JK Design Group

Theater Planning for Entertainment and Architecture

16921 Parthenia Street, Suite 205
North Hills, California 91343
818 895-7000 VOICE | FAX
www.jkdesigngroup.com

16 February 2016

Mr. Todd Hensley
SCHULER/SHOOK
750 North Orleans, Suite 400
Chicago, IL 60654

ASTC: Nomination of Mike McMackin for elevation to ASTC Fellowship Status

Dear Todd,

I am writing you today to nominate Michael McMackin for consideration for elevation to Fellowship status in the American Society of Theatre Consultants. It is my intent to act is his sponsor for all efforts associated with this purpose. For the purposes of this nomination, Len Auerbach and Bill Conner have agreed to write letters of support for Mike's elevation to Fellowship status and I have included pdf copies of their letters to this nomination submittal. It is at least worth noting that Mike's letters of support were authored by two members who themselves have previously been elevated to Fellowship status for their outstanding contributions to the Society. This is a strong testament to Mike's suitability for Fellowship as these Fellows actively recognize and agree that he belongs amongst them.

As defined by the By-Laws, Mike is the epitome of an individual deserving this recognition as he has rendered significant service to ASTC in multiple fashions for a significant number of years. He has consistently and repeatedly given exemplary service to the Society as a long time member of the Board of Directors, most notably serving several terms as our President.

Mike has spent over thirty years in the theatre consulting profession, consulting on several noteworthy commissions. Some of his Project highlights include: the Valley Performing Arts Center on the Campus of the California State University at Northridge, the theatre for Cirque du Soleil's KÀ™ at the MGM Grand in Las Vegas, Nevada, the San Francisco Jazz Center and the Cathedral of Christ the Light in Oakland, California. These projects as well as others he has completed have earned honors from organizations such as the AIA, USITT, the Architectural Record, the Urban Land Institute, the Themed Entertainment Association and the International Interior Design Association amongst others.

After receiving his undergraduate degree from Carnegie Tech, Mike worked in a variety of roles involved with the design and production of theatre including carpentry, electrics, technical direction and lighting design. Mike joined AUERBACH, POLLOCK, FRIEDLANDER in 1983 and became a principal in 2003. While there, he has consulted on over 100 major and noteworthy projects.

Mike joined ASTC in 1990 as an Associate Member and was elevated to Full Member status in 1993. Since 2002, Mike has served continuously in one roll or another on the ASTC Board of Directors. Mike has served two terms as President of the Society, from 2004 to 2006 and from 2012 to 2015. Additionally, Mike has twice served as the Society's Vice President, from 2002 to 2004 and also from 2009 to 2012.

During the period of his membership, Mike has personally led or contributed to numerous ASTC special Project efforts including: the Fellowship Program, the Intern Program, the Founders' Video Project, the ASTC Promotional Video Project *Yesterday, Today and Tomorrow*, and the ASTC Database Project. He has also contributed as a member and/or chairperson of the Conference and Outreach Committees and has spoken on many conference panels.

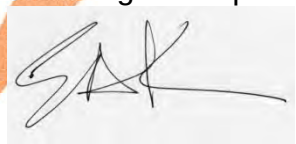
Mike has championed a series of Society efforts that have helped to keep the organization functioning effectively. Mike helped guide the transition from Ned Lustig's long time tenure as Society Secretary/Treasurer to Duane Wilson. He participated in the team that transferred the organizations archives from paper to electronic files. Mike has acted as the program coordinator and locations coordinator for many annual meetings and Forums.

In accordance to the rules for member elevation to Fellowship status as defined in the Society's By Laws, I have attached a package of materials representing Mike's professional history that includes information regarding career highlights, awards and things garnering special recognition. As mentioned earlier, I have also attached pdf copies of the two required letters of recommendation.

In conclusion, I'd like to suggest that Mike's potential elevation comes at an appropriately poignant time for ASTC having recently lost two giants dating back to the founding of the Society. Ron Jerit and Ned Lustig provided early, consistent and strong leadership of the Society in its infancy and helped ASTC to grow into the organization it has become. Mike's dedication, commitment and leadership (totally in the spirit of Ron and Ned) has embraced the challenge of taking what the founders wrought and moving it forward with the next generation of members and into the theatre of the 21st Century. It is Mike's guidance of the Society has enabled it to make that transition and while there's no claim that he is "replacing" either Ron or Ned, his leadership fills the void that they left. No other candidate embraces this connection to the past while working with such a strong and committed vision towards our future. I trust you will agree!

