

L-ACOUSTICS SOUND SOLUTIONS

PERFORMING ARTS CENTERS

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INTRODUCTION

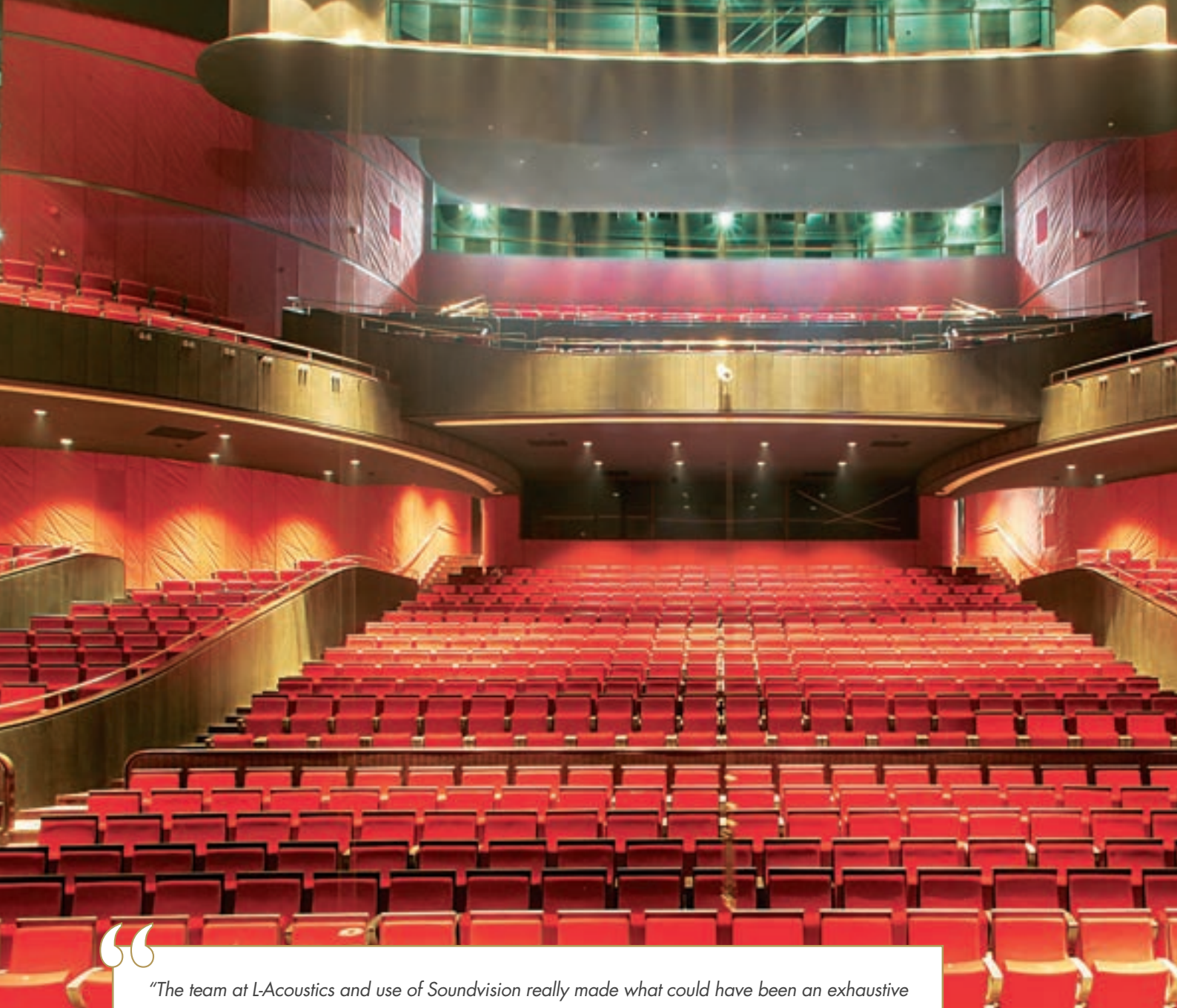
When the founder of L-Acoustics, Dr. Christian Heil, invented the V-DOSC system – the very first line source system featuring the exclusive WST® technology in 1992 – it revolutionized the professional audio industry.

Since 1984, a large body of theoretical research and experience is behind every system that L-Acoustics develops. Today, L-Acoustics sound systems are considered the #1 choice for internationally recognized venues ranging from the Hollywood Bowl, the Beijing Opera House, the Olivier Theatre, part of the National Theatre, in London, and countless other facilities worldwide.

As the live performance business continues to evolve, performing arts centers are increasingly required to provide excellence in sound reproduction, by artists, productions and audiences alike. This performing arts center brochure presents a select number of performance venue challenges and solutions tackled by owners, consultants, engineers and contractors with L-Acoustics systems. From the early stages of design through to system commissioning, every performing arts sound system project presents its own unique set of constraints, objectives and challenges. With L-Acoustics, we always find the solution. We look forward to delivering The Best Sound to your audiences in opera houses, theatres, live clubs and performing arts centers across the globe.



