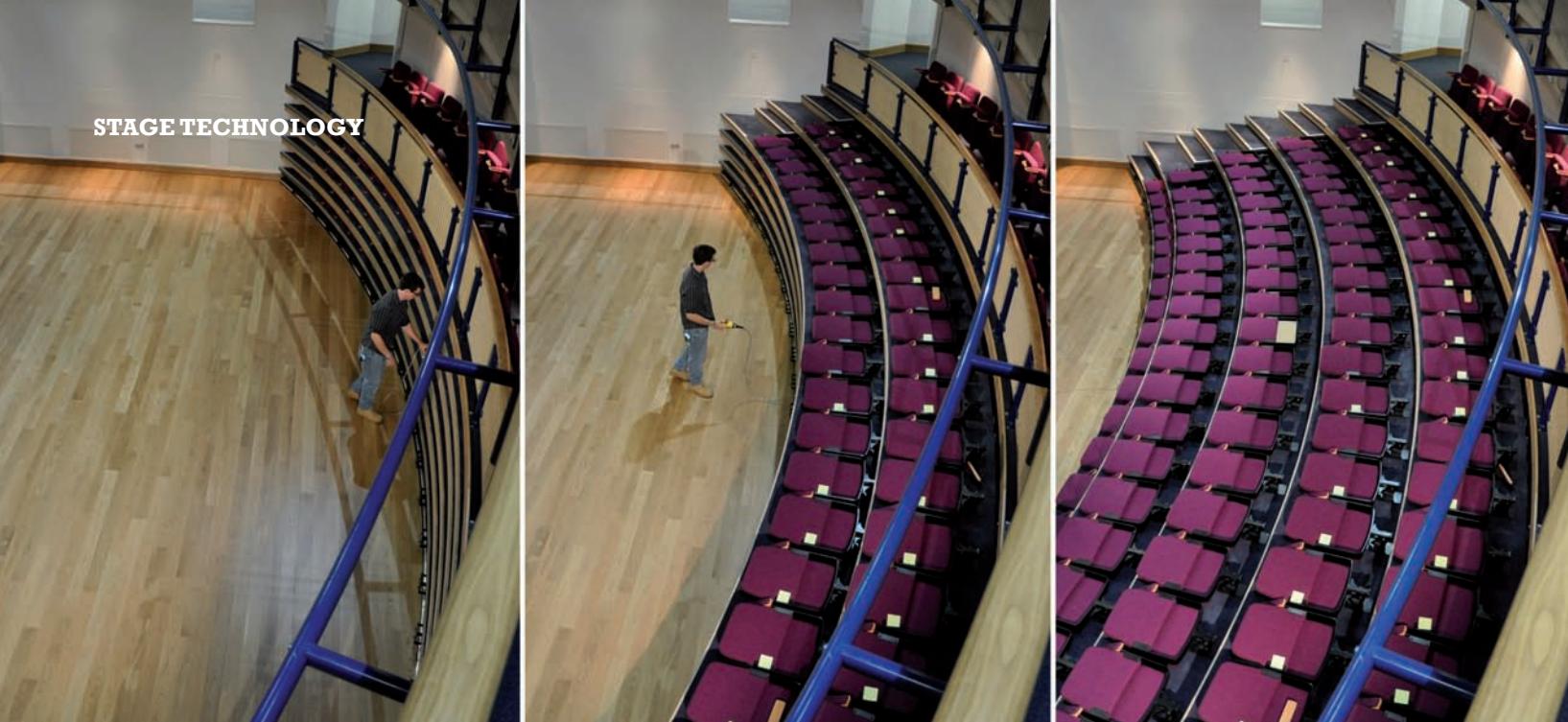
“The most common, flexible and best-value solutions involve plug-in leg platforms,” says Parsons. “These can double as both stage and seating structures, essentially without compromising the range of choices or geometry of the room at all.” The plug-in leg platform is a Steeldeck speciality – the product has a steel truss frame designed for strength and durability.

Alongside this type is the extruded aluminium frame, usually used for lighter duties and benefiting from lower storage volume. “The drawback of this sort of approach is the labour and time needed for a changeover, together with the necessary storage space requirement,” says Parsons. “It is suited to venues changing (perhaps very substantially) every few weeks and having significant changeover periods available.”

Then there are scissor frame platforms, which Parsons says trade in some flexibility for speed of set up. Scissor frame platforms dispense with the need for legs and operate with a mechanism similar to that of an ironing board. “In North America and the UK these are a niche product, while in Europe they are in very general use, proving that even in a rational market cultural preferences are seen,” notes Parsons.

One variant of this type is NIVOflex’s AirStage unit, which Steeldeck also distributes and installs alongside its own products. The platform is built into the floor so it forms the venue floor when not in use. The operating handles’ simple twisting and lifting action, assisted by counterbalancing gas springs, lifts that chosen section of the floor to working height. Various heights may be chosen, but are preset in the factory and cannot subsequently be changed. “Of course since the platform is permanently fitted it cannot itself be moved around but with judicious design a pit filled with these units can achieve a variety of layouts (end-stage, in the round and the like), and critically the changes can be effected quickly and with minimum effort,” says Parsons. The product also, obviously, doesn’t require any storage space.





**Above:** The first APack installation in the UK, at Hampton School in Middlesex

**Below:** RADA's 200-seat Vanbrugh Theatre has more than half a dozen variants of the same seat model

Another option is retractable seating tiers, which can change the shape and/or role of a space in minutes. The space may only have two configurations – flat floor and seating tiers – but the transition could, for example, take place between a school assembly and dance lesson at the push of a button. “The compromise to flexibility is now very considerable (no freewheeling in the round setups here), but the theatre ‘feel’ need not be abandoned,” says Parsons. “Steeldeck’s APack solution can offer an extremely permanent and solid feel underfoot and, most notably, can create a curved auditorium which packs away in the same way as conventional retractable tiered seating.”

Reconfiguring the venue floor is not the only way that flexibility can be built into a space – adding a balcony adds seating capacity and space for control positions, and perhaps more importantly, declares that the venue is a theatre. A balcony is not always appropriate, but systems such as Steeldeck’s CourtYard can be reconfigured or removed altogether if the need arises.

#### Mix it up

“Of course fully motorised and remotely controlled solutions would be the preferred options in most situations but are rarely affordable,” says Parsons. “A mix of structural steelwork, modular platforms and a simple mobile hoist can usually achieve all that a motorised lift could and possibly more, at a fraction of the cost.”

Even within a given space, the ideal solution may involve a wide variety of seat forms. The seats in the stalls are likely to differ from the circle, even more so on the balcony or the slips. RADA’s Vanbrugh Theatre in London has more than half a dozen variants in a theatre with only 200 seats, all based on the Mirage profile by designer Christopher Richardson.

“The demand for flexibility is growing,” argues Parsons. “The argument has moved from why a space should be flexible as to justifying why it should not be, particularly in the smaller venue. Steeldeck’s objective is to provide a whole range of solutions, whether structural, seating or both (rather than one size fits all), and work with the theatre consultant to find the right mix – every performance space is different.” ■



If our answer is yes - What was your question?



# Collaborative effort

The design of a high-tech communication and presentation system for a pharmaceutical company's new 'campus of knowledge'

**Right: Novartis's auditorium, in full configuration**

**N**ovartis, operating in 140 countries with a head count of nearly 100,000, is one of the world's leading pharmaceutical companies. The company's headquarters in Basel, Switzerland – home to numerous research, production and administrative buildings – has been transformed, in Novartis's words, into a "campus of knowledge, where interaction and encounter is encouraged and innovation inspired". The long-term campus master plan by Vittorio Magnago Lampugnani, professor of city planning history at the Swiss Federal Institute of Technology in Zurich, includes not only architecture and landscaping but also functional, ergonomic and cultural considerations. The campus aims to offer Novartis employees and visitors a well designed, comfortable platform for collaboration.

The keystone of the campus is an all-glass building designed by Frank O. Gehry, positioned at a prime location on the intersection of two new main streets. Below grade, the building includes an interactive computer learning facility and a divisible master auditorium.

"For Novartis the auditorium is to be understood not as an end in itself but as a tool for communication and collaboration," says Daniel Zurwerra, general manager of Virtually Audio. "As such it needs a degree of technical flexibility, connectivity and functionality."

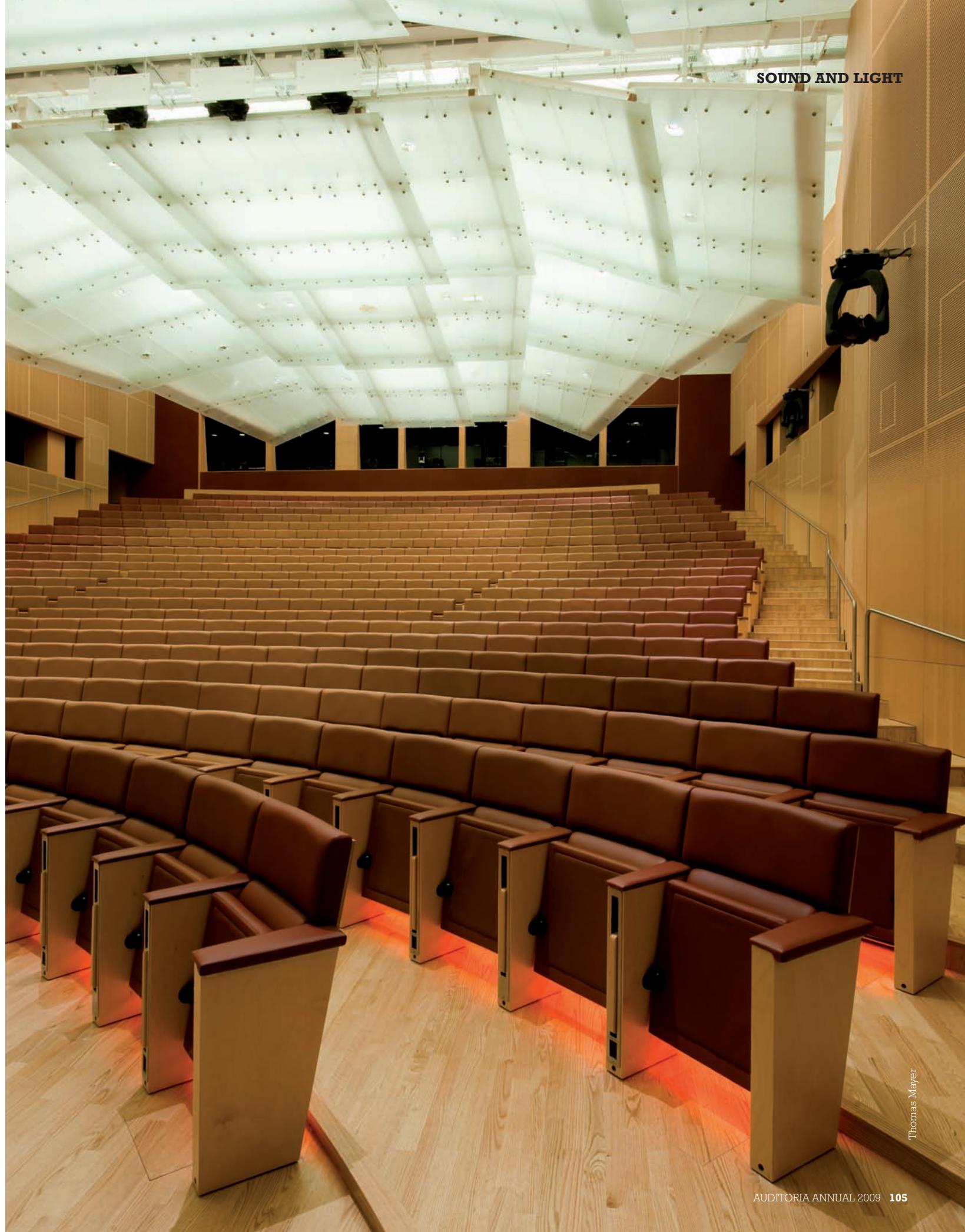
Combining know-how and manpower, WSDG and Virtually Audio – both experienced AV technology consultant and engineering offices – teamed up on the AV design and consultation, designing systems employing

next-generation audio, video, system control and conferencing technology. As well as design architect Gehry Partners, others working on the project included local architect ANW, and Kilchenmann Telematik – which was responsible for the AV installation.

The room can be divided – as a full auditorium it seats 632; while with the division wall in place (which takes up some seat space) it is split into an upper auditorium (with 298 seats) and lower auditorium (with 171 seats). The upper and lower auditoria can be used simultaneously and independently – support spaces such as lobbies, audio video control rooms and translator booths are available for both. Entrance doors and a dedicated pre- and post-show area are located on two separate floors. While in terms of seating arrangement and density the upper auditorium is of a longitudinal, traditional approach, the lower auditorium offers an almost semi-circular seating arrangement that allows quasi face-to-face proximity and interaction in large, but nevertheless compact groups.

The moveable partition wall manufactured by IAC is designed to provide extreme noise isolation for simultaneous use of both upper and lower auditoria. A large lift handles the use of the centre section – this is used either as a motorised stage (in split configuration), or to hold more seating (in full configuration). The seating blocks are moved using a pressurised air 'hovercraft' system.

Although it is below-grade, the auditorium receives daylight through a skylight and the sand-blasted glass ceiling panels. Selected panels are motorised to allow the acoustics to be varied according to the different room configurations.



Thomas Mayer



**Above:** The lower auditorium in split mode

**Below:** The technical control room

### Audio technology

A Studer Vista 8 mixing console and a CobraNet network serve as the core of the fully digital audio system. A key feature is the 'shared resources' concept that allows high flexibility in patching, optimising and routing incoming source signals (such as microphones, teleconferencing feeds, media players and floor tank inputs) to the receivers, which include the main loudspeaker systems in the main hall and lobby, broadcast feeds and translator booths.

All main loudspeakers are line array systems provided by Nexo, complemented by EAW subwoofers. A BSS Soundweb digital signal processor is used for modifying the loudspeakers' radiation pattern and sound pressure levels according to the auditorium's configuration. The svelte distributed mode surround loudspeakers – Tannoy's Mirage product – are covered by motorised wood panels.

The audio system is capable of delivering theatre-quality 5.1 surround sound in full auditorium configuration and offers appropriate monitoring conditions in the main control room. In split configuration, a Yamaha LS9 mixing console is used in the proprietary control room for the lower auditorium. Infrared-based infrastructure for simultaneous translation in three languages is provided, as well as an induction loop system for people with impaired hearing. The speaker lectern holds a high-sensitivity Microtech Gefell cardioid plane microphone designed for excellent speech intelligibility with low camera obtrusion.

### Video technology

The video system, with its core component being a 64x64 Network high-definition serial digital interface (HD-SDI) routing matrix, is laid out for full HD 1080i capability. Computer signals are routed by an Evertz optical/electrical 32x32 routing

matrix. Fibre optical cabling enables long runs without impairing the 1920x1200 pixel-by-pixel accurate DVI transmission. Portable VGA/DVI transmitters are available for use at floor tanks.

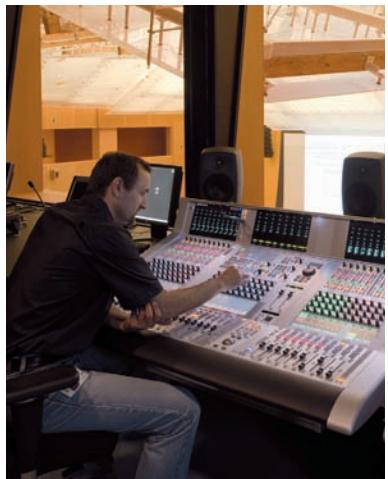
The two motorised Stewart film screens (one in the centre for split configuration, and a wall-filling one in the front for full configuration) are illuminated by Christie 3-chip HD digital light processing projectors. In split configuration, the lower auditorium uses a rear projection system. The space is equipped with motorised Sony HD cameras at front and rear viewpoints. A Ross video mixing console and a title generator can be used to create broadcast-quality transitions and effects.

A Polycom video conferencing system is used to link audio and video to the world – be it a remote auditorium or an offsite research team. Internal and external webcasts can be created and streamed directly from the control room. Full broadcast-grade connectivity is available for hook-up of third-party broadcasting vehicles.

### Auxiliary technology and system control

An ADB theatrical stage light controller is used for operating the various moving head lighting fixtures. Site-wide AV control is implemented by Crestron touch-panel systems with standardised functional layout. This includes an automatic system status and fault detection console in the control rooms.

"The campus auditorium thus is ideally equipped for the various user scenarios that Novartis has envisioned for the space – from large media conferences and addresses from the CEO to scientific collaboration and exchange meetings," says Dirk Noy, general manager of WSDG's European office. ■



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# Show business

For the Durham Performing Arts Center, a shrewd business plan was just as important as the design of the building

**Right: The Durham Performing Arts Center is designed to offer clear sightlines from every one of its 2,800 seats**

Irving Berlin wrote the classic show tune *There's No Business Like Show Business* for the 1946 Broadway musical *Annie Get Your Gun*, but as architect Philip Szostak, FAIA, of Szostak Design notes: "Berlin certainly wasn't thinking about construction budgets, developer deal points or venue operating agreements. In this day and age, there is nothing more important to the success of a performing arts centre than the soundness of its balance sheet." Such considerations, suggests Szostak, are quite literally the "business of show business".

A good example is the new Durham Performing Arts Center (DPAC) in Durham, North Carolina, USA. "This 2,800-seat proscenium theatre opened in the autumn of 2008 to rave reviews, both for its design and its first season of stellar performances. However, the real story of this project isn't its finely detailed façade or crisp acoustics. It is DPAC's soundly constructed business plan that truly deserves the accolades," says Szostak.

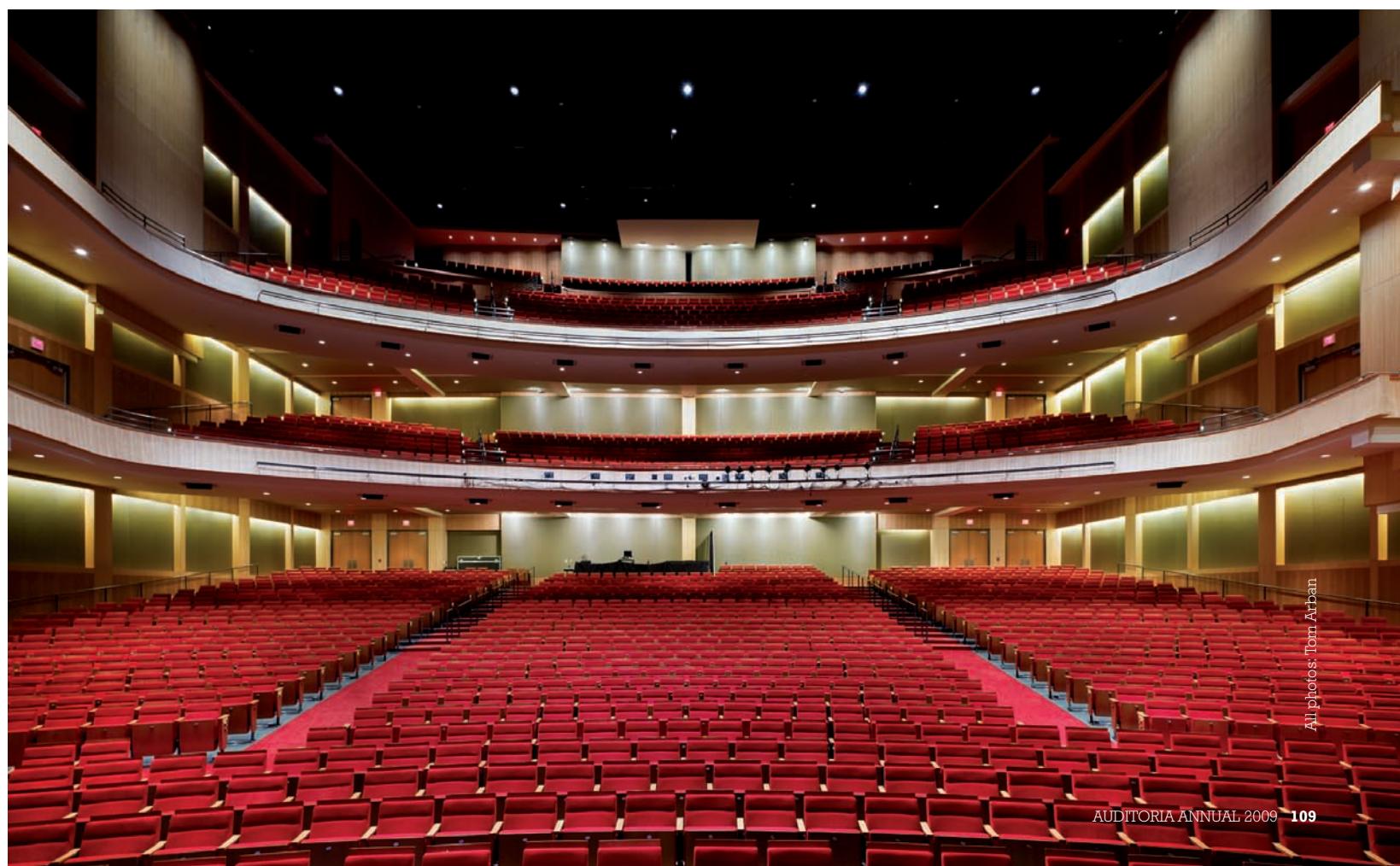
The story begins with the city of Durham in 2001. With the goal of invigorating its central business district and attracting new capital investment, Durham's community leaders proposed the creation of a vibrant arts and entertainment district, sited in a dilapidated warehouse neighbourhood just south of downtown. They envisioned a colourful, people-oriented environment populated by restaurants, nightclubs, art galleries, a new minor league ballpark, and anchoring it all, a regional performing arts centre. And while Durham did

not lack for vision or ambition, what it did lack was money, particularly when the price tag for a state-of-the-art theatre complex was projected upwards of US\$100 million.