JK Design Group

Best regards,
JK Design Group



Edward Kaye, LC ASTC

encl

BILL CONNER ASSOCIATES LLC
637 North Marion Street Oak Park, Illinois 60302
708 437 0505 - office 708 323 1118 - fax
www.bcaworld.com

13 February 2016

Todd Hensley, ASTC
Schuler and Shook
750 North Orleans, Suite 400
Chicago IL 60554

Re: In support of the nomination of Michael McMackin

Dear Todd:

I met Mike through ASTC. His carefully spoken thoughts were immediately apparent and made it easy to see his high value as a consultant. I was impressed that he seemed committed to the ASTC as evidenced by his taking on Society tasks. I recall the database project that, while eventually ill fated, or perhaps just on a long pause, required significant research and effort

I associate the important work of looking to the future and Mike's steady efforts to develop the intern program and very significantly his continuing leadership of the ASTC USITT Venue Renovation Challenge.

I recall that as ASTC president he would reach proactively offer support for my code project work, which I appreciated greatly. This of course came with encouragement and gentle nudging to keep it up and be timely in those tasks, which I heeded - at least occasionally.

For these reasons and many other, it's with great pleasure I submit this letter without reservations in support of Michael McMackin's nomination to be a Fellow or the American Society of Theatre Consultants.

Sincerely:

Bill Conner Associates LLC

Bill Conner ASTC, ETCP CR-T

enc.

AUERBACH·POLLOCK·FRIEDLANDER
Performing Arts/Media Facilities Planning and Design

Principals
S. Leonard Auerbach, ASTC
Steve Pollock, ASTC
Steven Friedlander, ASTC
Kenneth R. Fause
Paul Garrity
Michael McMackin, ASTC
Tom Neville, ASTC

1 February 2016

Todd Hensley, ASTC
Schuler and Shook
750 North Orleans, Suite 400
Chicago, IL
60654

Via Email: thensley@schulershook.com

Subject: ASTC Fellow Nomination

Dear Todd,

It is with great pleasure that I nominate Mike McMackin to be elevated to be a Fellow of ASTC.

Mike has been a member of ASTC since 1999 and provided service to ASTC with great leadership and dedication. He has served as the President of ASTC, been a Board Director, contributed to numerous committees and fostered liaison with USITT for joint ASTC and USITT conference events.

Mike's professionalism has been exemplary at Auerbach Pollock Friedlander as a Principal and Partner. Joining APF in 1984 his tenure of over thirty years has seen him consult on and manage several hundred theatre projects. He has a strong client following that is demonstrable of his carrying the mantle of our firm and the badge of ASTC to the highest standard.

Please consider Mike as a Fellow to ASTC in recognition of his service to the organization and his standing in the profession of Theatre Consulting.

Sincerely,

Len Auerbach, FASTC
Chairman – Director of Design
Auerbach Pollock Friedlander

AUERBACH·POLLOCK·FRIEDLANDER

Performing Arts/Media Facilities Planning and Design

MICHAEL McMACKIN, ASTC
Principal

Michael McMackin brings a diverse production background with hands-on experience in theatre operations and film to his work in the technical design of audio-video and theatrical systems. Since joining Auerbach Pollock Friedlander in 1983, Mr. McMackin has provided expertise in project management and the design of theatrical, audio-video and media facilities for a wide range of projects. His projects benefit from his experience and sensitivity to complex technical theatre systems and their accommodation in architecturally sensitive performance environments.

Mr. McMackin's work in the professional theatre includes technical design and execution of special projects at the Pittsburgh Public Theatre, freelance work with IATSE Local 3 and film production work on George Romero's feature films, *Creepshow* and *Knightriders*. He also worked at Chicago Scenic Studios and the Indiana Repertory Theatre as master carpenter where he was responsible for the coordination of set construction and general theatrical system maintenance of the two-theatre facility. On his arrival in San Francisco, Mr. McMackin worked for the Lorraine Hansberry Theatre and FM Productions before joining Auerbach Pollock Friedlander.