Cédric Montezor
Director of Application, Install



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“The team at L-Acoustics and use of Soundvision really made what could have been an exhaustive process a much simpler method leading to the prime solution.”

Sam Moergen, LiveSpace Project Designer - Epikos Church



▲ Shanghai Oriental Arts Centre, Shanghai - China

A PARTNER

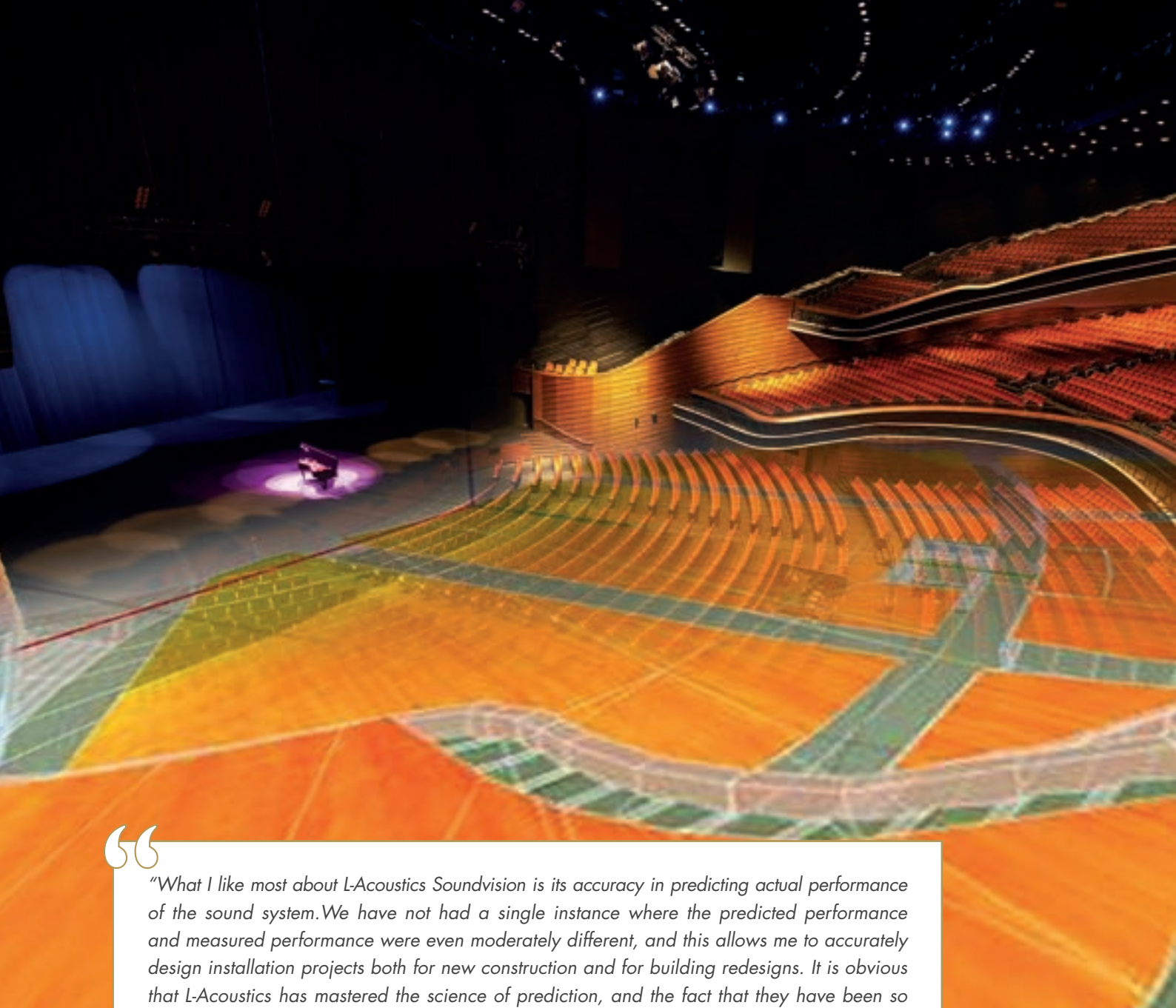
DELIVERING A CONCERT SOUND EXPERIENCE TO EVERY FAN

With a good sound system, everyone enjoys the show. L-Acoustics' number one goal is to create an unprecedented sonic experience for the audience, with easily reconfigurable and widely accepted sound systems. Combining breathtakingly high-impact sound reinforcement with stunning transparency, our systems "disappear" behind artistic performances, providing a truly immersive experience for the audience. Our high-quality systems allow performing arts centers to become truly multi-purpose venues, with the potential to create or enhance revenue streams.