The city put up US\$1.4 million in seed funding provided by its hotel and restaurant tax surcharge and on this basis alone, issued a request for proposals (RFP) for the development of the theatre. The RFP stipulated that the proposed project would cover not only its initial capital costs, but also all future facility improvement and maintenance expenses, as well as returning a share of the operating profits back to the city's coffers.

No small challenge, but one that was enthusiastically taken up by architect/developer Szostak Design and its co-development partner Garfield Traub. Szostak Design and Garfield Traub determined early on that the only way to satisfy Durham's demanding requirements was to quickly assemble an experienced team of professionals, thoroughly conversant in the nuances of theatre financing, operations, marketing and construction. Nederlander Productions and Professional Facilities Management (PFM) were brought on board to help fashion the theatre's business plan and the terms of its operating agreement with the city. Meanwhile, Theatre Consultants Collaborative was charged with defining the venue's performance requirements clearly, and Skanska was given responsibility for cost estimating and budget conformance.

"The most critical element of the team's development strategy was to precisely match



All photos: Tom Arban



**DPAC is part of a wider scheme to invigorate downtown Durham**

needs to expenditures,” says Szostak. “Accordingly, every conventional wisdom about theatrical management, design and construction was examined, challenged, and if found unjustified, purged from the theatre’s planning.” For example, DPAC’s stage was designed to be not an inch deeper than Nederlander and PFM determined was absolutely necessary for the most expansive of Broadway productions. DPAC’s lobbies, though gracious, were sized not a square foot larger than actually needed to accommodate the theatre’s patrons. For these and literally hundreds of other considerations, from dressing room finishes to the mechanical systems to the marketing budget, every provision and corresponding expense for the theatre was honed to its critical essence. On

one occasion, the development team spent 45 minutes debating a US\$350 expenditure for a minor elevator upgrade.

“Clearly, all this attention to the most minute of details paid off, because DPAC was ultimately brought in for a total project cost of US\$46 million, a good 40% of the cost of comparable venues elsewhere in the USA,” says Szostak. “And in its first season of operation, the theatre is exceeding initial attendance projections and making good on its commitment to return a share of profits to the city of Durham over the course of a 10-year operating agreement.”

Despite Szostak Design and Garfield Traub’s careful pruning of DPAC, no one has voiced concerns about the quality and performance of the finished product. Indeed, the theatre has already garnered three awards for design excellence. Mark Reyer, chair for the North Carolina American Institute of Architects 2009 Design Awards jury, pronounced DPAC “beautifully done and well crafted. A stunning urban project. The entry hall celebrates the act of arriving at the venue and moving through the building. It really activates this urban site. It provides a beautiful wrapper around what usually is a big blank box.”

Theatre critics have been equally admiring of the building. David Menconi, writing for the *News and Observer* in Raleigh, comments on both the impressive scale and intimacy of DPAC as the setting for a recent B. B. King concert: “The performance area is a cavernous room. From the back wall of the upper balcony, it feels like you’re looking straight down at the stage.” And from the standpoint of financial performance, the early notices are every bit as favourable. Bill Kalkhoff, president of Downtown Durham, notes that the theatre’s success “really has exceeded our expectations for a first year in a difficult economy”.

Here then, according to Szostak, is the bottom line to the story of the Durham Performing Arts Center – to craft a truly successful performing arts centre, start early, assemble the best team of professionals available, make the numbers work by precisely matching needs to expenditures and then, as Berlin first suggested over 60 years ago, ‘go on with the show.’ ■

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# Running the show

A system to help performing arts centres manage and make the most of resources, sales leads, marketing, and reporting – all with the aim of increasing profitability

**Right:** The Royal Opera House's Paul Hamlyn Hall, where visitors gather before a performance

**Below:** The Royal Opera House is in London, UK



Peter Mackerlich

**E**ven before the downturn in the global economic situation, performing arts centres were under constant pressure to strike a balance between producing outstanding performances and being profitable, or at least breaking even, especially for those run publicly. In an effort to reach financial targets, several performing arts centres already sensed the benefits of opening up their venues to commercial events.

However, the dilemma when mounting a repertoire of production and commercial events can be that both types of events require access to certain resources, including people and space. Resources therefore need to be scheduled as effectively as possible. "In addition, attracting further customers or sending out multiple proposals per day requires standardised processes within the organisation," says Thorsten Kolbinger, general manager of Ungerboeck Systems International, EMEA. "This is the point where professional event marketing and management software comes into play, helping the venue to cut manual work and duplicate data entry to a minimum, by simultaneously improving communications internally as well as with the client. Integrated software solutions such as Ungerboeck Software go one step further and can cover all departments' needs in one single database."

The Royal Opera House in London's Covent Garden, home to The Royal Opera and The Royal Ballet, started using Ungerboeck Software in 2004. "When we were looking for a venue

management software, we were looking for a central system that would support a range of resource scheduling processes but would also produce the immediate commercial benefits of an effective approach to manage commercial events," says Moya Maxwell, head of commercial programming at the Royal Opera House.

In addition to providing scheduling and call-sheet information – including production-related information – the customer relationship management (CRM) and diary functions of Ungerboeck Software are used at the Royal Opera House to sell the different venues and rooms to corporate clients such as Google, BP, Eurostar and Universal Music.

## Selling and scheduling

Ungerboeck Software includes a comprehensive CRM system designed to improve service to existing customers and manage potential customers. Lead tracking, automated follow-ups and reminders, contact management, review of communication history (emails or letters exchanged), and sales goals are all integrated functionalities of the centralised CRM, keeping the entire team on the same page. With just a few clicks, contacts can be imported into the CRM system, giving the sales team the chance to set import values such as sales opportunities and additional prospect information. "Furthermore, the CRM module can also be used to help performing arts centres to actively acquire new customers," says Krister Ungerboeck, executive vice president at Ungerboeck Systems International. For example, an integrated



Rob Moore

<b>Booking Revenue Summary</b>			
<b>By Month</b>			
Event Start Date: 1/1/2010 - 12/31/2010			
	<b>Space Revenue</b>	<b>F&amp;B Revenue</b>	<b>Misc. Revenue</b>
<b>January 2010</b>	46,301.00	23,098.00	6,542.00
<b>February</b>	75,980.00	45,768.00	11,256.00
<b>March</b>	79,876.00	32,509.00	9,875.00
<b>April</b>	71,209.00	22,289.00	5,949.00
<b>May</b>	50,560.00	10,219.00	8,679.00
<b>June</b>	48,276.00	8,509.00	2,560.00
<b>July</b>	26,610.00	11,416.00	3,507.00
<b>August</b>	49,166.00	4,999.00	2,390.00
<b>September</b>	32,390.00	21,600.00	2,650.00
<b>October</b>	30,567.00	23,226.00	9,436.00
<b>November</b>	25,456.00	19,257.00	6,542.00
<b>December</b>	30,981.00	20,400.00	10,457.00
<b>Total</b>	<b>565,372.00</b>	<b>243,290.00</b>	<b>79,843.00</b>

campaign functionality enables staff to easily set up direct marketing campaigns, send them out via various media and track the results afterwards.”

To manage commercial bookings as effectively as possible, the diary/booking calendar allows viewing of scheduling information and available rooms across time. Once the sales team receives a concrete enquiry for a corporate or private event, it can take a look at the booking calendar to check for free rooms or carry out an availability search on special requirements such as entrances for people with disabilities, removable seating, etc. Ungerboeck Software then matches booking requests to available spaces. There is no need to manually re-key information that has already been entered into the system.

### Management information

The same applies to the creation of proposals and contracts. “As these become more and more individual when dealing with corporate and private clients, it is essential to have standardised document templates within the software,” says Kolbinger. Information entered into the system is automatically filled in the appropriate template. “In addition to taking less time, this enables greater accuracy of information and consistent work practices when booking rooms and events, reducing the number of errors,” says Kolbinger.

A new feature of Ungerboeck Software is the optimiser functionality, which allows the performing arts centre to do ‘what-if’ analyses. Depending on variables such as business goals and resource constraints, the system will assist with prioritising the different options.

**Left: Ungerboeck Software can be used to view a summary of booking revenue**

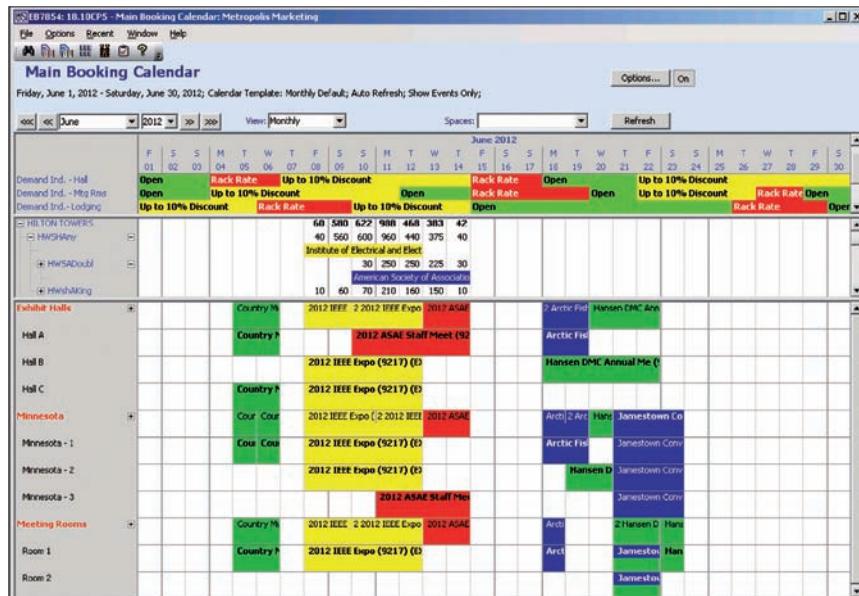
**Below: The booking calendar gives an overview of what resources are available**

“One of the major benefits we have using Ungerboeck Software is its ability to retrieve comprehensive management information and statistics including costs and profitability, attendance figures per event/performance/time period – all at a touch of the button, usually without the need to write bespoke reports,” says Maxwell.

“Today’s venue managers need more than just good results – but a system to provide them with executive-level information on almost everything, from fairly common sales figures to more sophisticated analyses,” says Ungerboeck. “An excellent reporting functionality implemented in their software can help them to analyse past activities such as sales performances, revenues versus budget, room utilisation, event types and so on, but also to forecast revenues, etc. on future time periods.” Ungerboeck Software offers actionable management information by its drill-down option. Starting at a single point in the database, managers can endlessly fragment information and set up measures accordingly.

“Performing arts centres that are aware of the value of operating from a fully integrated system are best positioned to successfully look into the future,” says Ungerboeck. ■

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# Dream come true

The vision for the new TELUS Centre for Performance and Learning was two-fold – it was designed to be both a prestigious venue for performance, and a space in which the next generation of performing artists could hone their skills

**Right:** The 1,135-seat Koerner Hall at Toronto's TELUS Centre

**T**he TELUS Centre for Performance and Learning fulfils a 20-year dream to build a new home for Canada's premier music and arts educator, the Royal Conservatory (RCM). Kuwabara Payne McKenna Blumberg Architects (KPMB), under the direction of Marianne McKenna, has committed to helping the RCM to realise the vision set forth in an award-winning master plan in 1991.

Conceived as 'a series of great rooms' for music, Toronto's TELUS Centre manifests the RCM's ambitions for an innovative hybrid facility for performance and learning. The centrepiece of the project is the 1,135-seat Koerner Hall, which signals the expanded role of the RCM as a cultural destination for performance. With its distinctive interior and world-calibre acoustics, Koerner Hall will create a recognisable icon for the RCM, locally and internationally.

The project also includes three tiers of glass-fronted lobbies overlooking Philosopher's Walk, back of house areas for performers, a café at the ground floor level and a collection of antique musical instruments donated by Michael Koerner. Each level of the lobbies – the Leslie & Anna Dan Gallerias – offers magnificent views of the University of Toronto and the city, and distinctive spaces in which to host a variety of functions related to concerts, conferences and special events. The triple-height orchestra lobby features limestone floors and is designed to accommodate 200 for seated

dinners. A glass-enclosed room at the second balcony level, in memory of Hin Shiu Hung, will be host to meetings and private entertaining. Large, light-filled vocal and instrumental studios (directly above the back of house and below the lobbies) wrap Koerner Hall and reinforce the complementarity of performance and learning that is the mandate of the RCM.

The project occupies an important site in midtown Toronto at the threshold of the University of Toronto's downtown campus and integrates Philosopher's Walk, a pedestrian route that runs north and south linking Bloor Street to Hoskin Avenue. The design strategically participates in forming a new cultural precinct for the city, along with its neighbour the Royal Ontario Museum and the Gardiner Museum around the corner on Queen's Park.

## Revaluing history

The project also involved the progressive restoration of the RCM's heritage site, Ihnatowycz Hall, including the restoration of the exterior heritage fabric and the 237-seat Mazzoleni Hall. Although the new TELUS Centre is substantive, its site and mass is deferential to the 19<sup>th</sup>-century heritage buildings on Bloor Street that have housed the RCM since 1963. The contemporary architecture emphasises transparency and accessibility as a dynamic counterpoint to the polychromatic masonry walls and elevated entrance on Bloor Street.



All photos: Tom Arban Photography



**Above left:** The TELUS Centre features three tiers of glass-fronted lobbies overlooking the University of Toronto

**Above right:** The Koerner Hall's twisting oak 'strings' not only add to the aesthetic, they are part of the hall's acoustic reflection strategy

The space between the historic and new building is enclosed to create a sky-lit pedestrian court linking the Bloor Street entrance to Koerner Hall and the Dan Gallerias. The glass and steel structure of the new addition generates a dialogue between old and new, and celebrates the restored polychromatic façades of the heritage buildings. Small balconies project through the façade of the historic south wall, marking the half landings of the original wood staircase of Ihnatowycz Hall.

#### Academic and professional

A key objective was to maximise flexibility to integrate new technology and adapt to changes in the RCM's professional and community programmes. The new additions include 43 new teaching and practice studios, the renovation of Ihnatowycz Hall (1881) and the new 150-seat Conservatory Theatre – a rehearsal space designed to accommodate a range of functions, including music performances, special events, and classroom activities. In scale and proportion



the theatre replicates the acoustic quality and stage size of the main Koerner Hall, to prepare students for live performance.

Overall, the TELUS Centre emphasises the primacy of acoustics to directly support the RCM's educational mission to foster creativity.

#### Koerner Hall

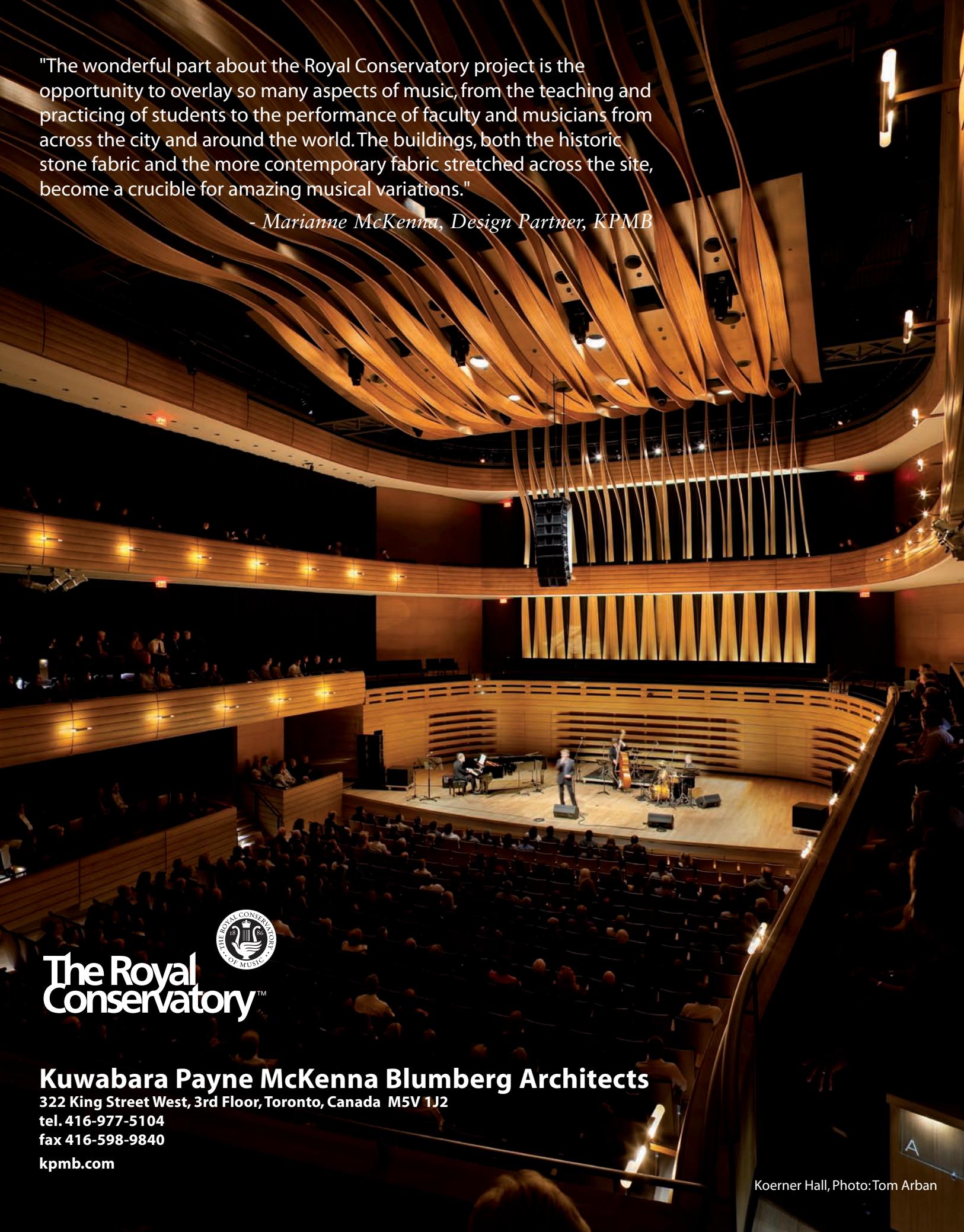
The heart of the project is Koerner Hall, the 1,135-seat concert hall named after donors Michael and Sonja Koerner. The signature element is the veil of twisting oak 'strings' that forms the backdrop for the chorus at the first balcony level, then hovers over the stage below the fixed acoustic canopy, extending into and over the hall at the technical balcony level. The strings act as part of the acoustic reflection when under the canopy, and then become acoustically transparent over the rest of the space.