EDUCATION
Bachelor of Fine Arts,
Carnegie Mellon University

PROFESSIONAL AFFILIATIONS
American Society of Theatre Consultants, Former President and Vice President

Audio Engineering Society

United States Institute for Theatre Technology

PROFESSIONAL ACTIVITIES
Lecturer : Carnegie Mellon University

SELECTED PROJECT EXPERIENCE

- Agua Caliente Casino, The Show Concert Theatre, Rancho Mirage, California
- Allan Hancock College Fine Arts Complex and Theatre Arts Renovation, Santa Maria, California
- Bonita Unified School District, Bonita Center for the Arts, San Dimas, California
- California State University, Chico, Bell Memorial Union Event Space, Chico, California
- California State University, Northridge, Valley Performing Arts Center, Northridge, California
- California State University, San Bernardino, San Bernardino, California
- Campbell Heritage Theatre Renovation, Campbell, California
- Campbell Union High School District, Campbell, California
- Carnegie Mellon University, Purnell Center for the Arts, Pittsburgh, Pennsylvania
- Cathedral of Christ the Light, Oakland, California
- Chabot College, Planetarium and Lecture Halls, Hayward, California
- Chula Vista High School, Chula Vista, California
- East Side High School, San Jose, California
- Electronic Arts, Redwood Shores, California
- Emery Center for Community Life, Emeryville, California
- Foothill College, Los Altos, California
- Historic Hoover Middle School, San Jose, California
- Idaho State University, L.E. & Thelma E. Stephens Performing Arts Center, Pocatello, Idaho
- Irwin M. Jacobs Qualcomm Hall, San Diego, California
- James Logan High School, Union City, California
- Joan B. Kroc Theatre, San Diego, California
- Lake Louise Study, San Francisco Symphony and SFJazz, San Francisco, California

MICHAEL McMACKIN, ASTC
Principal

- Lake Louise Study, San Francisco Symphony, Expansion of Davies Symphony Hall, San Francisco, California
- Lake Louise Study, San Francisco Symphony, San Francisco Opera, SFJazz, Joint Use Consortium, San Francisco, California
- Lamb's Players Theatre, Coronado, California
- Lynda.com, Corporate Media Hall Study, Carpenteria, California
- Macau Studio City Entertainment Center, Macau, China
- Merced Theatre, Merced, California
- Mesa Arts Center, Mesa, Arizona
- MGM Grand Hotel and Casino, *KÀ*™ for Cirque du Soleil, Las Vegas, Nevada
- MGM Mirage, Cirque du Soleil LOVE™ Theatre, Las Vegas, Nevada
- Moorepark College, Exotic Animal Training Center, Moorepark, California
- National Hispanic Cultural Center, Albuquerque, New Mexico
- New York-New York Hotel and Casino, *Zumanity*™ for Cirque du Soleil, Las Vegas, Nevada
- Pechanga Event Center and Amphitheatre, Temecula, California
- Peninsula College, Maier Hall, Port Angeles, Washington
- Qualcomm Building N, Lawn Study, San Diego, California
- Qualcomm Building Q, Lecture Hall, San Diego, California
- Qualcomm, Pacific Center Building AZ, San Diego, California
- Qualcomm, Pacific Center Building AZ, San Diego, California
- San Diego Civic Theatre, San Diego, California
- San Francisco Friends School, San Francisco, California
- San Francisco War Memorial Performing Arts Center and Veterans Building, San Francisco, California
- SandCastle Showroom, Tumon, Guam
- Santa Barbara City College, School of Media Arts, Santa Barbara, California
- Santa Monica College Performing Arts Center, Santa Monica, California
- Scripps College Music Facilities, Claremont, California
- Semiahmoo Performing and Contemporary Arts Centre Pre-design, Surrey, British Columbia, Canada
- SFJAZZ Center, San Francisco, California
- Skagit Community College, McIntyre Hall, Skagit, Washington
- Soka University of America, Performing Arts Center in Aliso Viejo, California
- Sonoma State University, Concert Hall, Schroeder's Recital Hall and Lawn Rohnert Park, California
- Stanford University, Frost Amphitheatre, Stanford, California
- Stern Grove, San Francisco, California
- The Academy of Music, Philadelphia, Pennsylvania
- The August Wilson Center for African American Culture, Pittsburgh, Pennsylvania
- University of California, Berkeley, Zellerbach Auditorium Seating Renovation, Berkeley, California
- University of California, San Diego, RIMAC Center, La Jolla, California
- University of California, San Francisco, Mission Bay Campus Community Center, San Francisco, California
- University of California, Santa Barbara, California Nanosystems Institute, Santa Barbara, California
- University of California, Santa Barbara, Campbell Hall Program, Santa Barbara, California

MICHAEL McMACKIN, ASTC
Principal

- University of California, Santa Barbara, Center for Film, TV and New Media, Santa Barbara, California
- University of Southern California, Bovard Auditorium Renovation, Los Angeles, California
- USS Midway Museum, San Diego, California
- Ventura College, Theater Renovation Study and New Music Annex Planning, Ventura, California
- Victoria Gardens Cultural Center, Rancho Cucamonga, California
- West Los Angeles College, Watson Center and Technology Training Center, Los Angeles, California
- Woodside Elementary School, Sellman Auditorium, Woodside, California