How is this achievement possible? L-Acoustics has been designing reference line array systems for more than 20 years. Our exclusive technologies, providing enhanced directivity control, allow L-Acoustics to:

- provide consistent Sound Pressure Level, and sonic experience, to every audience member
- enhance the intelligibility of the system, ideal for spoken word messages
- provide enhanced zoning capabilities, optimizing acoustics and offering energy savings and flexibility in your system set-up.

L-Acoustics speakers focus all of their sonic energy on a particular segment of the audience. This allows an exceptionally coherent sonic signature in very long throw applications, beyond the limits of other systems.



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“What I like most about L-Acoustics Soundvision is its accuracy in predicting actual performance of the sound system. We have not had a single instance where the predicted performance and measured performance were even moderately different, and this allows me to accurately design installation projects both for new construction and for building redesigns. It is obvious that L-Acoustics has mastered the science of prediction, and the fact that they have been so consistent over the years is a testament to their manufacturing precision.”

Deward Timothy, Poll Sound

SOUNDVISION

3D SOUND DESIGN

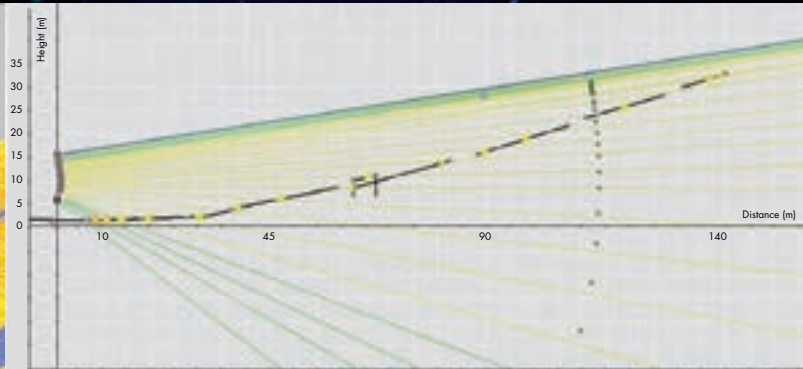
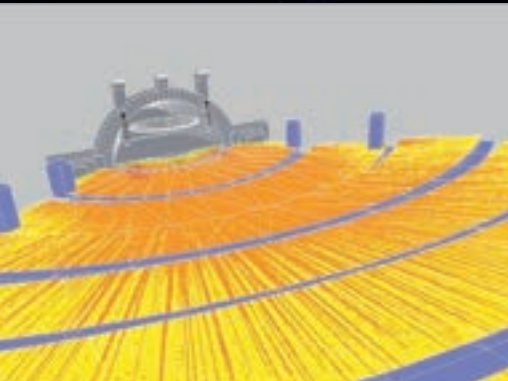
Soundvision supports sound designers to create acoustical and mechanical simulations of their L-Acoustics sound systems. The first 3D sound design program capable of operating in real time, Soundvision allows designers to draw audience zones manually, import them from CAD files or upload them from the L-Acoustics online database of the world's most renowned venues. Placing loudspeakers in the simulation is rapidly done, and Soundvision automatically calculates impact coverage and SPL mapping, including subs. System time alignment of multiple loudspeakers or arrays can be visualized using delay mode. Soundvision provides mechanical data with detailed set-up information for installers and riggers.

Advanced features include cardioid array modeling tools, contour EQ modeling tools and a response curve display tool that features adjustable target curve and post-processing options.



L-Acoustics can provide electro-acoustic modules to offer compatibility with third party acoustical software.

▲ Star Performing Art Center - Singapore





OUTSTANDING THROW

HOLLYWOOD BOWL IN LOS ANGELES, CA

18,000 seats

Hollywood Bowl is a famous outdoor venue, with an audience capacity of 18,000 across a 450 feet (137 meter) incline. This spectacular audience depth presents a major coverage challenge. The system must throw high frequencies far into the distance. It must also control the differential attenuation of low frequencies, which tend to progressively thin out the tonal balance towards the outermost seats. Finally, the noise pollution of the system must be reduced to a minimum in the urban Hollywood location.

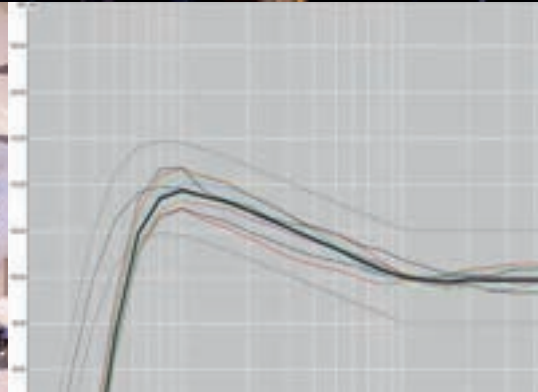
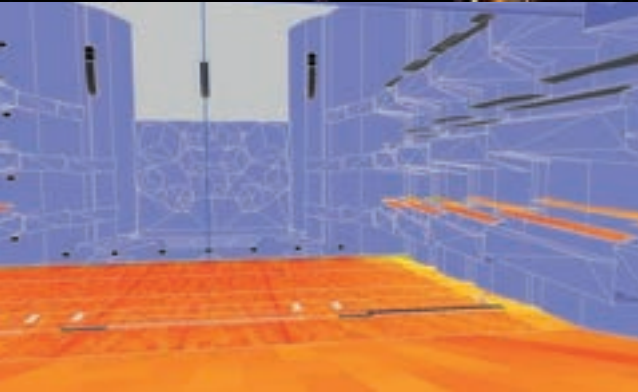
The LA Philharmonic board oversaw a blind comparative evaluation of leading manufacturers. The LAcoustics K1 line source system was chosen unanimously, bringing additional SPL and a smoother horizontal coverage. The left and right line sources of 16 x K1 were optimized by a further 4 x K1-SB LF enclosures to control and throw the LF contents. The radiation pattern of low frequencies is squeezed vertically projecting acoustic energy to the back of the audience.