Balcony fronts and seats and the hall floors are natural oak, contrasted against undulating black plaster panels that line the hall and reflect the dark stone of the exterior cladding.

Developed in conjunction with Sound Space Design and Anne Minors Performance Consultants, Koerner Hall is designed to achieve an N1 acoustic rating and is ideal for classical music, jazz, world music, amplified music, lectures and film. The design is based on the classic shoebox format, and features two balcony tiers above the main orchestra level and a third technical balcony. Juxtaposed against the shoebox form of the hall, the wooden balcony fronts and curving walls create a warm, sculpted 'liner' within the rectangular form. Sightlines and adjustable acoustics mean that a broad range of concert types can be held there, including those with live television broadcasts. ■

"The wonderful part about the Royal Conservatory project is the opportunity to overlay so many aspects of music, from the teaching and practicing of students to the performance of faculty and musicians from across the city and around the world. The buildings, both the historic stone fabric and the more contemporary fabric stretched across the site, become a crucible for amazing musical variations."

- Marianne McKenna, Design Partner, KPMB



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**Kuwabara Payne McKenna Blumberg Architects**

322 King Street West, 3rd Floor, Toronto, Canada M5V 1J2

tel. 416-977-5104

fax 416-598-9840

[kpmb.com](http://kpmb.com)

Koerner Hall, Photo:Tom Arban

# Liquid asset

Performers and technicians are getting ready for their watery new theatre with a mock-up of the automation system at its high-flying heart

**Clockwise from top:** The City of Dreams complex; construction work on the multilevel track support structure above the Theatre of Dreams; a test jump over the pool; BigTow2-490 winches; the auditorium and central water stage

**I**t would be hard to find a more apt description for City of Dreams in Macau than Coleridge's much-quoted line "Water, water everywhere". Water plays an important role in Chinese folklore, representing luck and fortune, and it flows as a recurring theme throughout the complex. The stage of the complex's 2,000-seat Theatre of Dreams is a 2.5 million-gallon pool (about five times the volume of an Olympic-sized swimming pool). Details of the Dragone production that will open at the theatre in early 2010 are being kept secret, but while divers and swimmers set the scene in the pool, the main action will be in the air.

Stage Technologies – which has a permanent Asia-Pacific office, experience of three high-profile Macau casino projects, and a lengthy track record of installations for mega-show spectacles – was chosen to engineer a whole-house automation system that could match Dragone's lofty expectations.

Controlled by a powerful arrangement of Acrobat-G6 fixed-position desks, Nomad portable desks and Solo handheld consoles, the system has the potential to fly upwards of 80 performers in the air at one time using a combination of winches mounted on tracks and moving trolleys, point hoists, line-set winches and super-fast winches that move at speeds of up to 6m/s.

The system has 139 moveable axes, of which 126 are winches, and 20 of these winches are heavyweight BigTow2-490s. With a drum length of 2.5m, these mechanical giants are engineered for high speed and high capacity, carrying up to two tonnes at 2m/s on multiple lines.

As the Macau theatre construction has progressed, some of Dragone's acrobatic actors have been getting their feet wet in the quiet Belgian countryside at the Alfacam Studios in Lint. Here, a 10-axis training system, with control and software that mirrors the mother system

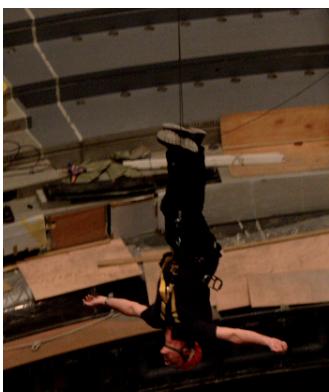
in Macau, has been used not just to coach the performers but to train the operators too.

"The Lint system has been a roaring success and the operators will go on to train their colleagues when rehearsals move to China in December 2009," says Alex Hitchcock, training development manager for Stage Technologies. "Co-development between Dragone and Stage Technologies resulted in a very clever integration of software technologies, enabling us to create graphic representations of the shows that allow pre-programming in a more fully rendered real-time environment than ever before."

The Dragone rehearsal space has a large installation of AU:tour – plug-and-play cabinets built especially for touring. The Lint studio also incorporates an array of single-axis joysticks, five in this instance, which can be assigned to any of the winches in the training system. This gives riggers the ability to operate the winches autonomously, adding extra versatility and allowing training to continue while the main desk is offline for programming.

Steve Colley, head of automation and rigging at Dragone and the brains behind the ultra-high-speed Macau winches and the Lint joysticks, says that the partnership has been incredibly productive. "The beauty of this collaboration was that there was no need to look outside for other specialist subcontractors. The Stage Technologies engineers have a strong understanding of creative performance art so we could work closely with their design team, developing specially crafted equipment based on our creative needs for the show," says Colley. "Because the equipment and controls are common between the two venues this has enabled early pre-programming and 3D pre-visualisation of the more complex sequences. This is key to managing the scale of our operation and has maximised time management for the Belgian and Macau teams." ■

[www.stagetech.com](http://www.stagetech.com)



**DESIGN**

JOHN SERGIO FISHER &amp; ASSOCIATES

# Community spirit

Why has a remote community with around 8,000 inhabitants built a 700-seat performing arts centre?

**The Sitka High School  
Performance Center in Sitka,  
Alaska, USA**

**T**he city of Sitka in Alaska, USA, can only be reached by aircraft or boat and has a population of around 8,000. However, that has not stopped the community investing in a 700-seat multi-use performing arts centre.

Famous jazz bassist Todd Coolman, who came to the Sitka High School Performance Center as part of a tour, marvelled (in his editorial in the Spring 2008 issue of *Jazz Improv*) at the hall's quality: "Imagine my surprise and delight when our tour revealed a hall of a state-of-the-art design, ultra-modern, that took every conceivable acoustical and usability question into account," Coolman wrote. "It is a magnificent hall and one that could easily produce any variety of musical or dramatic events. I wondered how a

community of this size and in this relatively remote portion of the world could create such a beautiful space."

Coolman believes the hall is a result of the community prioritising the performing arts: "They have found that it has strengthened their community and enriched the lives of their children. The hall has been built at an approximate cost of US\$16 million and the funding came from a variety of sources, including a state of Alaska bond, the people of Sitka agreeing to raise their own local tourist season sales tax by 1%, and other local charitable foundation grants and donations by the citizens. Of all the things they could have chosen to devote themselves to, they chose the arts above all other priorities."



All photos: Dan Evans



Coolman said that the “world-class performing arts space” would “attract world-class artists to perform there, thus enriching their community”.

John Sergio Fisher & Associates (JSFA) of Los Angeles and San Francisco, USA, was part of the joint venture responsible for the design of the theatre and its documentation. JSFA was also the in-house theatre consultant and acoustician. Bezek Durst Seiser was primarily responsible for the exterior of the building, which was designed to shed the large amount of rain and snow that pounds Sitka.

The audience chamber seats 500 in the orchestra and parterre, and 200 in the balcony and boxes. All seating is continental, and the venue’s community use is taken into account with a cry room at the back of house left.

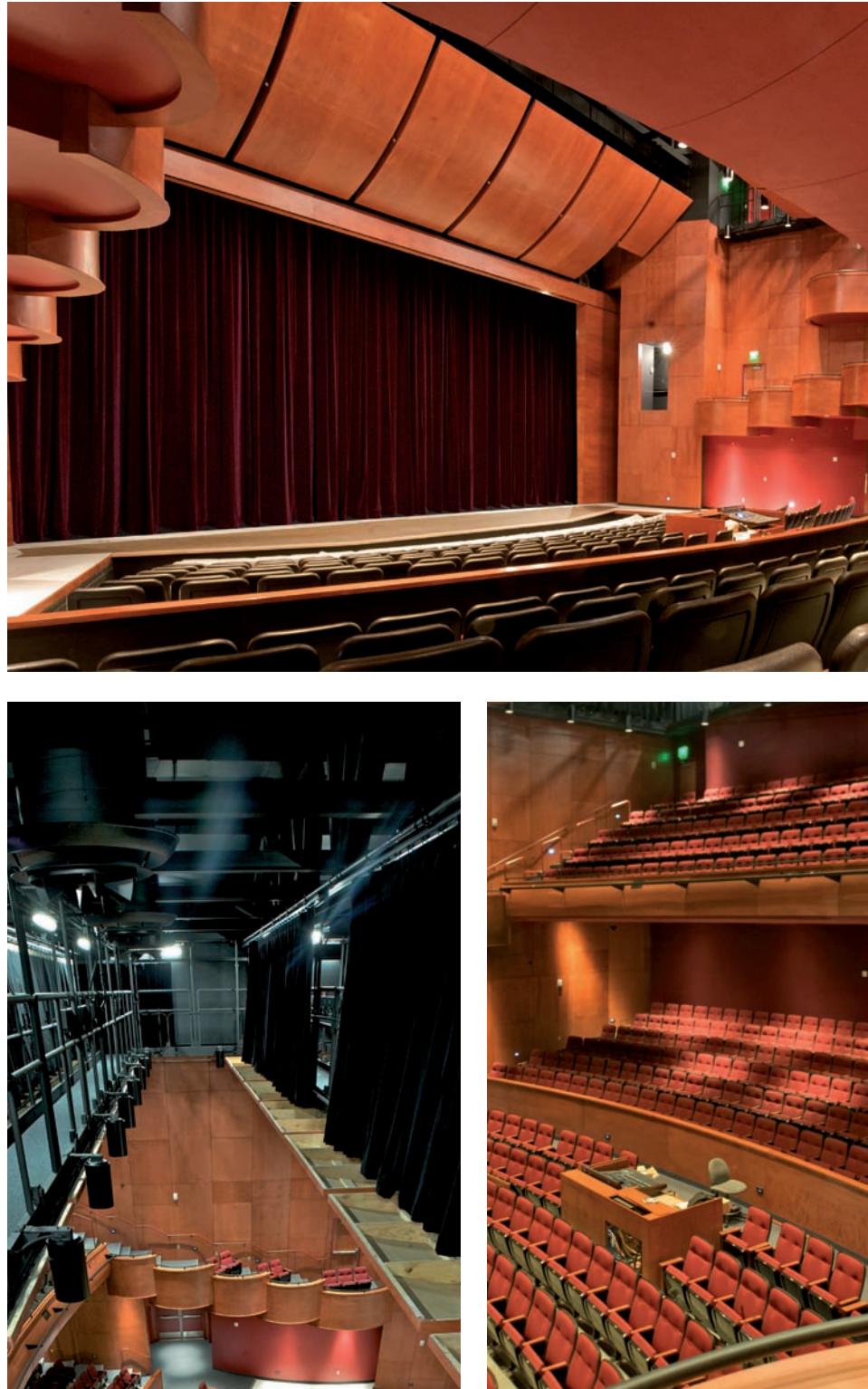
The hall has a number of features to allow flexibility for various events – including a lift in the orchestra pit so that it can be set for three positions (for the orchestra, for additional seating or for a stage thrust). Meanwhile the proscenium opening itself can vary from 36-50ft by means of tracked tormentors, orchestra shell ceiling units are flown, tower units are stored in a rear projection bay, and the sprung hardboard stage floor is trapped.

Acoustic needs have also been taken into account. The front-of-house lighting positions are on exposed catwalks with acoustic reflectors attached to their underside, while a forestage reflector and convex sidewalls help to achieve acoustic intimacy. Acoustic draperies dampen the reverberation time from 1.7 to 1.0 seconds.

## **Education**

Further to its mandate to provide a facility for the young, measures such as a counter-weight rigging system are provided for student learning.

“Obviously, the community in Sitka has an atypically substantial commitment to the arts, especially considering their relatively small population and geographic isolation,” said Coolman. “I believe they desire to provide a less conventional style of nurturing and education to their youth as an alternative to shopping malls, video arcades, and the like. What their community lacks in size, they trump in substance.” ■



# Role call

The role of the theatre consultant – to learn from the past and keep up with the technologies of the present – is championed by the Society of Theatre Consultants

**Theatres completed with input from STC members, clockwise from top left:** Kings Place; Glyndebourne; Singapore's Esplanade – Theatres on the Bay; Shakespeare's Globe Theatre

**T**he Society of Theatre Consultants (STC) was established in 1964 to bring together theatre consultants in a recognised professional body. Members are elected on the basis

of proven experience and agree to abide by a code of professional conduct. "Their experience is in the art of linking technical understanding of theatre building design to the client's artistic desires," says Michael Holden, chairman of the STC. "Their skill is in understanding the importance of those subtle influences that make for good performance spaces – one where the performing artist finds energy and impetus in creating a work – and where the limitations on expression are as few as possible."

In half a millennium of theatre design there have been many changes, and new technologies have become available, leading to different kinds of theatre. This has led from the open stages of the Elizabethan era, where imaginative response to the spoken word is dominant; to the intense scenic design of the Victorian period where the visual imagination is stimulated; to 20th century 'black boxes' and 'found spaces'; and now a broad canvass of approaches from highly technical scenic theatres to the simplest space for communication. Recently theatre design has been led by an ever-increasing scientific understanding of how the audience receives signals from, and reacts emotionally to, the performer. Coupled to this, the increasing technical development of specialist machines, lighting, sound and video allows theatre design to do more than ever to help the performer."

As knowledge expands so theatre consultants are realising the virtues inherent in elements of past designs – such as the

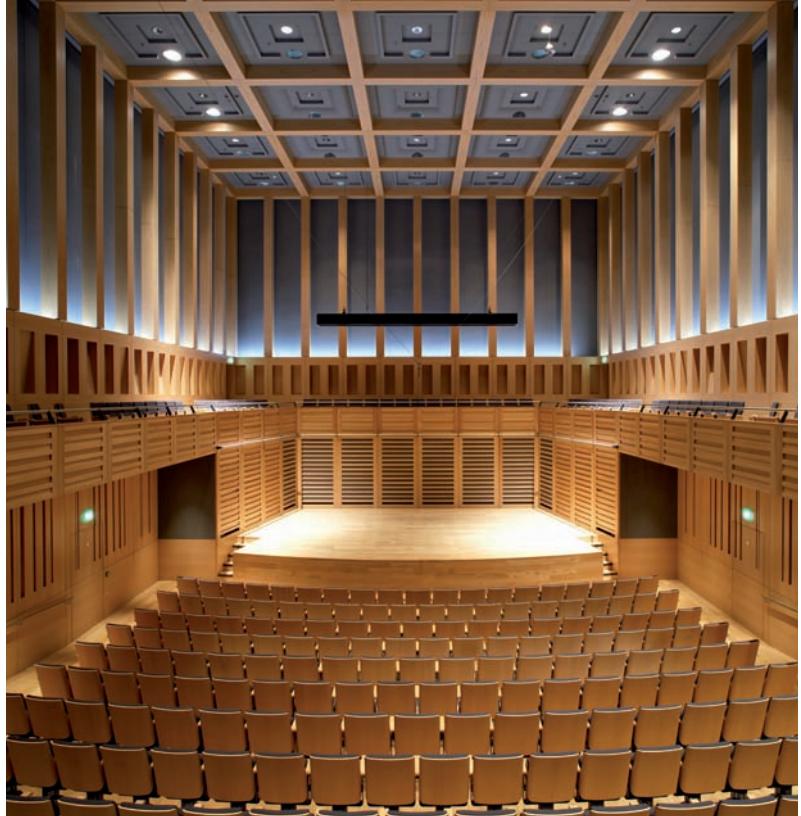
rediscovery of the Elizabethan public playhouse with its ability to bind an audience together, or the more intimate involvement in performance enjoyed in tiny Georgian theatres with their parallel galleried sides.

These rediscoveries add to the palette of established tools the theatre consultant brings to the design task, re-evaluating the project against present and past techniques to provide the unique solution required by each theatre. "Each design must be an expression of the client's artistic approach, the community it is to serve, and the means available (artistically and materially) to support the work," says Holden. "The theatre consultant's direct experience of design and building many theatres brings a wealth of knowledge to the design task – and help in avoiding pitfalls."

Theatre consultants also have an interpreting role in helping the client to come to terms with the long timescales involved in the decision and implementation processes in the building industry. "This can be in stark contrast to the theatre industry's experience – in their productions there is an expectation that infinite changes can be made right up to the very last minute," says Holden.

Members of the STC are to be found working on every continent with theatres completed in almost every country. Buildings as varied as opera houses, drama and music theatres and studios together with concert halls, conference centres, lecture theatres and special auditoria of all kinds – anywhere that people tell stories to people – are benefiting from the knowledge and skills of members of the STC. ■

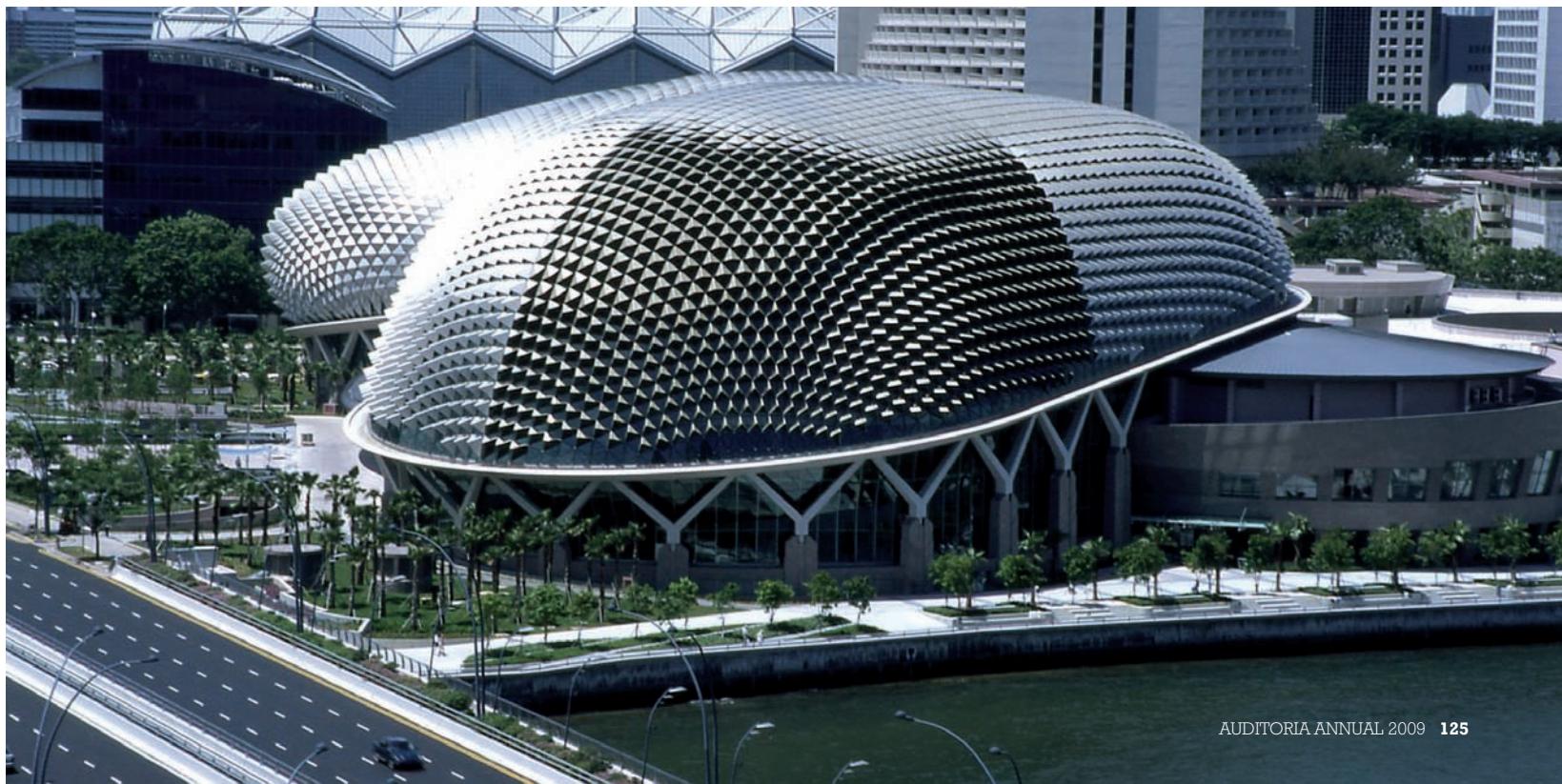
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THEATRE CONSULTANTS



Richard Davies



# Leading light

How LED technology was pushed to offer an alternative to tungsten luminaires

**Right: The Selador range uses seven LED colours**

**Below: ESPN's NASCAR Countdown studio**

**L**ED lighting has been around for some time now, but usually only uses red, green and blue (RGB) LEDs to light their subjects. "Combine the three and theoretically you get white, but in reality you don't get anything close to the pleasant,

warm white you would get from a traditional tungsten filament," says Tom Littrell, fixtures manager at ETC. "Dim the green a little and you get something more pleasing, but it's still not comparable to anything suitable for lighting flesh tones in a theatrical or stage setting."