MIKE MCMACKIN, ASTC AWARDS

Bonita Unified School District, Performing Arts Center, San Dimas, California
- AIA California Council/ CASH, Honor Award, 2015
- Gold Nugget Awards, Merit Award for Best Educational Project and Grand Award, 2015
- Los Angeles Business Council, Architectural Awards, Award of Excellence, 2015

California State University, Northridge, Valley Performing Arts Center, Northridge, California
- AIA Los Angeles, Design Awards, Award of Merit, 2011
- AIA Minnesota, Design Awards, Honor Award, 2011
- AIA San Fernando Valley Building Team Award, 2011
- ENR California, Best Projects, Award of Merit, Higher Education and Research, 2011
- Southern California Development Forum, Design Award, Institutional category, 2011
- United States Institute for Theatre Technology, Architecture Awards, Merit Award, 2013

Carnegie Mellon University, Purnell Center for the Arts, Pittsburgh, Pennsylvania
- AIA/SFV, Citation Award, 1999
- AIA/SFV, Citation Award, 1998
- Society of American Registered Architects, Design Award of Honor, 2000

Cathedral of Christ the Light, Oakland, California
- AIA National Honor Award for Interior Architecture, 2010
- AIA National Honor Award for Architecture, 2009
- AIA - California Council, Honor Award, 2009
- AIA - East Bay, Honor Award, 2009
- AIA - San Francisco Chapter; Excellence in Architecture: Honor Award, 2009
- American Institute of Graphic Arts, Annual National Award, 2009
- American Society of Civil Engineers - Region 9 (California), Outstanding Architectural Engineering Project of the Year, 2009
- American Society of Civil Engineers - San Francisco Section, Outstanding Architectural Engineering Project of the Year, 2009
- Chicago Athenaeum, American Architecture Award, 2009
- D&AD British Design and Art Direction, Annual National Award, 2009
- Faith and Form magazine and the Interfaith Forum on Religion, Art and Architecture (IFRAA), Design Award for Religious Architecture: Liturgical/Interior Design, 2009
- Forest Products Society, Wood Engineering Innovation Award, 2009
- Institution of Structural Engineers, Award for Community or Residential Structures, 2009
- Interior Design, Best of Year: Institutional Merit Award, 2009
- International Interior Design Association, Best of Competition, 2009
- International Interior Design Association, Interior Design Award, 2009
- International Interior Design Association - Northern California Chapter, Best in Show, 2009
- International Interior Design Association - Northern California Chapter , Honor Award, 2009
- National Council of Structural Engineers Association, Excellence in Structural Engineering Award, 2009
- San Francisco Business Times, Best Community Impact - Inner East Bay, 2009
- San Francisco Business Times, Best East Bay Public or Cultural Space, 2009
- Society for Environmental Graphic Design, Honor Award, 2009
- Spark Awards, Architecture & Interiors Category: Gold Award, 2009

AWARDS ***(CONTINUED)***

- Structural Engineers Association of California, Award of Excellence: Landmark Structures Category, 2009
- Structural Engineers Association of Illinois, Jurors' Favorite Honor Award, 2009
- Structural Engineers Association of Northern California, Award of Excellence: Large Project, Landmark Structures Category, 2009
- WoodWorks, California Wood Design Award: Landmark Category, 2009
- California Construction magazine, Outstanding Architectural Design, 2008
- California Construction magazine, Overall Top Project, 2008
- McGraw-Hill Construction, Best of the Best Award, 2008
- treehugger.com, "Ten of the World's Most Beautiful Green Buildings", 2008
- Wallpaper magazine, Best Building Site of the Year, 2008
- *Wood De*sign & Building magazine, Wood Design Awards: Honor Award, 2008
- American Concrete Institute - Northern California and Western Nevada Chapter, Regional Architecture Award for Use of Concrete, 2007
- AIA - San Francisco Chapter, Unbuilt Design Award, 2003

Chula Vista High School, Chula Vista, California
- American *School and University* magazine, Outstanding Design, Specialized Facility, 2011

Electronic Arts, Redwood Shores, California
- American Concrete Institute, Architectural Award, 2002

Historic Hoover Middle School, San Jose, California
- California's Coalition for Adequate School Housing / Leory F. Green Design Award, Specialized Facility: New or Modernized Award of Honor, 2005