“It literally stopped me in my tracks as I stepped out into one of the promenades... there was no discernible drop in dynamic range, volume or quality.”

Paul Geller, Production Director - Hollywood Bowl

The K1 line source system provides 105 dB of max SPL (102 dB on the previous system) on 95% of the audience depth with a tolerance of 3 dB. The tonal balance measured from the front seat positions shows an LF contour of 15 dB. In addition, the superior control of HF dispersion contributes to an additional 6 dB of rejection over the previous system, contributing to a significant reduction in noise pollution to the surrounding neighborhood.

EQUIPMENT LIST				
32 x K1	8 x K1-SB	16 x Kara	8 x ARCS II	12 x 5XT
16 x SB28	30 x LA8	4 x LA4		



VERSATILE MULTICHANNEL DESIGN

MINNESOTA ORCHESTRA HALL, MINNEAPOLIS, MINNESOTA 2,000 seats

The 2,000-seat Minnesota Orchestra Hall, opened in 1974, is home to the Grammy Award-winning Minnesota. The hall, which completed a \$52 million renovation in early 2014, has long been renowned for its acoustics, which were originally designed by Cyril M. Harris. The Hall also programs an eclectic schedule of non-orchestral performances, ranging from popular music, jazz and world music to Broadway, film music and comedy and concluding each season with Sommerfest, a month-long urban summer music festival. In 2015, the Hall chose to upgrade its sound system, to better serve the needs of their modern music and theater production scheduling.

Minnesota Orchestra Hall chose an L-Acoustics Kiva line array system to perfectly and evenly reproduce speech and music across the entire audience.

Allied Audio Services installed a left-center-right configuration of Kiva line array speakers together with SB15m and SB18 subwoofers, all of which are powered by LA4X amplified controllers.

Because Orchestra Hall covers such a wide variety of programming, the system's LCR configuration and ability to modify the position and number of speakers enables production staff to raise or lower the sound stage to match the production: for cinema, the left-right-center is kept up high to match the using true L/C/R panning and for rock performances, the image can be brought down lower, even stacking them on the stage. The system is appreciated by audiences and technicians alike for its ability to match all types of programming.



"We tried all the big names and the reason we chose L-Acoustics for Minnesota Orchestra Hall was because we felt it matched everybody's desires, both the people in the audience and the technicians who come through our hall. The brand meets all riders."

Joel Mooney, Technical Director, Minnesota Orchestra Hall

EQUIPMENT LIST

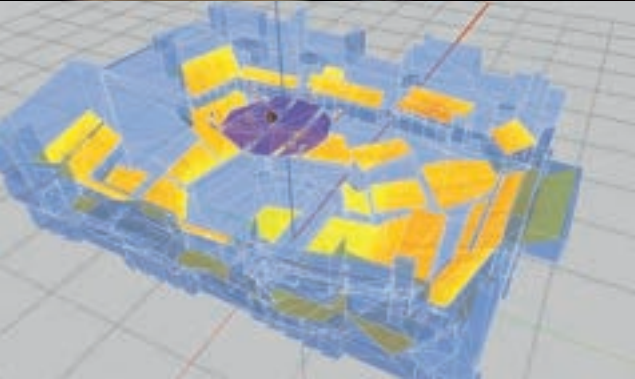
40 x Kiva

4 x SB15m

8 x SB18

9 x LA4X

15 x 8XT





FAITHFUL TO ARCHITECTURAL

MUSIC HALL IN HELSINKI, FINLAND

1,700 seats

Helsinki Music Hall was designed as a purpose-built concert hall to host Helsinki's two major symphony orchestras: the Finnish Radio Symphony Orchestra and the Helsinki Philharmonic. Inaugurated in 2011, the 1,700-seat main hall wraps 360° around a center stage in a complex patchwork of multiple asymmetric seating arrangements. During the design build process, acousticians added reflective surfaces to modulate the reverberation time from 1.6s to 1.9s (when the venue is occupied), creating an additional challenge.