Lighting designers Novella Smith and Rob Gerlach realised that the problem was the purity of the LED light – tungsten has a smooth curve of light through the entire visible spectrum, while RGB LEDs only light those parts of the spectrum. Smith and Gerlach researched all the different coloured LEDs currently available on the market and came up with what is, while no means identical to tungsten, a good approximation, using seven colours. The colours were mixed and laid out in a fixture that became, in 2001, Selador.

## Broad range

Just like a regular lighting fixture, no one product is suitable for every job – so there are three products in the Selador range, which is now owned by lighting manufacturer ETC. One is optimised for lush, soft washes of pastel colour; one for pure white and warm colours for natural LED skin tones; and a third for strong, saturated colour. ETC says the uniqueness is in the patented x7 Color System, which defines not only the seven colours in the fixture, but also their layout, for strong, even light. A number of secondary lenses are also available to spread the light beam and reduce distraction.

One of the first installations of Selador is in an outside broadcast TV studio for US sports





channel ESPN. The studio is lit entirely using LEDs including Selador for key and fill lighting, to prevent the studio overheating while still providing the high level of lighting required – the wall behind the presenters is entirely glass. “It’s easy to make individual skin tone adjustments on the anchors instead of repainting the cameras,” says Bruce Ferri, lighting designer for ESPN’s NASCAR Countdown. “When the video controller realised this, he was thrilled.”

Littrell says ETC is really pleased with the results of comparison tests between Selador and traditional luminaires. “Selador offers a broad range of colours – including lush, soft washes of pastel colour and bright, pure white – in order to blend seamlessly with tungsten gel fixtures, while also offering the intensity you would expect in an additive light,” he says. ■

[www.etcconnect.com](http://www.etcconnect.com)

## LEDs: not just for colour anymore!



### *Selador Lustr fixtures by ETC*

Broadcast quality white and tinted light, rendering skin tones and pigments in their natural hues. The secret is the groundbreaking x7 Color System, which combines seven different hues to create bright, broad spectrum light that looks great on people.

*Go green – and get every colour you can imagine.* Lustr LED fixtures use a fraction of the power of an incandescent light.

To learn more about Lustr and the other fixtures in the Selador Series, visit [www.etcconnect.com/selador](http://www.etcconnect.com/selador)



**Winner of PLASA  
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# Art nouveau

An automation system at a new college performing arts space is being used to explore new forms of theatre

**Clockwise from top:** The Experimental Media and Performing Arts Center; the theatre set up for the musical and visual event *Rammed Earth*; the theatre set up for multimedia performance *The Builders Association: Continuous City*; the cedar-clad concert hall

**T**he Rensselaer Polytechnic Institute in Troy, New York, USA, has a new, and rather futuristic, addition to its facilities – the Experimental Media and Performing Arts Center (EMPAC) – which on the north side features a dramatic 100ft-high glass wall showcasing the cedar-clad concert hall within.

The US office of Stage Technologies provided the automation system for this 19,120m<sup>2</sup> venue, including control of all of the acoustic banners and ceiling panels to facilitate easy acoustic alterations to the venue.

EMPAC comprises a 1,200-seat concert hall, a 400-seat theatre with an 18m fly tower, two black box studios, a dance studio, a suite of artist-in-residence workshops, and audiovisual recording, editing and production facilities.

The theatre has eight winches and the studio has 10. Stage Technologies says these can be rigged into bridle combinations to anticipate virtually any pattern of 3D performer flying, using Visual Creator software. The automation system also controls 50 encoder-fitted chain hoists and third-party axes such as winches, the orchestra lift, 22 fly bars, and encoder-controlled acoustic banners that have been integrated into Stage Technologies' control network of portable Nomad desks, handheld Solo units and wall-mounted control stations.

The main concert hall uses special fabrics and a suspended ceiling canopy to achieve acoustic optimisation for musicians not only on the stage but anywhere around the audience. The concrete ceiling has 60 core-drilled holes, from which acoustic plugs can be removed in order to position chain hoists. This allows any truss, platform, screen or object to be hung anywhere within the hall. The 400-seat theatre comprises a 300m<sup>2</sup> stage with fully automated rigging and an 8.93m x 15.24m projection screen. The two multipurpose studios can be configured as traditional black-box theatres or as open media environments such as video or audio recording studios.

According to Robert Bovard, director for stage technology at EMPAC, "the diverse

production staff at EMPAC serve as researchers in the integration of emerging technologies into cutting-edge productions". The automation equipment has therefore been designed to enable the production researchers to explore and open up new artistic possibilities.

EMPAC's production researchers opted to control the entire automation system from their own programmes and decided on Open Sound Control (OSC) as a communications protocol, which was developed and fine tuned to work with Stage Technologies' automation system. This allows users to issue commands directly from an OSC-enabled programme that also interfaces and synchronises with cameras, lights, audio and other stage equipment.

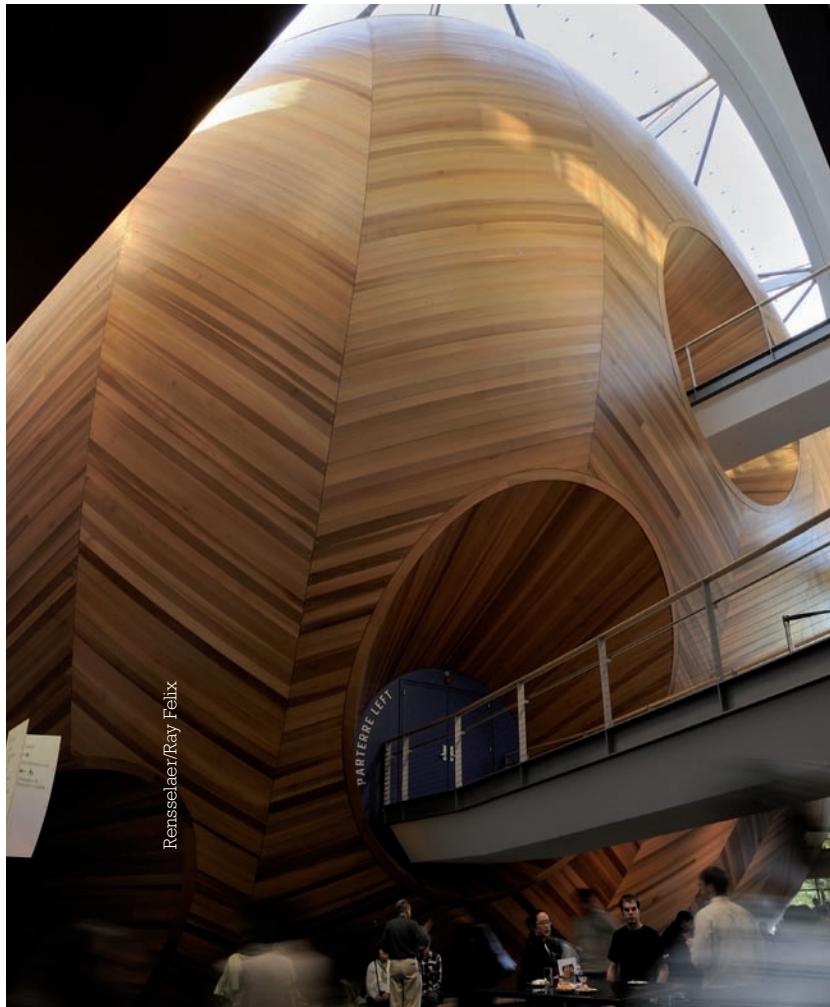
One of the first projects at EMPAC to unlock this potential was a conceptual dance of movement and light generated from a single performer. Initially, the motion of the dancer was captured by a series of cameras. This camera system outputted the motion coordinates to the automation system, which then moved screens and scenic elements in coordination with the dancer's movements. In turn, these automated elements were tracked by moving head projectors and lighting. All this combined to culminate in a real-time ballet of the human form, light and automated scenery.

The possibilities enabled by this combined technology are vast – for example the pitch of a singer or the varying volume of a drum can trigger automated rigging; the intensity of light can control the acceleration of a moving scenery panel; or the position of a performer flyer can be controlled by the dominant colour a video jockey uses in a live-generated video projection.

"With its media capabilities maximised by links to a supercomputer, EMPAC is set to spark a new renaissance in audio-visual media, audience interfaces and immersive experience, challenging how we view and interact with performances," says Mark Ager, managing director of Stage Technologies. ■



Rensselaer/Kris Qua



Rensselaer/Ray Felix



William Fritz



William Fritz

# Divide and rule

The Plenary Hall at Melbourne's new convention centre had to be as flexible and technically advanced as possible

**Right: The Plenary Hall divides into three sections**

**Below: The hall has timber-clad walls**

Melbourne Convention Centre in Australia was created by a public-private partnership between the Victorian State Government and Plenary

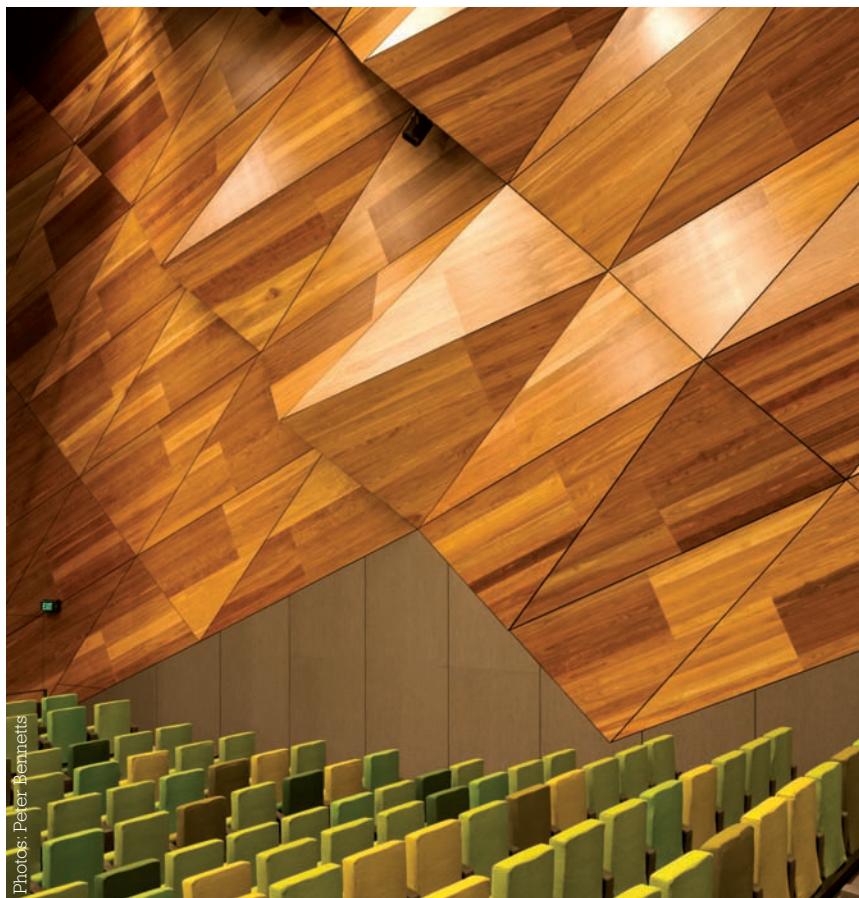
Group. The Melbourne Convention Centre is situated on the banks of the Yarra River in central Melbourne, and joins to the Melbourne Exhibition Centre through an enclosed glassed walkway – resulting in the largest exhibition and convention facility in the southern hemisphere, The Melbourne Convention and Exhibition Centre. The building is also the first convention centre in the world to be awarded a 6 Star Green Star environmental rating by the Green Building Council of Australia.

For Marshall Day Acoustics, the acoustic consultant on the project, the brief was complex and required a high degree of flexibility. The architectural design was undertaken by Woods Bagot and NH Architecture, with Marshall Day Entertech as the theatre design consultant, Jands the specialist theatre contractor, Rutledge Engineering the specialist AV contractor, and Brookfield Multiplex the builder.

## Transformation

The heart of the Melbourne Convention Centre is the fan-shaped Plenary Hall, which has timber-panelled walls and fabric seats in five different colours representing the colours of the blades of grass at the Melbourne Cricket Ground. The hall can transform with the minimum of effort to accommodate conferences, exhibitions, concerts and sporting events.

The brief required a 5,000-seat auditorium capable of being subdivided into three. In the end, the project surpassed this requirement, delivering a total capacity of over 5,600. The hall can be subdivided into one auditorium



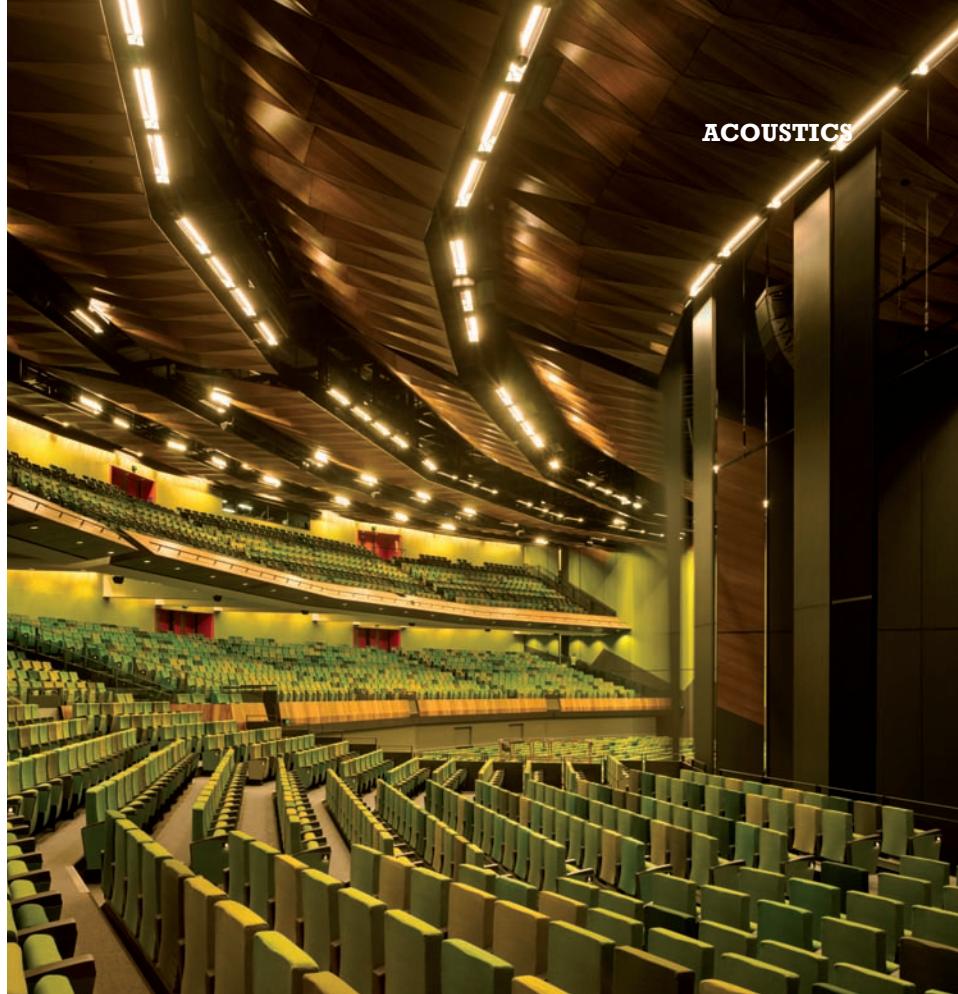
Photos: Peter Bennett

of 2,500 seats and two with 1,500 seats. The 17m-high Hufcor operable walls are the second highest in the world and by using two operable walls in series, a noise reduction of 60dB has been achieved.

Further flexibility has been achieved by the installation of 1,600 Gala Venue seats that automatically rise off the floor and unfold themselves. Alternatively all the seating can fold away, leaving a large flat floor area for use as a banqueting hall, exhibition space or ballroom.

The technical infrastructure is comprehensive – with 30 power flying lines, each with a capacity of 1 tonne, over the main stage. The fully motorised stage can be dropped to floor level for heavy vehicle access or raised in tiers, while the sound system consists of Nexo line array speakers and Digico digital mixing consoles. ■

[www.marshallday.com](http://www.marshallday.com)



## MARSHALL DAY

Marshall Day is a theatre planning, acoustics, and noise control company providing specialised professional services for architects, engineers and designers involved in creating performing arts spaces, sporting arenas and other major building projects.



Guangzhou Opera House



New Performing Arts Centre, Perth

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Entertech

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## DESIGN

ANNE MINORS PERFORMANCE CONSULTANTS

# Personal space

The Koerner Hall is designed to be both intimate and expansive, in line with the variety of performances it will host

**The Koerner Hall at the Royal Conservatory of Music in Toronto, Canada**

**T**he Koerner Hall for the Royal Conservatory of Music (RCM) in Toronto, Canada, is a product of the interwoven skills of architect Kuwabara Payne McKenna Blumberg (KPMB), concert hall designer Anne Minors Performance Consultants (AMPC) and acoustician Sound Space Design (SSD).

"The challenges of the project were many – a tight site, existing building levels to tie into, a phased development, a limited budget and a broad range of music types to be accommodated, including opera and chamber music," says Anne Minors, principal designer at AMPC.

AMPC took a holistic approach, working with the site constraints to deliver as much backstage accommodation as possible and producing a

compact 3D form for a 1,000-seat concert hall, raised up to link with the levels of the McMaster Hall. This freed up the backstage level for performers. AMPC created alternative ways onto the stage from the delivery area beneath as well as to the conservatory theatre.

Peter Simon, president of the RCM, was looking for "a different and immediately distinguishable hall, with the sound of a narrow and long hall with technology hidden, and with distinctive materials and rich surfaces". AMPC responded by wrapping the stage with the balconies and optimising the height of the chorus in relation to it, stepping down the first balcony at

the sides of the stage. The stalls level is narrow and relatively close to the stage with a gentle rake from the main foyer circulation level down to the front of the stage, while the slight reverse fan shape is designed to enable people at the sides of the hall to see the stage in a more comfortable way, while towards the back of the room the balcony fans out slightly like a fish tail and the balcony geometry expands in successive balconies.