Helsinki Music Hall invested in a discreet yet powerful L-Acoustics Kiva sound system for its even tone and homogenous coverage throughout the venue.



"The L-Acoustics Kiva line source system was the ideal choice, as the modularity of its curvature ensures excellent homogeneity of coverage, even tonal balance and adequate SPL to each audience member."

Pauli Molnár, Starlike

Helsinki's Starlike Oy installed a front, rear and side configured sound system, located in the ceiling and flown on the canopy at 15.5m above ground level. The audience coverage is divided into eight horizontal sectors which overlap to recreate stereo imaging, with eight hangs of Six to nine Kiva line array elements topped by two SB18 subs to provide 360° directivity while minimizing low frequency energy on the stage. This solution gives homogenous tonal balance and SPL to each audience member, while simultaneously preserving the stage and maintaining a high immunity to feedback. The sound system is totally transparent, respecting the acoustic signature required by the Acousticians from Nagata Acoustics.

EQUIPMENT LIST

46 x Kiva

2 x SB18i

5 x LA8



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“There are many good brands out there but L-Acoustics was the one that ticked all the boxes for us and the good support we receive from L-Acoustics partner Sound Harmonics is the best part of it. They installed what they promised when they promised, regardless of many challenges that they were faced with and we are very happy with the install and service we were given.”

Jean Kruger, sound and maintenance manager at Christian Revival Church, Pretoria - South Africa



CERTIFIED PARTNERS

A NETWORK OF CERTIFIED SYSTEM INTEGRATORS

L-Acoustics carefully selects certified system integrators. Our System Integrator Charter outlines three key commitments:

- tailored services from specification to post-integration stage
- adoption of recommended technical standards to ensure the consistency and predictability of performance and operational safety of the sound system
- in-house trained personnel on multiple aspects of integration of L-Acoustics sound systems.

L-Acoustics certifies its system integrators with official training seminars. Technical and engineering personnel are trained on theory, sound design, system set-up and rigging procedures for all systems.

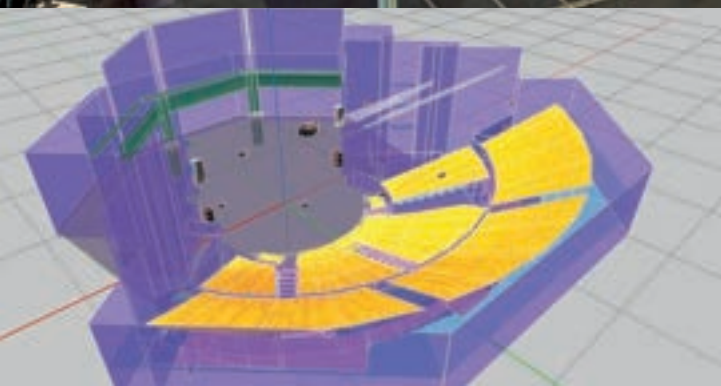
STANDING BEHIND EACH PROJECT

L-Acoustics stands behind the integrators and the consultants for every single installation project, from project analysis, system specification, engineering, integration, commissioning and maintenance services ensuring that the system will work at its best. L-Acoustics clients' benefit from dedicated manufacturer support. Sports facilities can expect the highest quality of service, whether the project is design built by an integrator or specified by a consultant and awarded through a bidding process.

STREAMLINED INTEGRATION

With 30 years of designing touring systems, L-Acoustics manufactures turnkey sound systems with an integrated rigging approach. No custom rigging is required to install an L-Acoustics sound system, which dramatically reduces design and installation time. L-Acoustics amplified controllers provide an EQ station, control and monitoring, DSP processing, and limiters all in one package, providing a full plug and play system for straightforward integration.

▲ Skylark Audio Video installing LA4 amplifiers at Rivers Crossing Community Church in Mason, OH



Currently Playing



Othello

Adrian Lester, last seen at the National as Henry V, takes the title role, playing opposite Rory Kinnear as Iago.

Edward II

John Hellewell takes the title role. The production is a contemporary take on Marlowe's play.

ADAPTIVE SYSTEM

NATIONAL THEATRE IN LONDON, UNITED KINGDOM

1,160 seats

The Olivier Theatre, named after the National Theatre's first Director, Laurence Olivier, is one of the most prestigious producing theatres worldwide. As a production house, luminaries of sound design take responsibility for each production, imparting their theatrical sound design stamp on the venue. The new sound system had to be mobile enough to be reconfigured production after production and to offer maximum flexibility to support the artistic vision of the guest sound designers.

A sound system "toolbox" based upon two technologies is provided. The reproduction of vocals is served by a fixed constant curvature central cluster of 6 x ARCS II (completed by a ring of 8XTi balcony delays) with a horizontal coverage of 135°. A mobile KARA modular line source system is deployed for the reproduction of modern music in a left right arrangement of 9 x Kara enclosures with 3 x SB18 to deliver LF contour, impact and a highly transient response. The sonic space can be divided into different zones according to production demands.