In deciding on a two-balconied room wrapping around the stage, and in drawing the relative overhang of each balcony to create a shorter room, AMPC integrated the acoustic and sightline requirements to locate the people in space, thus setting the stage for the development of the wall geometry by the acoustician, SSD, and the architect, KPMB.

AMPC set about determining a stage geometry that would showcase soloists, be intimate for recitals and chamber quartets, and be expansive for the RCM Orchestra and visiting orchestras and choirs. AMPC provided the technical infrastructure for these arrangements and for the Koerner Hall to change its character for pop and jazz concerts. These were demonstrated to the design team, the RCM, and its future partners in a series of 3D computer renderings and stage layouts so that they could plan the use of the hall before opening.

AMPC worked closely with KPMB to realise its vision for the ceiling veil and provide all the technical wizardry for the broad range of performances anticipated in Koerner Hall, without infringing the visual clarity of the architecture. The fixed acoustic canopy not only reflects sound to the performers on stage, but



also contains stage lighting, house lighting and rigging systems. The central speaker cluster and the speech reinforcement speaker can be lowered into view when needed, as can the moving lights, while classical concerts will have a clean appearance on stage with performance lighting from the fixed elements within the hall.

AMPC collaborated with KPMB to integrate lighting on the canopy and front-of-house catwalks with the sinuous timber ribbons of the veil.

Other equally important adjustments for performance are the ability to extend the stage with an electrically operated lift; an orchestra pit for semi-staged opera; and stage risers.

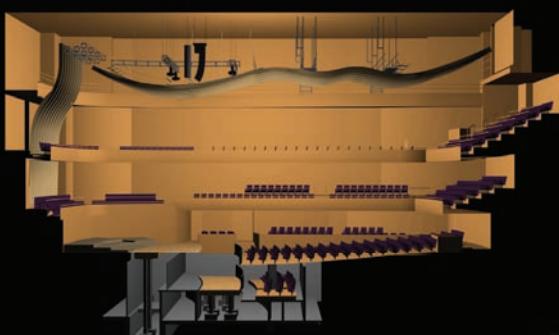
From a brief of 1,000 seats, AMPC increased the seat count to 1,135 within the same footprint and capital cost, offering a greater income stream to the RCM. ■

[www.ampcstudio.com](http://www.ampcstudio.com)



## Instrumental

Anne Minors Performance Consultants are devoted to creating the best conditions for presenting and enjoying performances. Since 1996 the practice has been briefing, planning and equipping performance spaces, working with directors, performers and architects to explore and extend the boundaries of performance architecture.



**AMPC**  
Anne Minors  
Performance  
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2 St George's Court, 131 Putney Bridge Road, London SW15 2PA.  
Tel +44 (0) 208 877 5860; Fax +44 (0) 208 877 9385  
[info@ampcstudio.com](mailto:info@ampcstudio.com); [www.ampcstudio.com](http://www.ampcstudio.com)

# All change

Once seen as rickety and uncomfortable, retractable seating systems have improved vastly and can now offer venues increased multifunctionality without compromise

**Right: The Netherlands'**  
**Parkstad Theater Heerlen has**  
**a retractable seating system**

**Below: The system in retracted mode**

**V**ersatility is the name of the game for today's venues. Venue operators are all too aware that their facilities need to be versatile to maximise the number of different types of events they can offer. What were once distinctive building types designed for a particular form of entertainment have now morphed into multifunctional spaces capable of hosting all manner of events, and this is where retractable seating is so useful. A type of seating system once seen as rickety, unstable, unattractive and uncomfortable, today offers quality and comfort for patrons while maximising the profitable use of the venue's space.

The first retractable seating systems were available only in straight, linear sections that didn't necessarily offer an exact fit to the curved nature of most theatre venues. But in 1996, Jezet Seating installed the first curved retractable seating system with a perfect radius. As the radius is constant, this creates a slight difference in row spacing between the middle section and the outer sections of the system. To resolve this problem the curved retractable seating system with concentric platforms was developed. All platforms are placed at an offset to the previous one, resulting in a different radius for each platform. Several of these concentric systems have been successfully installed by the company in various locations all over the world.

Strange as it may seem, the importance of good sightlines is often overlooked in seating installations. To obtain perfect sightlines on a fixed stand, the height difference in the riser should increase from the front to the back of the stand (parabolic riser). On a retractable seating system, it used to be common to find the riser was at a constant height, often resulting in substandard sightlines. But by integrating a parabolic riser in the design of telescopic platforms, it is possible to provide perfect sightlines. Of course compliance with all standards must be taken into account, and so a detailed study has to be undertaken in the design phase of the project.

Seating comfort is another vital factor, and is of immense importance to the visitor, but it is often compromised as venue operators obviously want to maximise the seat count in a given area. The seat riser, as well as the centre-to-centre



distance between seats, is often reduced to a minimum. However, even with a riser of 20cm, it is possible to have a seat that is comfortable and attractive. Jezet achieves this by making the seats as flat as possible, using high-density foam and ergonomic shapes for the seat and back.

Technical solutions have been developed to minimise the labour resources needed to erect retractable seating systems. Gas-spring assisted seats, automatic tip-up backrests, and fully motorised seats are just some of the innovations in this area.

It is also now possible for architectural design teams to work with the seating manufacturer and the client to create a unique, branded design for the venue. This approach is not restricted to huge, international projects – it is just as applicable for projects as small as 100 seats. ■

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# Pull together

Arts and cultural organisations worldwide are joining forces as users, owners and governors of a technology services company

**The Sydney Opera House in Australia (below), and the Capitol Theatre in Salt Lake City, USA, (right) are members of the Tessitura Network**

In these times of failed business models, unobtainable bank financing, and revenue maximisation on the backs of consumers through service fees, one company is bucking the trend with a very unconventional approach. Over the eight-year history of the Tessitura Network there has been no investor funding, no bank debt and fees for services have been reduced over time.

The story began in the mid-1990s when New York's Metropolitan Opera (The Met) realised it needed to upgrade its customer relationship management. "It was no longer viable to store vital donor and ticket buyer information inefficiently in different systems and it was virtually impossible to provide great service unless a user was able to know everything about each donor, prospect, subscriber, ticket buyer and other constituent categories at a glance," says Jack Rubin, president of Tessitura Network. The Met could find no system on the market that it deemed capable, and so spent several years and

several million US dollars building a system in which the right customer is always in the right seat, a complete view of all information for any user of the system could be found in a few seconds, fundraising and sponsorship capabilities are built in, and actions taken anywhere automatically update related records.

The launch of The Met's system would normally have been the end of the story - The Met got what it wanted and could have stopped there. However leaders at the Met, together with senior managers from six other flagship arts organisations, decided to take a non-traditional path for the business and create a technology services company for the arts and cultural sector owned and governed by its users.

The concept went from a utopian idea for a user-driven technology support and development company to reality in 2001. Today, there are over 290 arts and cultural organisations in six countries that not only license and use Tessitura Software and Tessitura Network products and services, they also own and govern the not-for-profit company. The users drive future product direction by voting and participation in the process.

The founders of the company were the early adopters of the software. "They wanted a company structure that would protect them from the uncertainties, surprises and high fees associated with commercial software and technology providers," says Rubin. "Users thrive in the cooperative environment formed, and a passionate, professional, experienced team of Network staff members provide support, consulting, education, training, product development, internet, community-building



and knowledge-sharing services for the arts and cultural organisations who are members."

Arts and cultural organisations benefit in many ways. "We are a collage of unique artistic venues united by uncommon software," says Roger Boltz, IT support specialist at the Dallas Symphony Orchestra. Not only is the company a technology services provider, the Tessitura Network is a community enabler in which users interact online and in person to share ideas and best practices. "This member-owned cooperative company accomplishes a total congruence of goals and culture between the community-driven company and the member organisations," says Rubin. "The industry is being remade with a company concept not reliant on traditional funding methods, structural restraints and outside investor demands." ■

[www.tessituranetwork.com](http://www.tessituranetwork.com)



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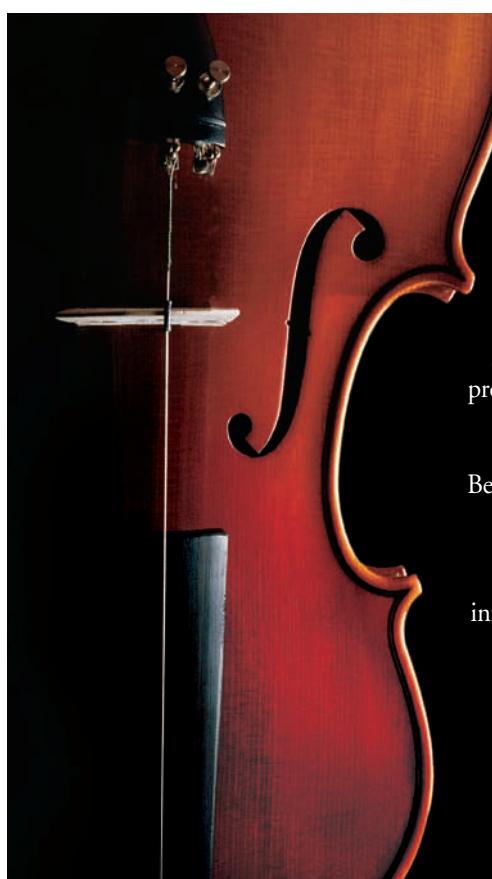
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# Up to date

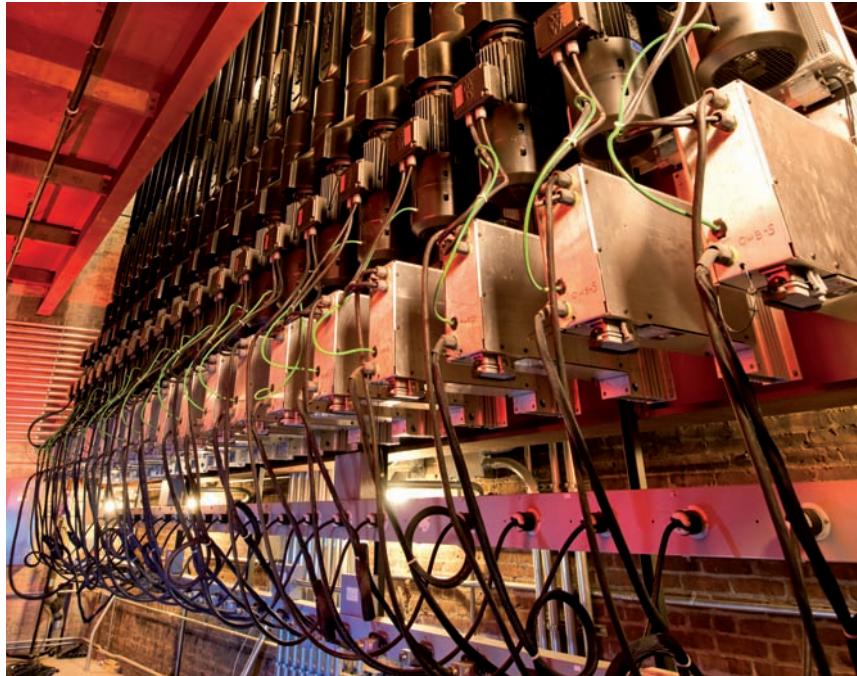
A 1921 vaudeville house has been brought into the 21<sup>st</sup> century with a fast stage lift and automated rigging

Photos: Kevin Reeves



**Above and right:** Hanna  
Theatre in Cleveland, Ohio

**Below:** The theatre uses  
PowerLift automated hoists



When the newly renovated Hanna Theatre in Cleveland, Ohio, USA, launched its first production in October 2008, opening night theatergoers gained a new understanding of what the resident Great Lakes Theatre Festival could do in a 21<sup>st</sup> century performance space.

From pre-show drinks in the lobby to the production of Shakespeare's *Macbeth* on the flexible, hydraulically powered thrust stage, the entire evening took place in a single room. Seating options in the house ranged from cozy couches and traditional theatre seats to high stools at an elongated bar. The stage itself, the first and only thrust stage in Cleveland's Playhouse Square Center, launched the theatre into a new era of technological capability with its speedy motors, each of which can move at

2ft per second. Behind the scenes, a structurally independent rigging system was computer controlled from a central console operated by a single crewman.

The US\$14.7 million (£8.8 million) renovation began with the combined vision of Charles Fee, producing artistic director of the Great Lakes Theatre Festival, and the design minds at Westlake Reed Laskosky (WRL), an architectural, design and engineering firm with a strong specialisation in historic theatre renovation. J. R. Clancy, a prominent designer, manufacturer and installer of rigging solutions for theatres, was chosen to supply the automated rigging and thrust stage configuration.

"This was a 1920s house, so it had 65 counterweight sets with a maximum 350 lb (159kg) capacity – and Great Lakes runs in rotating repertory, so you have two sets of drapes and two sets of scenery," says Raymond Kent, who led the Hanna Theatre design team at WRL. "No one felt that counterweights were the right thing for a contemporary theatre." Automated rigging was chosen, and J. R. Clancy supplied 48 of its patented PowerLift automated hoists, each with a load capacity of 1,250 lb (567kg). J. R. Clancy's SceneControl 500 motion control system, complete with 3D visualisation of the performance space, allows the rigging operator to select line sets, move them individually or in groups, and develop simple or elaborate cues to match the flow of the performance.

"This theatre is the first in Playhouse Square to have a completely automated line-set system," says Fee. "The 48 separate line sets are all electronically operated by computer, and we can move 12 of them simultaneously, each at a different speed or in a different direction. We changed over from *Macbeth* to *Into the Woods* in two hours – reconfigured the whole theatre with our deck crew in two hours. That is nothing, really. It used to take ten hours to do a significant changeover."

For the thrust stage, J. R. Clancy engineers worked closely with Atlantic Industrial Technologies, Turner Construction, and MG McLaren Engineering. J. R. Clancy says the lifts' 2ft per second shift capability has delighted both audiences and the theatre's director and crew. "Most theatres have 4ft x 8ft monstrosities that have to be moved with a chain hoist, and you have to bring in a whole crew to do it," says Kent. "Here the modules are easy to install and easy to remove – one guy can take out a module and away he goes."

For a stage once graced by such theatrical luminaries as Noel Coward, Henry Fonda, Helen Hayes, Hume Cronyn and Jessica Tandy, it's only fitting that care should be taken to return it to its former glory with an ultra-modern, high-powered makeover. ■

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**Hanna Theatre • Cleveland, OH** • "We are the first theatre in PlayhouseSquare to have a completely automated line set system. We have 48 separate line sets which can each carry 1250 lbs., all electronically operated by computer. We can move 12 of them simultaneously, each at a different speed and direction. We can now change over from Macbeth to Into the Woods in two hours — it used to take ten!" *Charles Fee, Producing Artistic Director, Great Lakes Theater Festival*

# Smooth operator

Waagner-Biro presents some of its latest stage technology – products designed to enable venues to change scenery and spatial configurations smoothly



**Above:** Waagner-Biro's telescopic stands in use at Berlin's O<sub>2</sub> World

**Right:** The Fly hoist system at Vienna's Ronacher Theatre

**Below:** The Seoul Arts Center

Waagner-Biro Austria Stage Systems, an established expert in technical equipment for opera houses and theatres, offers its customers a full scope of products and services designed to ensure that even rapid changes of scenery or spatial configurations can take place smoothly. Waagner-Biro provides overall solutions from engineering to installation of the complete system including the latest control technology.

Waagner-Biro says its success lies in its flexible approach to complex problems. A good example is the Fly, a compact point hoist combining all mechanical and electrical equipment in one unit. Developed for Vienna's Ronacher Theatre, the Fly can be suspended directly from a mobile girder system without weighing on the grid, and because of the flexible positioning of its suspension points, can be repositioned quickly, by just one person. The Fly is connected to the power supply and the

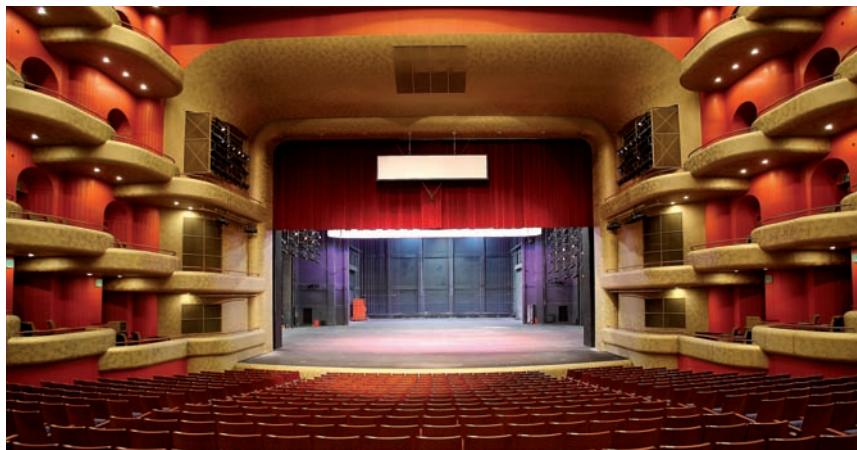
central control unit via a single cable. The control system immediately recognises where each Fly has been connected, thus allowing the configuration to be rapidly changed for various performances.

Waagner-Biro also offers acoustic solutions – past projects include acoustic banners for venues in Reykjavik, Iceland, and Doha, Qatar. The company has developed various designs for both visible and hidden configurations, designed to be compact and easily installed. Acoustic banners are directly integrated with the Waagner-Biro control system, so that both stage equipment and room acoustics can be controlled from a single user interface.

## Emergency measures

As well as serving customers through technological development, the company also prides itself on the prompt support it can give customers in the case of an emergency. This was demonstrated at the Seoul Arts Center in South Korea, which was heavily damaged by fire in December 2007. Following an intense evaluation phase during which Waagner-Biro and the customer defined what equipment needed to be replaced; Waagner-Biro installed over 150 new hoists, including CAT control. After completely replacing the over-stage machinery and repairing the under-stage machinery, the opera house was ceremoniously reopened in March 2009 with a performance of *The Marriage of Figaro*.

The multifunctional O<sub>2</sub> World in Berlin is another Waagner-Biro customer – the 17,000-capacity arena uses Waagner-Biro's telescopic stands. The stands are equipped with integrated electromechanical drive units and are automatically extended and retracted via a control



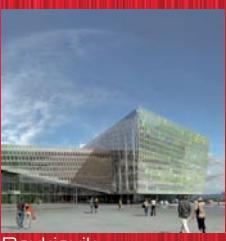
panel to accommodate the various events held at the arena. The stands are designed to ensure that whatever the event, the seating always reaches the field. To allow events on ice to be seen from a close distance, the front parts of the stands are equipped with a level-equalising wagon, allowing the stands to be placed partially on the covered ice.

To enable the rapid transformation of the stands' seating platforms into standing platforms and vice versa, depending on the type of event, Waagner-Biro developed Sitstand, available in fixed or telescopic versions. The main advantage of Sitstand is that one row of seats can be easily transformed into two rows of standing room. Sitstand is equipped with height-adjustable railings and an extending step for the second row of standing room in order to meet safety standards and offer all visitors optimum visibility. ■

[www.waagner-biro.at](http://www.waagner-biro.at)



## PROJECTS



Reykjavik



Zagreb



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stage systems

## PRODUCT NEWS



FLY



SITSTAND



Acoustic Banner



We realise visions

# High five

A 'cultural renaissance' in Canada has led to Aercoustics' involvement in five major projects

**Right: The Queen Elizabeth Theatre in Vancouver**

**Below: The Esplanade Arts and Heritage Centre in Medicine Hat, Alberta**

**A**coustic consultancy firm Aercoustics Engineering, based in Toronto, Canada, says it is seeing a cultural renaissance in its home country – which has led to its involvement in five major projects in the region.