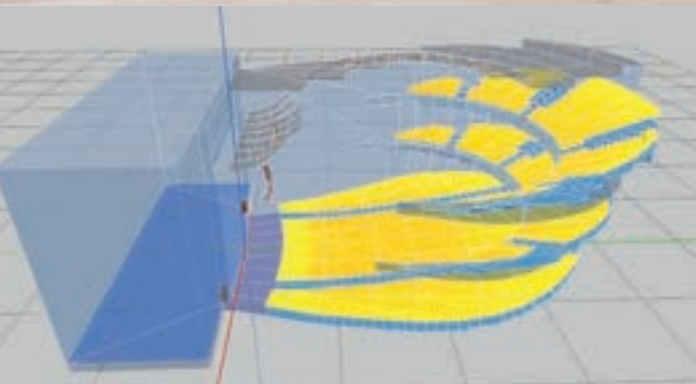
"The Olivier Theatre is an extremely tricky theatre for sound. I was knocked out when I first heard the Karas in this space. The sound is superbly detailed, and the system is extremely powerful."

Paul Arditti, Theatre Sound Designer

With the diverse range of theatre the Olivier produces and the need to cater for the requests of the world class sound designers who work there, L-Acoustics have designed a flexible system that can cater for every eventuality and allow the venue to host multiple productions on a weekly basis.

EQUIPMENT LIST

6 x ARCS II	18 x Kara	6 x SB18	8 x 8XTi	2 x 12XTi
8 x LA8				





DISCRETE INTEGRATION

CHONGQING GRAND THEATRE IN CHONGQING, CHINA

1,850 seats

The Chongqing Grand Theatre is a landmark in the region for its striking sculptural design. The Grand Theatre is designed as a world-class venue hosting opera, dance, drama, ballet, symphony and other large-scale variety shows. The integration of the sound system had to fulfill exacting architectural constraints.

In the Grand Theatre, left and right arrays, encompassing 14 x Kiva ultra-compact line source array cabinets with 4 x KILO low frequency extensions have been flown on either side of the proscenium arch. An additional 2 x 115X HiQ cabinets have also been installed on each side of the stage for infill. 4 x SB28 high-power subwoofers can be moved into different places. A fill system composed of 28 x 108P and 12 x 112P self-powered coaxials has also been installed.



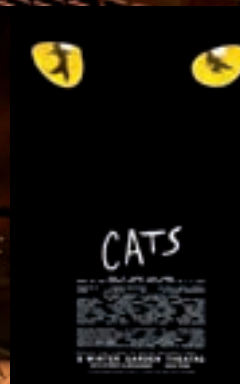
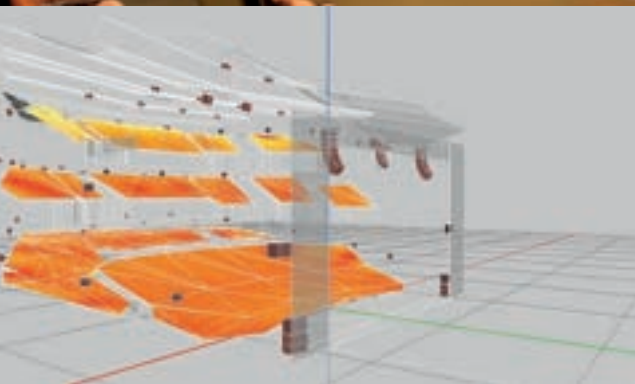
"L-Acoustics have always been a world-famous brand. The unique line source technology fits well into the architectural style and structure of the theatre."

Liu Yongyao, Technical Director - Leafun

The KIVA system provided a clean, seamless integration choice, with enhanced mobility for moving and installing the speakers according to the event taking place in the theatre. The senior designer from Muller-BBM, Mr Kuemmel said, "This is the best theatre that I've participated in designing in China. Despite the effects of the architectural acoustic environment or the sound reinforcement effect of the theatre, L-Acoustics speakers have provided the best sound for this theatre."

EQUIPMENT LIST

28 x Kiva	8 x Kilo	4 x 115XT HiQ	4 x SB28	24 x 112P
28 x 108P	4 x SB15P	6 x LA8		



FAITHFUL TO ARCHITECTURAL VISION

GUANGZHOU OPERA HOUSE IN GUANGZHOU, CHINA

1,804 seats

The Guangzhou Opera House is rated as one of the China's top three theatres and the best-equipped performing arts center in southern China. Acoustic engineers and architects were briefed to design a space to accommodate diverse performances. Sir Harold Marshall designed a unique "encircling" grand auditorium, which continues the asymmetrical streamlined architectural design of Ms. Zaha Hadid. It features a 1.6 seconds of reverberation time when at full capacity, ideal for both symphonic and drama works. The sound system had to fit within the architectural and acoustic design.