"In the 1990s, Canada paid down government deficits faster than any other country in the G7. That money had to come from somewhere and cultural infrastructure was often the victim. Thus, at the turn of the millennium there was a lot of pent-up demand for new venues, leading to the country's so-called cultural renaissance. In western Canada, the demand was even higher, spurred on by Vancouver's upcoming 2010 winter Olympics," explains acoustician John O'Keefe, a principal at Aercoustics.

One of the projects that Aercoustics has been involved in is the Esplanade Arts and Heritage Centre in Medicine Hat, Alberta, which includes, among other things, a 700-seat multipurpose auditorium. It opened in October 2005 and has been hailed by many for its good acoustics – including tenor Ben Hepner, who said, "Acoustically, it's one of the best places to perform in Canada." The building was designed

by Diamond & Schmitt Architects, with Fisher Dachs Associates acting as the theatre consultants and Engineering Harmonics in charge of the sound system and A/V design. Acoustic technology developed during the project garnered Aercoustics the coveted Schreyer Award.

Other western Canadian work on Aercoustics' plate includes Simon Fraser University's School for the Contemporary Arts, opening in January 2010, and the recently opened Vancouver East Cultural Centre (both projects involving architect Thom Weeks and his team at Proscenium Architecture + Interiors), as well as a new recital hall and teaching space for the Vancouver Symphony. "We certainly seem to have hit our stride!" says O'Keefe.

The most challenging building for O'Keefe however was the renovation of Vancouver's Queen Elizabeth Theatre. Built in 1959 with an addition in 1962, it features the 2,929-seat main auditorium and 668-seat Playhouse Theatre. Working again with Proscenium Architecture + Interiors, O'Keefe considers it "our masterpiece". He's speaking in the sense of the old European guilds – to become a master craftsman, an apprentice would have to produce a piece of work that demonstrated everything they had learned. "In hindsight, it's as if Thom and I have spent our whole careers getting ready for this one piece of work. Everything we know – and more – is in that room," says O'Keefe.

The first step was to stop noise transmission between the two buildings. "We literally cut the building in two," says O'Keefe. Completed in 2006, this was the first of four construction phases, all carried out during the summer when the theatres were dark.

O'Keefe says the biggest challenge came from Rae Ackerman, director of Vancouver Civic Theatres. "Rae kept reminding us that our fees were directly related to seat count. The more seats we lost, the less we got paid! 2,000 seats is often thought to be the maximum for good acoustics. That's a lot less than the 2,900 that Ackerman wanted," says O'Keefe. "However, there are rooms with more



Tim Griffith

than 2,000 seats that still have good acoustics – the Berliner Philharmonie in Germany and the Christchurch Town Hall in New Zealand are two that we took a lot of lessons from, although by the time we finished there was more of Christchurch in the hall than Berlin." By that, O'Keefe means the large reflectors that now hang above the audience. These redirect sound to arrive at the audience from the sides sooner than it otherwise would. These were installed in the summers of 2007 and 2008 and have created a more intimate sound. "That's pretty hard to do in a 2,900-seat room," says O'Keefe, who also notes that Vancouver Opera, one of the venue's principal tenants, is also happy with what they've heard so far, praising the improved warmth of the sound. The construction concluded this autumn with work on the lobby and final touches inside the auditorium. ■

[www.aercoustics.com](http://www.aercoustics.com)



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**DESIGN**

DIAMOND AND SCHMITT ARCHITECTS

# Jewel in the crown

Montreal's cultural district is to be completed and renewed with a new 2,100-seat concert hall

**Below: L'Addresse Symphonique**

**M**ontreal's Quartier des Spectacles is an entertainment district located east of the city's downtown business core. Approximately 1km<sup>2</sup> in size, the district is recognised as the epicentre of Montreal's cultural events and festivals.

At the heart of the Quartier is Montreal's Place des Arts, Canada's only cultural complex devoted to both performing and visual arts. Over the past 45 years, five performance halls have been built on the elevated outdoor plaza, including the 2,990-seat Salle Wilfrid-Pelletier, the 1,460-seat Théâtre Maisonneuve, the 755-seat Théâtre Jean-Duceppe, the 350-seat Cinquième Salle and the 135-seat Studio-Théâtre, as well as the Musée d'art Contemporain de Montréal, completed on the west side of the plaza in 1992.

The buildings on Place des Arts are interconnected through a network of underground passages and three-level parking garage. "However, since most people enter and exit each building on the site via the garage or Metro station, the plaza is often empty, serving as a reminder of the misplaced ambitions of mid-century modern urban planning," says Jack Diamond, principal in charge at Diamond and Schmitt Architects. "Four decades of renovations and additions to the site have created a mélange of styles of architecture and urban space. They have been band-aid fixes for a flawed plan. It must be said, however, that the site comes to life in the summer during the annual 11-day Festival International de Jazz de Montréal, when the plaza and surrounding streets are filled with life and energy."

In May 2009 the Government of Quebec unveiled the design for a new 2,100-seat concert hall that will take its place on the northeast corner of the site. The hall, named L'Addresse Symphonique, has been designed by Diamond and Schmitt Architects to meet the performance and rehearsal needs of the Orchestre Symphonique de Montréal (OSM), and is scheduled to open in 2011.

The design put forward is pure Diamond and Schmitt: a simple prismatic form rendered with a sharp contrast of transparent public spaces and solid support spaces. The building presents a large transparent façade to the street edge and properly defines a true urban plaza at street level. Behind the glass façade is a double-height reception room, small but lovely side lobbies, and numerous doors leading into the auditorium.



The OSM auditorium is a three-balcony 'shoebox' or 'coffin' reverse fan design, a highly shaped composition of gentle convex walls and balconies, individually discontinuous but assembled into a consistent whole. Narrowest at the parterre level to contain and reinforce sound with strong early reflections, the volume widens gradually to develop reverberation and warmth.

"L'Addresse Symphonique has been designed first and foremost for symphonic repertoire. However, an extensive variable acoustic has been built in to allow for a wider range of music – from solo and small ensemble natural acoustic to very amplified jazz or pop," says Diamond. The acoustic programme was created by Artec, which will continue as the project's compliance acoustician. The design acoustician for the hall is Robert ESSERT from Sound Space Design.

"The juxtaposition of the intimate architectural scale with the larger task of framing



**Above: L'Addresse Symphonique faces both the Place des Arts plaza and the adjacent side street**

the urban plaza and terminating the east-west axis of the site makes the scheme stand out," says Diamond. The design accepts the dual reality of the current underground access to the building and the need for a presence on the elevated plaza. L'Addresse Symphonique is the only building on the site to turn its best face toward both the plaza and the adjacent side street, rue Saint-Urbain. ■

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# Sound effects

Tannoy's new digital beam-steering product offers an answer to common loudspeaker problems in auditoria

**Tannoy's new digital beam-steering array product is called QFlex**

**A**fter a series of high-profile international trade show launches for QFlex over the latter half of 2008, Tannoy's new digital beam-steering array product is now establishing itself in the acoustic marketplace.

To fully understand and appreciate the benefits of QFlex it's worth giving consideration to why the digital beam-steering approach to loudspeaker design is beneficial to acousticians and audio consultants. "When faced with highly reverberant, acoustically challenging spaces, such as is often the case in an auditorium – modern or otherwise – the biggest challenge is in designing a system that will deliver a high direct-to-reverberant sound ratio. In other words, we need to maximise the sound that arrives directly at the listener's ear, while avoiding reflective surfaces," says Mark Flanagan, PR and communications manager at Tannoy. "Achieving this with conventional loudspeakers is extremely difficult, especially where there is a specific requirement to minimise architectural or aesthetic impact, which often rules out the use of large numbers of 'delay' speakers around the listening space."

Tannoy's new QFlex device uses multiple channels of advanced amplification (between eight and 48 across six model sizes) and digital signal processing (DSP) to produce beams of acoustic energy that are directed on user-defined target areas. "With this ability to focus acoustic output in target areas where needed comes better speech intelligibility in highly reverberant spaces – effectively increasing the 'hall radius' beyond which reverberant sound becomes dominant,"

says Flanagan. The multibeam capability allows for multiple audience areas to be targeted from a single QFlex column, such as within auditoria where the stalls and various gallery levels need to be considered separately.



"There are limitations to what can be achieved with existing beam-steering loudspeakers, particularly with regard to frequencies over 2kHz, where beam control is compromised due to the incidence of lobing (spatial aliasing)," says Flanagan. Lobing is where strong side beams occur, often stronger than the main beam – particularly when steering at extreme angles.

### Steering restrictions

"Additionally, the extent to which beams can be steered is generally limited to angles of 20°-30° at most, restricting the height at which the loudspeaker can be located in a space and hence reducing the freedom to locate it high above the sightlines and away from the performance area," says Flanagan.

Tannoy's QFlex range on the other hand – boasting densely spaced transducers, integrated DSP and a standardised least-squares



multichannel inversion software algorithm – is designed to give excellent beam control even at high frequencies (up to 12kHz), and to be effective for musical applications as well as voice-only material. QFlex also offers a modular design (based around small eight- or 16-channel easy-to-transport units which can be combined to form longer arrays of up to 48 channels); a flexible and highly intuitive graphical user interface (using BeamEngine software) and the ability to steer up or down to 70°.

"QFlex offers acoustic designers a genuine breakthrough in capability when it comes to dealing with the reverberant spaces commonplace in Auditoria," says Flanagan. The range has already been installed in various locations throughout the world. ■

[www.tannoy.com](http://www.tannoy.com)



# Qflex

straight to  
the point

- Superior intelligibility and musical fidelity
- Class leading steering control of +/- 70 degrees provides unrivalled freedom in locating speaker
- Modular design for easy shipping and expandability
- Powerful and intuitive GUI for easy optimisation
- Only steerable array with full range beam control
- Target multiple zones with single QFlex column



tannoy.com

## DESIGN

AUERBACH POLLOCK FRIEDLANDER / AUERBACH GLASOW FRENCH

# Open season

The Sun Valley Pavilion, an open-air concert hall in a mountainous ski resort setting, had to be acoustically flexible in the summer and partially demountable in the winter

**Right:** The roof's acoustic reflectors and trusses are removed for storage in the winter months

**Below:** The Sun Valley Pavilion

**S**un Valley Pavilion, the new open-air concert hall at the Sun Valley Resort in Idaho, USA, combines a soaring, peaked stage with a removable tensile fabric canopy and support structure. In the shadow of the resort's signature Bald Mountain backdrop, audiences of up to 4,000 enjoy a variety of events, from pop acts to classical entertainment in a setting in harmony with the rugged beauty of the Rockies. The facility, designed and built in under 18 months, opened in August 2008 with a concert by the Sun Valley Symphony, followed by a performance featuring the Mormon Tabernacle Choir.

As well as being the Sun Valley Symphony's new summer home, the Pavilion also hosts popular music events. To accommodate a broad range of artists, its concert ceiling provides traditional acoustic shaping for classical music, while providing the infrastructure required for popular amplified acts. A series of curved wood

reflectors provides overhead acoustic support as well as the appropriate visual aesthetic. The range of acoustic requirements and accommodation for symphony concert lighting – all in an elegant and integrated design – were key requirements, tempered by the reality that the venue would be partially warehoused during ski season.

The Sun Valley Pavilion concept was developed by FTL Design Engineering Studio of New York, an expert in the design and engineering of tensile structures, with similar demountable concert venues on Baltimore's Inner Harbor, the US Capitol in Washington DC, and in New York's Central Park. The 70ft tall proscenium arch and the horn-shaped roof are designed as iconic elements of the venue that recall its surrounding landscape.

Ruscitto/Latham/Blanton Architectura of Sun Valley worked in collaboration with FTL, combining design work for the overall approach to the building, including the hard structure remainder of the pavilion. ES<sup>2</sup> of Idaho Falls supplemented the structural design for these architectural elements, all working closely with the Sun Valley Company and general contractor Intermountain Construction of Idaho Falls.

The Pavilion's acoustic design was developed by Chris Jaffe of Jaffe Holden Acoustics. Theatre consultant Auerbach Pollock Friedlander was responsible for refining the original seating plan, improving sightlines and audience access. The theatre consultants also collaborated on the integrated design of the concert ceiling, its hoists and lighting systems – all of which had to be demountable.

The support structure, an arrangement of curved metal trusses, forms the skeleton of the ceiling, complementing the permanent steel roof structure. Within the trusses, a series of self-climbing winches free the overhead roof structure from the visual clutter of the large motors and associated rigging. Wood acoustic reflectors are individually framed and easily



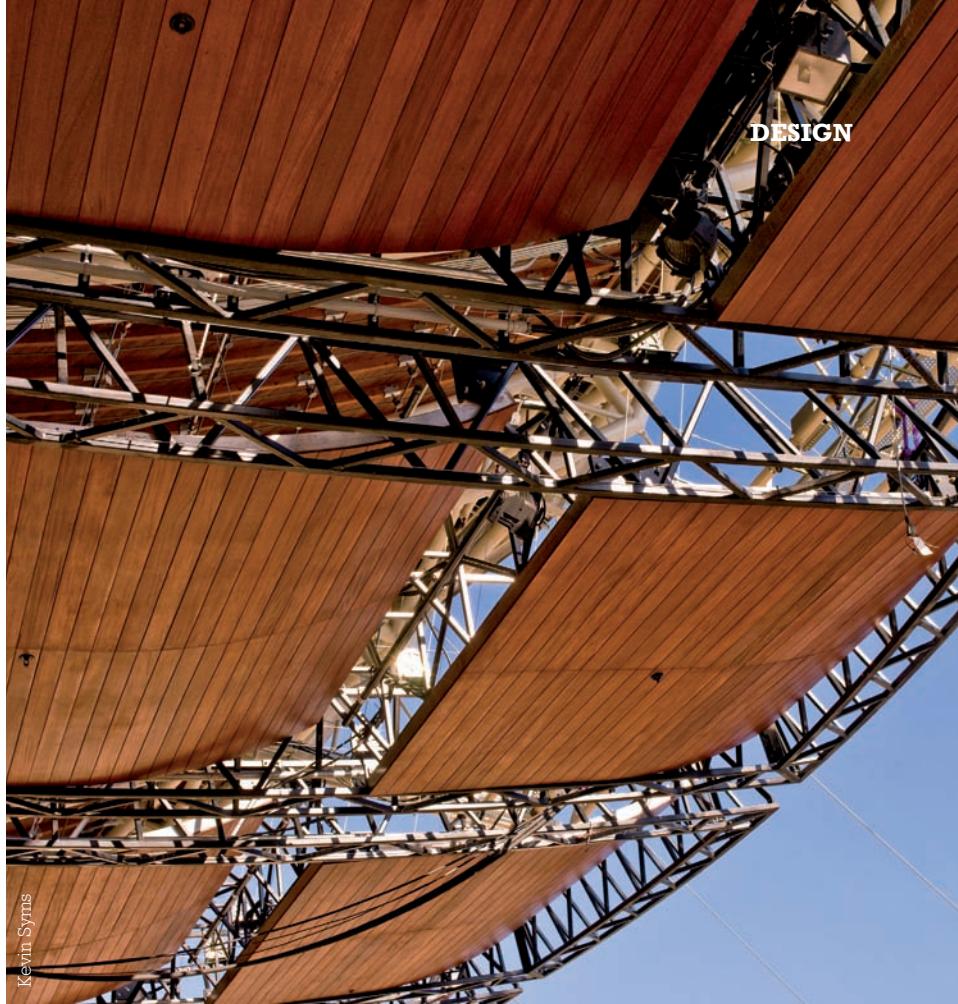
Kevin Syms

removed for storage, while trusses may be stored at stage level or brought up to the roof. Winches have covers and heater blankets to prevent damage during the winter.

### **Accommodating variety**

The ceiling design also includes an array of structural hanging points, accommodating rock 'n' roll trusses for popular entertainment. Show power and control links allow touring companies to install temporary gear as well as pre-rigged lighting trusses and equipment in the Pavilion's permanent installation. The ceiling was fabricated by Montreal's ShowCanada with motor controls by Stage Technologies of Las Vegas. Auerbach Pollock Friedlander's sister company, Auerbach Glasow French, designed the architectural lighting. ■

[www.auerbachconsultants.com](http://www.auerbachconsultants.com)



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# Supporting role

In each type of venue the acoustics should support the artistic intention to deliver maximum impact to the audience

**Right: The Koerner Hall**

**Below: Sound Space Design's projects include the 2,000-seat opera house at the Four Seasons Centre in Toronto, Canada**

**P**erformance spaces are not simply passive and neutral places in which performers communicate with the audience through sound – the room itself plays a vital part in what is heard by the audience.

What is to be communicated depends on the type of event. In a lecture or stand-up comedy, the acoustics need to transmit the performer's text so that it is clear and intelligible. In classical music the acoustics need to transmit the colour, emotion, rhythm, texture and dynamics initiated by the performer. In drama both are important – the room should transmit the actor's text and emotion clearly to the farthest seat.

"In both music and drama, the greatest artistic impact can be delivered when there is no audible background noise. In amplified concerts and musicals the acoustic is important too – most sound engineers prefer that the room acoustic 'disappear' to leave only the pure sound delivered by the loudspeakers to the listeners," says Robert Essert, director of Sound Space Design. "In concerts, the audience involvement and enjoyment are heightened when the acoustics draw the listeners into the performance – when the audience feels it is inside the music, not just looking at it. For unamplified music the concert hall geometry needs to gather the sound from all around the instruments, mix it and deliver it to the audience and performers. The directions from which the sound arrives to each listener influence the quality of the sound, especially the sense of envelopment and connection to the performer."

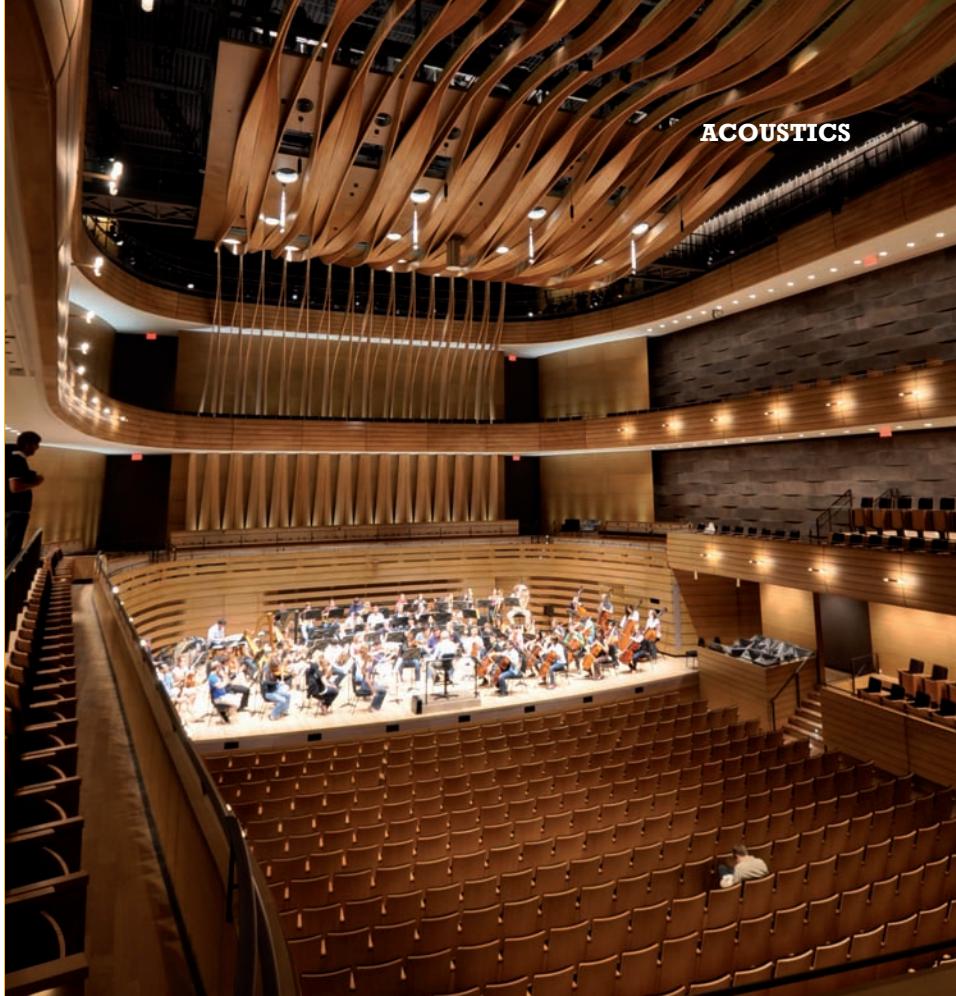
In the new Koerner Hall at the TELUS Centre in Toronto, Canada, a strong, enveloping sound was created with tall, parallel walls and side balconies that act as shelves to reflect part of the sound quickly down and inward to the audience, and part of the sound up into the resonant upper region, through an open mesh of timber ribbons. "With the acoustic benefits of a tall and narrow wall geometry, the hall does not feel like a 'shoebox,'" says Essert. Sound Space Design worked on the curved seating arrangement and balcony geometry with Anne Minors to make the space feel like a surround hall. "With a compact plan and two balconies, musicians feel the hall to be part of their own instruments, and this brings out the best in their performance," says Essert.



Sound Space Design has also worked on the new 2,200-seat Winspear Opera House in Dallas, Texas, USA. "In opera the text is delivered musically, and it carries information about the characters and plot as well as direct emotional impact; so the room needs to deliver clarity of text and warmth of tone, with singers and orchestra in proper balance," says Essert.

The space has four balconies and a counterpoint of convex and concave shaping to carry the sound to the farthest seats. "Balcony overhangs are modest so that the entire audience is involved in the sound, and so the performers can see their audience and feel acoustic support from the walls," says Essert. "The balcony fronts and ceiling work together to support the singers, to deliver strength, beauty of tone and clarity of text for maximum dramatic impact." ■

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# Past and present

A new glass extension complements classical stonework at the revamped Usher Hall in Edinburgh

**Right: Capacity in the main auditorium has been increased to 2,800 standing or 2,200 seated**

**Below: The Usher Hall with its glass extension**

The Usher Hall plays a central role in the cultural life of Edinburgh, Scotland. Built in 1914, the Grade A listed building has hosted some of the world's most acclaimed artists and musicians, and is renowned for its excellent acoustics and beautiful décor, with internal features including sweeping circular corridors and marble staircases.

Renovation on the building was completed relatively recently, in 1999. This was a two-year, £9 million project that included a new ceiling and redecoration in the main auditorium, redecoration in the foyers, renewed electrical systems, new heating and ventilation systems, and restoration of the hall's organ.

However, it was felt that further modernisation was needed to bring the building and its facilities into the 21<sup>st</sup> century. It was decided that the best way of doing this was to create a glass extension on the side of

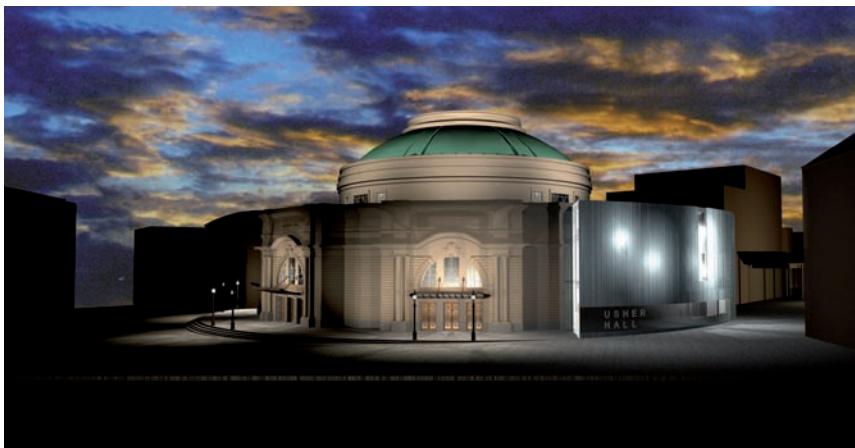
the building to modernise the building while complementing the existing classical stonework with a restrained, uncluttered surface. The interior layout of the wing is arranged to focus on and celebrate the stonework and sculpture of the original Grindlay Street elevation.

The aspiration of this project was to improve access, education and development within the hall. "It is a deceptively simple, bold and radical design to ensure a future for the Usher Hall in the 21<sup>st</sup> century," says Michael Hamilton from LDN Architects, who has been involved in the project since its planning eight years ago.

The new glass extension will create a contemporary space with open, friendly public areas. A daytime cafe and box office will give a new feeling to the building, as well as new function/education/hospitality spaces bringing new opportunities for life-long learning programmes. There will also be an office suite on the top floor, which will create much needed space for the Usher Hall administration team – bringing them together in one space for the first time.

## Better access

A new entrance podium is designed to present the building in a quite different, welcoming way, giving level access through all entrances. There will also be greater access with lifts to all levels, as well as new architectural features in the form of a spiral staircase connecting all levels – really opening up the spaces for the first time. Other changes include the removal of audience segregation, increased cloakroom and washroom facilities, and renovated backstage facilities.



New features include a state-of-the-art lighting rig for all types of concerts and shows (rock, classical music, folk, pop, comedy, etc) and a greatly increased capacity – the auditorium can now hold up to at least 2,800 standing and approximately 2,200 seated.

"The refurbishment work will create a venue fit for the 21<sup>st</sup> century – with excellent facilities for concerts of all musical genres, flexible conference spaces and vastly improved customer amenities," says venue manager Karl Chapman. "Our new extension is taking shape and looks fabulous." Once the building work is complete in October 2009, a further phase of work will redesign the external area around the hall, drawing it together with neighbouring arts venues the Traverse Theatre and the Royal Lyceum Theatre in a unified arts quarter. ■

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# Economy drive

How costs were kept under control in building the new Hull Truck Theatre

**The Hull Truck Theatre has been designed with whole-life costs (such as energy consumption and maintenance) in mind**

Hull Truck Theatre in the UK has come a long way since it began performing from the back of a truck in the 1970s. Earlier this year it moved to a new facility in Hull's city centre, which provides a modern and flexible space while remaining true to its origins. The redevelopment formed part of a wider regeneration project for the city.

The design by Wright and Wright architects is designed to support the financial demands of running a larger venue by reducing energy consumption. It is a naturally ventilated modern space, channelling fresh air into the venue at a low level, relying on both the natural heat created by the audience and the lighting to carry the stale air up and out of the building. The space is flexible for both matinees and evening



performances and uses cooling in the form of ground source water, dimming technology and carefully selected lamps to maximise the lighting while reducing energy costs.

Global construction consultant Davis Langdon was involved in the project from its inception, providing integrated cost and project management solutions. This included developing the total project cost and drafting and agreeing funding arrangements with the European Development Fund, the Arts Council, Yorkshire Forward, Hull City Council and ING. An overall strategic programme was created alongside agreement of all the legal arrangements and support in the development of the overall business case.

## Whole-life costs

"Theatre projects are typically high risk and a defining feature for success was the management of all aspects of the design delivery, using lessons learned from similar developments," says Paul Davis, head of culture at Davis Langdon. "To maximise the whole-life costs of the project, a



limited palette of high-quality materials was chosen and combined with the management of energy and maintenance costs."

Davis says the ventilation strategy and cooling, together with the choice of lighting and materials, were fundamental to low energy consumption and lower maintenance costs. The Davis Langdon team instigated the management of the capital costs and successful project completion, together with the whole-life costs. "The whole-life costing of any development is essential to any ongoing business case, yet it is often an area that is misunderstood when the primary focus is on capital cost," says Davis. "Davis Langdon's approach to this unique project was to provide the vital link between managed project risk and added value to ensure certainty of outcome and delivery." ■

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# The sound barrier

The acoustic design of Leicester's 'inside-out' theatre, Curve, had to enable simultaneous performances in two back-to-back spaces sharing a common stage

**Right:** Curve's 750-seat Auditorium

**Below:** Curve's foyer is a performance space in its own right

**T**he brief for Curve, the new theatre in Leicester, UK, asked for an open theatre concept (coined 'theatre inside-out') breaking with the traditional boundaries between front and back of house, and allowing performances to occur almost anywhere in the building. The initial architectural concept proposed a grid spanning the entire building, with theatres as open islands under a common roof, separated by mobile acoustic curtains. To optimise the technical and staging possibilities, the stage then shifted to the centre of the building, opening up onto both the larger 750-seat Auditorium and the smaller, 350-seat Black Box.

## Parallel performances

The acoustic design – by Kahle Acoustics – started with the question of how much (and when) acoustic isolation is really required. Parallel performances (and rehearsals) had to be possible in the Auditorium and the Box, despite

both spaces sharing a common stage. "An interesting outcome of the studies and discussions with theatre staff was that only moderate acoustic isolation is required between the stage and foyer during performances – as long as noisy activities in the foyer can be kept away from the vicinity of the stage house," says Eckhard Kahle, acoustician at Kahle Acoustics. "On other occasions, the foyer becomes part of the show, making acoustic isolation obsolete."

Initially, the acoustic isolation between the stage house and the foyer was achieved solely with two sets of multilayered soft curtains. These were eventually replaced with a single layer of shutters that move vertically. The fire-resistant, relatively lightweight shutters achieve an acoustic isolation of 38dB between the stage house and the foyer. A single 40dB safety curtain separates the stage from the Auditorium, while the separation to the Box is achieved with double shutters. To avoid structural sound transmission, the Auditorium and the Box are fully structurally separated above grade from each other, and from the roof, which includes most technical equipment.

The Auditorium is a one-balcony theatre with a squared-off horseshoe shape and acoustically optimised sidewall and ceiling reflectors. The Box features fully flexible seating and a full grid over the entire space allowing the placement of the stage anywhere in the room, in addition to the option of opening the Box onto the main stage. A fixed balcony and technical catwalks on three sides are used for improved acoustic reflections.

Surrounding the theatres on all sides, the foyer is regularly used for performances, as well as pre- and post-performance activities. With its two bars, it is open to the public every day. Significant



acoustic absorption was provided to create good acoustic conditions and reduce noise spreading. The 22m-tall, partially slanted glass façade achieves an acoustic isolation of 40dB to the outside. Kahle Acoustics says that in the foyer, buses passing by can be faintly heard, as well as amplified shows on the main stage, but out on the street, activity in the theatre cannot be heard, and inside the auditoria not a single intrusive noise from the street or foyer can be heard.

Since its opening in 2008, Curve is being used with promising results. The opening show crew made good use of the stage shutters even during set-up and rehearsal, praising the ability to rehearse in natural daylight. "The vision of the inside-out theatre has been successfully materialised into Curve's day-to-day operations," says Kahle. ■

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# Sense and sensibility

CHP & Associates had to overcome numerous engineering challenges to enable the Winspear Opera House to live up to its remit – bombarding the senses



**Above and right:** Winspear  
Opera House

**Below:** Plumbing, electrical  
and air conditioning systems  
behind the scenes

**I**t was Leonardo da Vinci who said, “Things of the mind left untested by the senses are useless,” and this was the thinking behind the engineering design of the Margot and Bill Winspear Opera House, part of the AT&T Performing Arts Center in Dallas, Texas, USA. With Foster and Partners producing an architectural design featuring a red glass drum visible through a transparent façade and Sound Space Design tasked with delivering world-class acoustics, the opera house is designed to overwhelm the senses from every angle – an aim that presented engineering challenges for CHP & Associates.

The acoustic design criteria required that the air conditioning be delivered at very low velocities into the main audience chamber. This translated into large ducts to bring the air from the basement equipment room to the occupied spaces. The space between the floor of the audience chamber and the basement floor was used not only for acoustic buffering but also for duct routing and air delivery. “By introducing the air at the floor, the benefits are two-fold – indoor air quality is improved and energy consumption

is reduced,” says Lisa Osborne, project manager at CHP & Associates.

The search for a floor grille led to an existing product manufactured for use in raised floor systems. To ensure acoustic and air delivery performance, laboratory testing was done using a full-scale mock-up of two rows of seats. “The grilles performed superbly thus saving the cost of developing a custom grille,” says Osborne. At the upper levels, air is delivered via a 4in round hole cored into the risers under each seat.

Another requirement to ensure superior acoustics was to isolate the mechanical, electrical and plumbing systems from the stage and audience structure. The structural engineer designed a universal support system to support the plumbing, mechanical piping, and electrical conduits in the basement service corridor.

Because of the open design of the lobby and the large volume of the space, Osborne says effective air distribution was a challenge. In many cases it was accomplished using the architecture itself – by providing openings at the base of walls to supply air and using light coves and stair risers for return air. To maintain the thin profile of



the elevated foyers, openings in the structural support beams were provided for ductwork, sprinkler piping and electrical conduits. Other conduits were concealed in the structural steel stair supports. To preserve the clean lines of the circulation corridors encircling the red drum at the upper levels, the fire alarm devices were mounted in a concealed housing in the ceiling. Upon activation of the fire alarm system, the device flips to reveal the strobe.

"In the midst of the performance it is hard to imagine what lies under the floor, above the ceiling or behind the scenes," says Osborne. "Yet without the 640,000 lbs (290,299kg) of sheet metal ductwork moving more than 290,000ft<sup>3</sup> of conditioned air per minute, and without 500 miles of electrical wiring, the beauty of the performance could not be realised." ■

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# In with the new

A new and intimate theatre designed to attract young audiences and cultivate emerging talent

**LCT3 is perched on top of the Vivian Beaumont Theatre**

The Vivian Beaumont Theater, part of the Lincoln Center complex in New York, USA, is looking to the future with a new venue, LCT3, devoted to developing and producing the work of emerging playwrights, directors and designers.

Aided by its extensive experience in designing for cultural institutions, New York-based H<sup>3</sup> Hardy Collaboration Architecture has been working closely with Lincoln Center Theater to help create a special place. "This project's core belief in attracting a new generation to Lincoln

Center Theater is a brave commitment to the future of American theatre," says Hugh Hardy, principal of H<sup>3</sup>. "Instead of simply savouring the visibility generated by success, Lincoln Center Theater is now set to create further excitement as it embarks on a programme to cultivate original and stimulating work for new and younger audiences."

The Vivian Beaumont Theater currently shares a building with the New York Public Library's performing arts collections, a building designed for theatre by Eero Saarinen in concert with modernist architect Gordon Bunshaft and scene designer Jo Mielziner. A contemporary addition to the complex will be a noticeable change to the building's aesthetic, a design challenge that was not taken lightly.

The two-storey, 23,000ft<sup>2</sup> volume LCT3 building will perch on top of the Vivian Beaumont Theater's roof. "This addition clarifies, rather than obscures, the integrity of Saarinen's original composition," says Hardy. "H<sup>3</sup>'s design reinforces the daring structural premise that cantilevers the library's stack space around the theatre's stagehouse and supports it on large, square concrete columns." Accessible by two elevators from the Beaumont lobby, the theatre will become a new home for experimentation, overlooking the site. "From the rooftop of the Beaumont, this new theatre will offer visitors a completely new and unique view of the Lincoln Center campus," says project designer Ariel Fausto of H<sup>3</sup>.

LCT3 will contain 100 fixed seats and a rehearsal room, support areas, public lobbies and administration space. To keep costs low, physical



productions will use simple scenery, with an emphasis on lighting and costumes. "New York has many different kinds of theatre spaces; however, this intimate, focused room is like no other," says Fausto.

#### **Direct approach**

The audience will be placed in a tiered, free-standing 'boat' inside an articulated theatre loft. "Its configuration ensures a directness of experience that characterises the company's approach to theatre and will permit new playwrights to address audiences with forceful immediacy," says Hardy. "It is not a theatre designed to be a civic embellishment or to venerate the past. Instead, LCT3 will create a contemporary workplace where exploration and discovery are the hallmark of experience." ■

[www.h3hc.com](http://www.h3hc.com)



## Creating

## Communities one theatre at a time

H3 Hardy Collaboration Architecture is a leader in the planning and design of theatres, libraries, museums and parks, as well as academic, residential, and commercial facilities. Our commitment to collaboration yields a portfolio rich in variety. We are dedicated to the creation of memorable and engaging places.



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# Golden age

Historic theatres can be brought back to life by restoring crumbling and moulding plaster to its former glory

**Below:** Replacing box fronts at London's Old Vic



**H**ayles and Howe is an ornamental plaster company specialising in the inspection, safety certification, conservation and restoration of theatres.

Over the years Hayles and Howe has found that implementing a regular safety inspection helps to protect and preserve historic theatres. Theatres contain a complex and broad mix of building materials, which requires careful and accurate monitoring. "For example, the structure of a fibrous panel is more than half composed of organic material, which is attached to timber struts, leaving it highly vulnerable to attack by moisture and all forms of cellulose moulds and fungi," says David Harrison, managing director of the company. "The most important part of fibrous conservation is therefore prevention via a regular inspection."



Hayles and Howe's inspection includes a time-consuming, accurate, technical and detailed assessment behind the theatre's entire roof space. The in-depth assessment gives the owners a true indication of the condition of the ceiling and includes moisture content (using up-to-the-minute and highly effective sensors), ventilation, structure, age and history, followed by clear recommendations for treatment, conservation and advice for any necessary repairs.

Hayles and Howe, which has divisions in both the USA and the UK, is more than happy to assist theatre owners and managers to prepare a cost-effective rolling inspection and maintenance plan that fits in with the scheduling of rehearsals and shows. The company is also quick to respond to any calls from theatres that find themselves with any unforeseen problems with ornamental plasterwork or Scagliola. Scagliola is made from



splinters of coloured material (scagliola) that is mixed together with plaster and pigment to create a marbled effect, highly polished and virtually indistinguishable from real marble.

The King's Theatre in Southsea, UK, is a theatre that Hayles and Howe has been involved with for over 10 years. The company was first asked to inspect the ceiling by the local council in 1998. A leaking roof, industrial dust and a coating of nicotine from the good old days had damaged this 1891 Frank Matcham theatre. The company has carried out various repairs over the years, including restoring the ceiling's plaster ladies and the Scagliola proscenium arch. On the strength of all its work on this prestigious project the company received a 'Highly Commended' award from the Federation of Plastering and Drywall Contractors in February 2009.

One of the most recent and remarkable projects Hayles and Howe has been involved with is the



A refurbished plaster lady on the ceiling of Southsea's King's Theatre

refurbishment of the decorative fibrous plaster box fronts at the famous Old Vic in London. The box fronts were carefully removed and taken to the company's workshops, where they were remade in fibreglass to enable easy removal when a larger stage area is required at the theatre. The new box fronts were installed in May 2009.

Hayles and Howe also works on the exterior of theatres and public buildings, and in 2008 the company restored and transformed the decorative render scheme for The Leeds Grand Theatre in West Yorkshire, UK. Other theatres the company has worked on over the last two years include the Beacon Theatre in New York, USA; the Hanover Theatre in Massachusetts, USA; and London theatres including The Apollo Hammersmith and Victoria; the Astoria 1 and 2; the Shaftesbury; and the Dominion. ■

[www.haylesandhowe.com](http://www.haylesandhowe.com)



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# Encore!

After a gap of 10 years, Multistage International has returned to the Thessaloniki Concert Hall in Greece to complete the second phase of development – stage technology for an additional 1,500-seat hall

**Right: Butterworth Concert Hall**

**Below: The new venue at Thessaloniki Concert Hall**



Multistage International can be forgiven for thinking it has been here before when it comes to the Thessaloniki Concert Hall in Greece. After a gap of 10 years since completing the first phase of this building project, the company is now finishing work on a second phase – an additional 1,500-seat venue built in the car park of the original. Indeed the initial Concert Hall marked the beginnings of the group of people that now make up Multistage International. During the later stages of the first design stage of the Concert Hall, in August 1999, John Tune and his team were made redundant and only stuck together, initially as JVT Associates, to finish the design and installation of the stage machinery for the Greek builder GEK.