The sound system consists of 8 x Kudo and 2 x SB28 per side and a central channel of 10 x dV-DOSC line sources. The three arrays are concealed in the ceiling. Each side of the stage apron features 5 x ARCS constant curvature line sources. Fill systems feature a total of 28 x 8XT coaxial enclosures. The sound effects system consists of 33 x 12XT coaxial enclosures and 2 x SB28 subs.



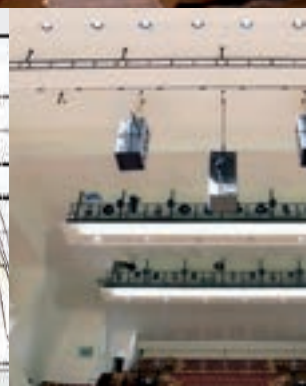
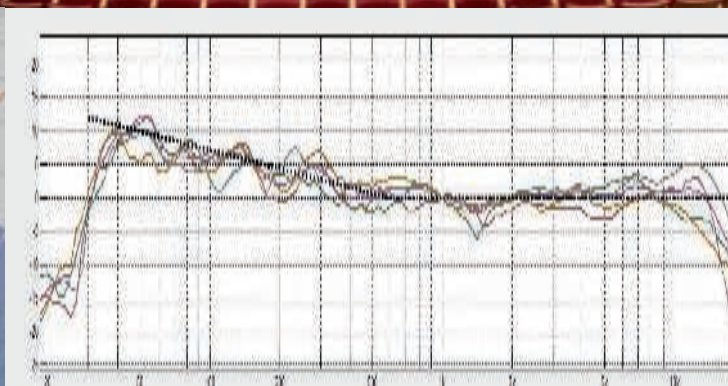
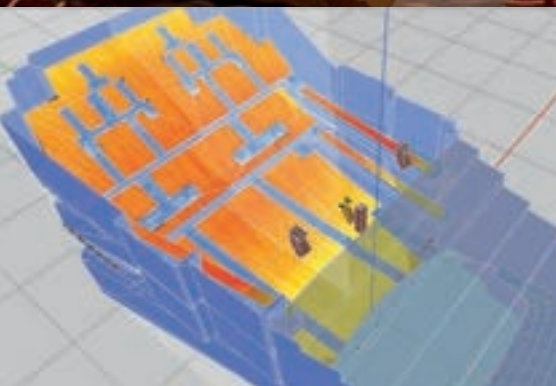
"This sound reinforcement system provides a perfect reproduction of natural and electro-acoustic sound that works very well with various types of large-scale performances"

Wilson Zhao, Supervisor of Sound - Guangzhou Opera House

Since its opening ceremony in June 2010, the GOH has hosted almost 1,000 shows. "Mamma Mia!", "Cats" and "The Adams Family" have been produced alongside world opera masterpieces such as "Turandot", "La Tosca", "Madame Butterfly" and famous ballets such as "Swan Lake" and "The Nutcracker". The GOH has been the subject of international recognition and praise for its exceptional acoustics, sound system neutrality, and performance.

EQUIPMENT LIST

16 x Kudo	6 x SB28	10 x dV-DOSC	2 x dV-SUB	10 x ARCS
33 x 12XT	28 x 8XT	4 x 115XT HiQ	14 x LA8	13 x LA4



DIVERSIFIED PRODUCTIONS

SALLE PLEYEL IN PARIS, FRANCE

1,913 seats

The Salle Pleyel is one of the most prestigious classical music venues in France with impressive art deco interiors. The current resident ensembles are the Orchestre de Paris and the Orchestre Philharmonique de Radio France. A major acoustic renovation program was implemented in the shoe-box venue between 2004 and 2006 by ARTEC. Part of this program addressed updating the sound system to diversify the venues' income stream.

A fixed central cluster of 9 x dV-DOSC modular line source enclosures is deployed to cover the announcements for the philharmonic concerts. For contemporary music from jazz to pop in a black box stage proscenium, a left right system composed of 6 x Kudo enclosures per side is completed by a 12XT stereo in-fill system. For higher SPL and impact, further systems of 3 x Kudo and 2 x SB28 can be added for the main parterre.



"Having had extensive experience with L-Acoustics sound systems, I am extremely happy to be responsible for operating the system in such a prestigious place."

Sebastien Moreau, Sound Engineer - Salle Pleyel

With the L-Acoustics system installed, a much wider range of applications now takes place in the venue. Salle Pleyel now hosts performances of jazz, world music as well as symphonic orchestras. Recent guest artists include Chick Corea, Herbie Hancock, Keith Jarrett, Youssou N'Dour, Patti Smith, Laurent Garnier, Goran Bregovic and Paco de Lucia.

EQUIPMENT LIST

12 x Kudo

9 x dV-DOSC

4 x dV-SUB

4 x 12XT

13 x LA48a



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“As an L-Acoustics Application Engineer, I have the opportunity to work with a wide range of professionals, from users to integrators to consultants. Our team offers support to audio professionals right from the early stages of their project, all the way through to commissioning and training. From small live clubs to the world’s most renowned venues, our goal is to always ensure that we offer engineering-driven advice and expertise to attain the optimum sound solution for each individual project.”

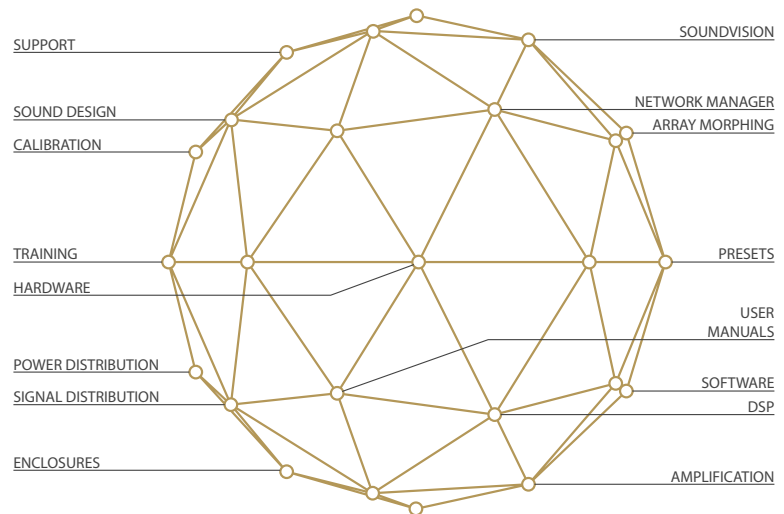
Julien Laval, Application Engineer Install at L-Acoustics

SERVICES

EDUCATION & SUPPORT

L-Acoustics' total system approach to sound goes beyond hardware and software. We offer training, show assistance, design support and on-site tuning and calibration for rental providers and system integrators. Our in-house engineers and certified consultants have been carefully selected for their skills and professional experience in the audio industry.

From basic technical and operational knowledge of L-Acoustics systems, through to providing full certification as a System Engineer, our clients will always get the best out of their L-Acoustics systems.



REFERENCES

Al Raha Theater	Abu Dhabi - U.A.E	National Concert Hall	Dublin - Ireland
Alt Opera	Frankfurt - Germany	National Doha Theater	Doha - Qatar
Austin Performing Arts Center	Austin - TX	National Grand Theater	Beijing - China
Baku Opera	Baku - Azerbaijan	Damascus Opera House	Damascus - Syria
Brno Theater	Brno - Czech Republic	Copenhagen Opera House	Copenhagen - Denmark
Carpenter Performing Arts Center	Long Beach - CA	Oslo Theater Hall	Oslo - Norway
Cemal Resit Rey Concert Hall	Istanbul - Turkey	Pallas Theater	Athens - Greece
Chunmu and Pohang Arts Hall	Pohang - Korea	Salle Pleyel	Paris - France
Cité de la Musique Concert Hall	Paris - France	Cultural Village Theater	Doha - Qatar
Figueira Casino Theater	Figueira Da Foz - Portugal	Radio City Music Hall	New York - NY
Fox Theater Pomona	Pomona - CA	Salle Raoul-Jobin	Quebec - Canada
Goteborg Concert Hall	Goteborg - Sweden	Royal Carre Theater	Amsterdam - Netherlands
Grand Auditorium Cultural Center	Macao - China	Royal Concert Hall	Glasgow - Scotland
The Grande-Duchesse Concert Hall	Luxembourg - Luxembourg	Salle des Etoiles Concert Hall	Monte-Carlo - Monaco
Guangzhou Opera House	Guangzhou - China	Sejong Cultural Center	Seoul - Korea
Helsinki Music Hall	Helsinki - Finland	Seoul-Ax Concert Hall	Seoul - Korea
Croatian National Theatre	Split - Croatia	Shanghai Oriental Arts Center	Shanghai - China
Hyogo Arts and Cultural Hall	Hyogo - Japan	Shibuya-Ax Theater	Tokyo - Japan
L'Orangerie du Botanique	Brussels - Belgium	Staatstheater am Gartnerplatz	Munich - Germany
La Cigale Club	Doha - Qatar	Suzhou Science and Cultural Centre	Suzhou - China
Lexington Opera House	Lexington - KC	The Esplanade Theater Studio	Singapore
Opéra Royal de Wallonie	Liège - Belgium	The Old Student House	Helsinki - Finland
Lille Grand Palais Congress Center	Lille - France	The Royal Danish Theater	Copenhagen - Denmark
Queensland Performing Arts Center	Brisbane - Australia	Umi Theater of Shiki Theatrical Company	Tokyo - Japan
Musical Dome	Cologne - Germany	Vantaa Martinus Concert Hall	Vantaa - Finland

Photo Credits

Cover page	Hollywood Bowl - Los Angeles Philharmonic Association Guangzhou Opera House - HUFTON + CROW Copenhagen Opera House - Lars Schmidt
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