The original Concert Hall is a multipurpose hall with a 40-tonne moving concert shell that when retracted allows the motorised flying winches to be used. The stage and forestage comprise a series of motorised platforms that allow the area to be configured in a variety

of settings depending on the requirements of the production. The initial stage equipment installation took two years to complete, which followed a year spent installing the stage equipment at the Royal Theatre, Thessaloniki, with acoustic consultant Theodore Timagenis.

Upon the completion of the Thessaloniki Concert Hall in 2001, JVT Associates, with help from Tonis Toumazis, managing director of Atlas Pantou Constructions, became Multistage International and since then the company has amassed an impressive track record of stage engineering, lighting and audio projects.

In 2008 Multistage International started on the design for the second phase of the Thessaloniki Concert Hall project, working again with acoustic consultant Timagenis, as well as Flemings & Barron. Due for completion in 2009, Multistage International has designed and installed motorised tracking acoustic panels, overstage lighting and scenery bars, forestage lighting bars with motorised ceiling panels that allow the auditorium ceiling to be closed when not in use, and a scenery lift linking the car park with the stage. Work is almost complete and the installation engineers were recently asked to do a full maintenance service on the original Concert Hall, as they were already next door, so to speak. Thankfully the company says very little was wrong even after eight years of use.

Multistage International doesn't only work in Thessaloniki though – 2008 also saw it start the design for the renovation of the Butterworth Concert Hall at Warwick Arts Centre in the UK. Working for the contractor Moss Construction and design consultants Acoustic Dimensions, four motorised stage lifts were installed to offer the flexibility needed to create the myriad of configurations needed for the venue. The lifts cover an area of 152m<sup>2</sup>, each travelling over 1.5m, and use Serapid's Linklift chain, so removing the need for additional civil works. Taking only

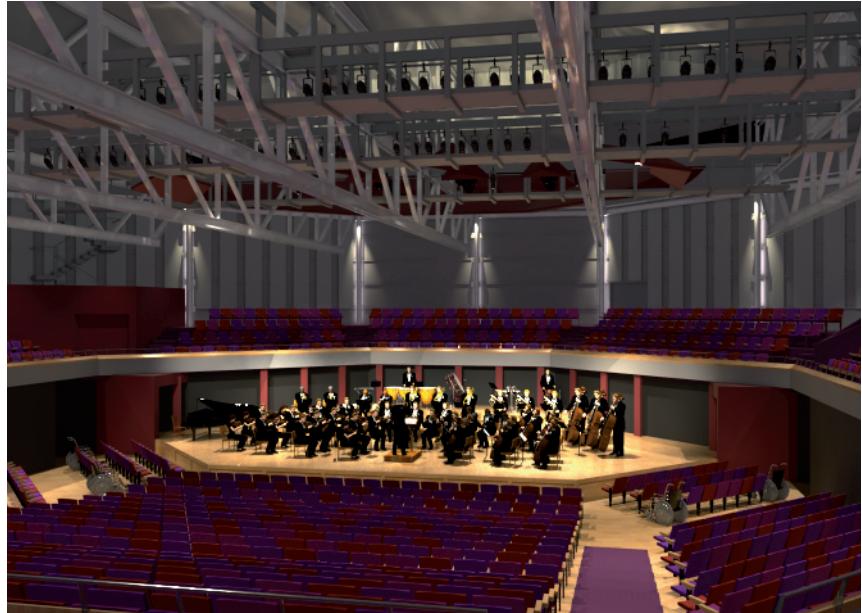


four weeks from when the first components arrived on site, Multistage International installed, commissioned and handed over the working system to the venue in April 2009.

"We found working with Multistage very easy. We were able to draw on its extensive knowledge and experience in the development of some tricky details such as the lift guides," says Nicholas Edwards of Acoustic Dimensions. "Multistage's CAD drawings were clear and its site installation and testing very clean and effective."

Multistage International is currently finishing off projects in the UK, including a comprehensive performance lighting and audio visual installation within the banquet and conference rooms at the Royal Garden Hotel Kensington, as well as working on designs for a project in Belfast, and contracts in Cyprus. ■

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Email: [info@multistage.co.uk](mailto:info@multistage.co.uk)  
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Concert Hall – Thessaloniki - Greece

# The conductor

Trizart Alliance says the role of the theatre consultant is to stay poised, orchestrate the various professionals working on the project, and balance the needs of different stakeholders

Robert Etcheverry



**The studio (above), music hall (below) and theatre (right) at the Montreal Conservatory of Music and Dramatic Arts**

**T**rizart Alliance recently worked on the renovation of the Showroom at MGM's Luxor Las Vegas hotel and casino complex. The project serves as a good example of the sorts of challenges a theatre consultant has to contend with. Part way through, and after reassigning the musicians' loft for lighting equipment and egress stairs, the company was told it had to put the live musicians back in, together with their instruments and monitors. The space also had to be completely acoustically discrete.

"A theatre consultant has to be able to listen calmly, and must also be on-site enough to attend to changes or questions," says François Morrison, managing director and principal at Trizart Alliance. "In addition, it is important to realise that the term 'theatre consultant' isn't really singular, it implies a team of professionals

adept at the many specialities required to bring a performance space to reality."

The situation at the Luxor involved space planning, seating reconfiguration, audio/visual design, lighting, rigging and stage machinery. Trizart Alliance provided this integrated expertise and coordinated the work of its design partners in architecture, engineering and acoustics.

## Striking a balance

The requirements of the end user, in this case the Cirque du Soleil, had to be balanced with the requirements of the client, MGM, to complete the renovation of the showroom on time and on budget. "The creation of this interface between the artistic and practical functions of a venue is typically where the value of the theatre consultant lies," says Morrison.

With a plethora of funding models, the theatre consultant may be directly answerable to the client, the architect, or sometimes, particularly in the case of a public private partnership (PPP), the development consortium of the project. "In any of these scenarios the client and the end users must be served by the best practices that the budget allows, absolutely independent of any affiliation with a particular manufacturer or supplier," says Morrison.

For example, another of Trizart Alliance's recent projects was the Montreal Conservatory of Music and Dramatic Arts in Quebec, Canada, where the owner/client was the Université du Québec, the funding came from the Ministry of Culture and Communication, but the end user was the conservatory itself, a strictly professional training programme that rents the facilities from

Robert Etcheverry



the university. These facilities serve the interests of students only, yet Trizart Alliance rates the design and equipment as equal to another of its projects, the Shenkman Arts Centre in Ottawa, Canada, a PPP project intended for the sole use of professionals.

"The agility required of a theatre consultant can also point us down new and interesting journeys," says Morrison. "In our practice, we often find ourselves concerned with sustainable design issues, in some cases fending off well-meaning green strategies that are actually counterproductive in a performance venue, in others we introduce the client to cost-effective, sustainable methods and materials. The road may be different, depending on the business model, but the destination is the same – a performing arts venue that exceeds all expectations." ■

[www.trizart-alliance.com](http://www.trizart-alliance.com)



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## SEATING

GUANGZHOU LIJIANG ECONOMIC DEVELOPMENT

# Open market

Guangzhou Lijiang Economic Development opened a new research and production facility this year to expand its ability to supply seating to the auditoria, theatre and cinema markets

**Right:** The new production facility

**Below:** The LS-6618 seat

**A**fter 10 years of rapid growth, Guangzhou Lijiang Economic Development is developing its global brand with a new logo and a new facility. The company specialises in researching, producing and selling chairs for auditoria, theatres, cinemas, waiting rooms and other public areas.

The new seating research and production base is located in the Science and Industry Zone in Sanshui city centre in Foshan, Guangdong Province, China. The facility, which opened in

March 2009, covers a total area of 80,000m<sup>2</sup>, and the company says it can produce around one million chairs a year.

“The new manufacturing facility and state-of-the-art technology demonstrates Lijiang’s commitment to continue to invest in our long-term growth,” says Zhang Qing, marketing director at the company. “And we feel confident the modern new facility will greatly help our cost-effectiveness and ability to respond quickly.”

### Auditorium seating

One of the company’s products for the auditoria market is LS-6618, a tip-up seat with a counterweight mechanism for smooth operation. The outer back panel (which is 18mm thick) and seat pan are made from plywood, surfaced with an attractive wood veneer. The back cushion is approximately 60-80mm thick, and uses cold-moulded foam (with a foam density of 55±5Kg/m<sup>3</sup>) for durability. The ergonomic seat cushion is designed to provide optimum support, with a foam density of 60±5Kg/m<sup>3</sup>, and a cushion thickness of approximately 50-80mm. The seat depth is around 18.5in (470mm). Meanwhile the injection-moulded, high-impact polypropylene armrests are 2.25in



(57.2mm) in width and offered with a choice of front-mounted cupholder. A centre retractable armrest is designed for added user space. The chair has strong steel structural support finished with an electrostatic powder coating, and stands at a height of 33.25in (845mm). The company recommends the seats are installed at a row spacing of 37.5in (952.5mm), but they can be fixed at just 33.5in (851mm).

Other options for this model include fixed back and riser mount versions, a lounger back, fixed seat, fixed arm, non-upholstered armrest, leatherette headrest, and seat or row number plates with aisle lights.

The company also offers a range of 'European style' seating for theatres and auditoria (the LD series) and has launched two new ranges of VIP seating to address customer demand. ■

[www.leadcom.cc](http://www.leadcom.cc)



Guangzhou Lijiang Economic Development Co.,Ltd  
Head office: Haijing Center, NO.152 Huangpu Ave,  
Guangzhou, China, 510655  
Tel:+86 208 562 6682  
Fax:+86 208 562 6075  
[info@leadcom.cc](mailto:info@leadcom.cc)  
[www.leadcom.cc](http://www.leadcom.cc)

**DESIGN**

AUSTIN-SMITH: LORD

# Crowd pleaser

The people of Shrewsbury in the UK can now enjoy a modern performing arts venue, which includes a 650-seat auditorium designed for intimacy



Daniel Hopkinson

**Above and below:** Theatre Severn in Shrewsbury, UK

Shrewsbury, a town in the Midlands region of the UK, can boast a new performing arts venue. Theatre Severn opened in March 2009 at a total construction cost of £20.7 million.

Austin-Smith: Lord, which commenced design work on the venue in 2006, has an already impressive portfolio that includes the Riverfront Theatre and Arts Centre in Newport, UK (a £13.5 million project completed for Newport City Council in 2004), and the Guildford Civic Concert Hall in Surrey, UK (a £20 million project for client Guildford County Borough Council, projected for completion in 2011).

Working with contractors Willmott Dixon and commissioned by Shropshire Council (formerly Shrewsbury and Atcham Borough Council) the delivery of Theatre Severn

spearheads a major review of the council's arts portfolio. Theatre Severn is a replacement for the much loved but outdated Shrewsbury Music Hall, which had been the town's performing arts venue for 170 years, and will now be renovated by Austin-Smith: Lord to become a museum.

The new venue is modern and well facilitated, comprising a 650-seat auditorium (with a full fly tower and orchestra pit), a 250-seat flexible studio theatre with flying facilities and retractable seating, a dance studio, a multipurpose space, a bar, a restaurant, and all the requisite ancillary, administration, technical and dressing spaces. Shrewsbury provides a sensitive backdrop to its iconic building form, yet the client was keen to provide a building of landmark significance.

The site posed design challenges as it was below the flood plain level, and was of archaeological interest, requiring protection and preservation. As a result the stages and main foyer spaces are raised a storey above ground with facilities incorporated for transporting large scenery from articulated vehicles at ground up to first-floor stages.

Austin-Smith: Lord worked to visually reduce the apparent height and mass of the building by breaking its external appearance down into its constituent parts, a concept well received by the planners, client and English Heritage. Both main and studio theatres and the dance studio are treated as independent entities and the bright and airy ancillary and foyer spaces form a 'solid-void-solid' rhythm between and around them, helping reduce the scale of the building, creating three smaller, acoustically independent buildings



Shropshire Council

within the one venue. At 650 seats, the main auditorium is surprisingly intimate, with the two upper tiers continuing to the proscenium arch and enveloping the forestage, and a rich colour scheme. The studio theatre is highly flexible, with flying facilities and retractable seating, while the dance studio is designed as a dramatic and inspirational space. The foyers are bright and airy and an old chapel, retained as the main bar, has proved an extremely popular space.

"Audiences love the intimacy of the main space. They feel so close to the action and even though the venue has to host a wide variety of different events, the acoustics are excellent," says Lezley Picton, head of arts and heritage at Shropshire Council. "Perhaps the most important thing is that already the people of Shropshire are calling it 'their' theatre." ■

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Riverfront Theatre and Arts Centre in Newport, UK

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# Flying high

The UK's prestigious Olivier Theatre needed a new computer-controlled flying system to replace the 1978 original



**Above:** A TNM control console

**Right:** SynchroPoints on the grid

**Below:** The Olivier Theatre

**T**he UK's National Theatre (NT) in London has three auditoria. The largest, with around 1,000 seats, is the Olivier Theatre, which has a thrust apron stage inspired by the Greek amphitheatre form.

Given the open stage there is no formal proscenium or portal and audience sightlines dictate a requirement for 3D scenery flying. The theatre opened in 1978 with the world's first fully computer-controlled power flying system. The mechanical element consisted of 147 'sky hooks' – moveable single point suspensions rather than a more conventional arrangement of line-set winches as found in more conventional proscenium houses. The original system, with some modest refurbishment along the way, remains in use but is rapidly degrading due to component lifecycle issues, and so is being completely replaced.

The first phase of replacement involved installing equipment from Trekwerk. A new power supply (regenerative DC bus) central server and TNM control consoles have been installed alongside the existing system. In addition 30 mobile SynchroPoint 250kg point hoists have been installed on the theatre grid, to allow suspension points to be moved and reconfigured on a show-by-show basis.

"In the short term, this system provides assurance to the NT that performance flying can continue without being affected by the maintenance problems associated with the original system," says James Taylor, automation operations manager at the NT. "The Trekwerk system was chosen for its flexibility, intuitive interface and operational features – which enable programming in the testing conditions of one of the world's leading repertory theatres. Very few systems are capable of meeting the programming demands of intensive, short rehearsal periods where every second counts and the ability to deal swiftly and efficiently with the ever-changing demands of designers and directors is paramount."

Theatre consultant Charcoalblue facilitated the process by designing and project managing the overall installation and accompanying electrical infrastructure and grid works. Trekwerk also supplied a standard mobile point hoist, and given the rapid project delivery time – four months from order to handover – this was essential as there was no time to develop a bespoke solution. Installation was achieved in one week.

Phase two of the installation will use the power and control systems from phase one, but all the existing original winches will be replaced



with line-set units with movable suspension points. These will complement the SynchroPoint mobile point hoists by providing a facility for lifting heavier, more linear loads, such as lighting bars and scenic flats.

Trekwerk has also recently strengthened its offering by acquiring fellow Dutch stage technology company Stakebrand, which went bankrupt in July 2009 after more than 100 years trading. Trekwerk acquired the company's stock, steel fabrication machinery and premises in the south of the Netherlands, as well as the majority of its employees. "Consequently, the skills base and expertise of the combined companies will strengthen and enhance the position of the relatively young Trekwerk in the international market," says Jennifer Benson, marketing manager at Trekwerk. ■

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## DESIGN

DARDEN ARCHITECTS / LANDRY AND BOGAN / DOHN AND ASSOCIATES

# Balancing act

How a concert hall built for students with public money struck the balance between architectural excellence and economic modesty



Paul Mullins

Above and below: The Paul Shaghoian Concert Hall

**W**hen Clovis Unified School District decided to build a new performing arts centre in Fresno (California, USA) to serve five local

high schools, the art was in creating a concert hall with the features of much more expensive facilities without the price tag. This US\$17.5 million publicly funded venue needed to balance the appropriate architectural statement to reflect its artistic nature, yet check the frills at the door to meet the community's expectations for a facility built with public money.

### Supporting the arts

"Clovis Unified School District deserves high praise for being able to focus the support necessary to create such an innovative and impressive performance space that few public school districts would dare attempt," says project architect Marty Dietz from Darden Architects. "By investing in a concert hall of this calibre, the district sent a strong message to students, parents, and the general community that

performing arts are a valued part of the district's curriculum, and the district has been rewarded – that message has been extremely well received."

The 750-seat Paul Shaghoian Concert Hall has been exactly crafted under the direction of Darden Architects. With initial input from the project's acoustic consultant Dohn and Associates, Darden Architects conceived a dramatic interior design by using a simple palette of quality materials

including slate, stainless steel, glass, and maple and cherry wood veneers.

Theatre consultant Landry and Bogan supported the design through extensive programming (working with school district users), and worked with the architect and acoustic consultant on the shape of the seating and stage to provide an intimate and comfortable environment. Landry and Bogan also engineered the acoustic canopy and acoustic curtain system based on input from the acoustic consultant, and provided lighting solutions to complement the architectural and acoustic design goals. With a wide range of reverberation times and a variable height overstage canopy, the hall was designed to accommodate just about any presentation the district's five high school music departments could envision, from amplified jazz to choral recitals. The hall is in the shoebox style, with overhanging balconies, a myriad of sound-diffusing surfaces, and upper reverberation chambers with retractable sound absorption.

So far the reviews have been overwhelmingly positive. "I have been blessed to have worked in several of the architectural and acoustic jewels of the 20<sup>th</sup> century," says Theodore Kuchar, music director of the Fresno Philharmonic Orchestra, and former director of the Janacek Philharmonic Orchestra and the National Symphony Orchestra of the Ukraine. "Many, many cities are blessed with excellent concert halls that seat in excess of 2,000 or as few as 200. Each of these dreams about the ideal venue which seats between 700 and 1,100. I had not yet seen such an ideal until I stepped foot (and subsequently went to listen to two performances, specifically to observe the acoustic qualities) in the new Shaghoian Hall. Both aesthetically and acoustically, this hall is a state-of-the-art gem." ■



Tomas Ovalle

[www.dardenarchitects.com](http://www.dardenarchitects.com)

[www.landb.com](http://www.landb.com)

[www.dohnandassociates.com](http://www.dohnandassociates.com)

# All rise

Hoists by Vortek can raise sections of seating in the Dee and Charles Wyly Theatre at the AT&T Performing Arts Center



**H**oists manufactured by Vortek, a division of Daktronics, are centre stage in the Dee and Charles Wyly Theatre at the AT&T Performing Arts Center in Dallas, Texas, USA.

"When direct lift, multipart-line in a high-capacity hoist is required, there is no group with as much experience as the Vortek team at Daktronics," says theatre consultant Michael Nishball of Theatre Projects Consulting. "At this point, it's clear to me that this is going to be a very successful power flying and controls installation."

Without the Vortek custom hoists, this design would not be possible. The hoists have the capacity to raise sections of box seats and balcony seats, allowing multiple

configurations for the various venues. Four massive custom hoists move horizontally and vertically with a lifting capacity of 60,000lbs (27,216kg). To control curtains and scenery, 45 Vortek Pro Series hoists and two custom hoists are installed on stage.

"Taking the vision of the theatre consultant and architect of literally hanging the seating from the upper floors was an enormous engineering challenge. A lot of credit goes to Vortek's engineers and field technicians – the towers flew the first time the button was pushed," says Steve Hagen from Secoa, Vortek's authorised dealer. "The general contractor, McCarthy Building Companies, assembled a team that looked out for the owners' best interest and all of the subcontractors, along with the logistics of this one-of-a-kind building." ■

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# The Tale of Two Cities

The Saenger Theatre and the Maryland Theatre for the Performing Arts are perfect reflections of culture as the heart and soul of any community. The stately Saenger, devastated by Hurricane Katrina, draws upon the remarkable architectural and cultural history of New Orleans while the Maryland Theatre evokes the contemporary essence of vibrant Annapolis. It's the tale of two cities, as told by Martinez + Johnson Architecture.



Saenger Theatre, New Orleans



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