Irwin M. Jacobs Qualcomm Hall, San Diego, California
- San Diego Structural Engineers Association, Excellence Award for Landmark Structures, 2008
- The Building of America, Gold Medal Award, 2008
- The Associated Builders and Contractors, San Diego, Excellence in Construction Awards Award of Merit, 2007

James Logan High School, Union City, California
- CASH/AICC Award of Excellence, 2011
- IA Santa Clara Valley Chapter, Design Award, 2001
- AIA California Council/ CASH, Honor Design Award, 2007

MGM Hotel and Casino, KÀ™ for Cirque du Soleil, Las Vegas, Nevada
- United States Institute for Theatre Technology, Architecture Awards, Meritr Award, 2006
- TEA 14th Annual THEA Awards, Award for Outstanding Achievement, 2008

Mesa Arts Center, Mesa, Arizona
- *AZR*E magazine, Real Estate Design Awards, Most Innovative Project, 2007
- International Interior Design Association, Honor Award for Public / Institutional Projects, 2006
- Southwest Contractor, Best of Award – Best Public Building Project over $5 million, 2005
- Urban Land Institute, Award of Excellence, 2006
- United States Institute for Theatre Technology, Architecture Awards, Merit Award, 2009

AWARDS ***(CONTINUED)***

- Valley Forward Crescordia Award: Site Development and Landscape Urban Plazas, 2005
- Valley Forward Crescordia Award: Art in Public Places, 2005
- Valley Forward Award of Merit: Buildings and Structures – Public Assembly Place, 2005

SFJAZZ Center, San Francisco, California

- AIA San Francisco, Honor Award, 2013
- *Architectural Record*, Good Design is Good Business Awards, 2015
- InfoComm, People's Choice Awards, Arts & Leisure category winner, 2013
- San Francisco Business Times, Real Estate Deal Awards, Public/Cultural category winner, 2013
- United States Institute for Theatre Technology, Architecture Awards, Merit Award, 2014

AWARDS ***(CONTINUED)***

Sonoma State University, Schroeder's Recital Hall, Rohnert Park, California
- The North Bay Business Journal; Top Projects; Education Category, 2014

The Academy of Music, Philadelphia, Pennsylvania
- *Building* Design & Construction magazine, Honorable Mention, 2003
- General Contractors Association, Award, 2003

The August Wilson Center for African American Culture, Pittsburgh, Pennsylvania
- AIA Pittsburgh, Honor Award, 2010

Victoria Gardens Cultural Center, Rancho Cucamonga, California
- California Parks & Recreation Society, Design Award, 2006
- Urban Land Institute, Award of Excellence, 2006

Mike McMackin bio info

Education

Bachelor of Fine Arts in Theatre Production from Carnegie Mellon University 1982

ASTC Time Table

Joined ASTC in as an 1990 as Associate Member

February 6, 1993 – became a full member

Board Member 2002 to Present

President 2012 - 2015

President 2004 - 2006

Vice President – 2002- 2004, 2009 -2012

General

Helped to guide the organization through the transition from Ned's tenure as Secretary to Duane

Participated in the team that transferred archives from paper to electronic files

ASTC USITT Venue Renovation Challenge – Conceived and executed

Program coordinator and local accommodations for many Annual Meetings and Forums

Association leadership during two terms as President

Served on ASTC Committees

Conference Committee

Outreach Committee

Worked on ASTC Special Projects

Fellowship Program

Intern Program

Last Website Upgrade

Founders Video Project

ASTC Promotional Video Project: Yesterday Today and Tomorrow

ASTC Database Project

ASTC Inter Program

Has spoken on various conference panels.

Personal/Professional

Joined Auerbach Pollock Friedlander in 1983. Became a Principal in 2003.

Over 30 years of theatre consulting experience

Consulted on over 100 projects with APF

Lectured on theatre technology at Carnegie Mellon University

Volunteer for local San Francisco based companies including Life on the Water Theater, Stage Werks

IATSE Local 3, Pittsburgh PA – Carpenter and Follow Spot operator 1977- 1981

Motion Pictures Creepshow and Knightriders – Carpenter

Allentown Community College, Allentown PA Technical Director

Chicago Scenic Studios, Carpenter

FM Productions, San Francisco, Carpenter and Draftsman

Indiana Repertory Theatre, Indianapolis Indiana, Master Carpenter

Yukon Arts Center Grand Opening - Technical Director and technical training classes for 10 days of performances from around the globe

Western Regional Baha'i Centennial at War Memorial Opera House in San Francisco - Lighting Designer

Missmatches.com – Production Manager, Lighting Designer

A stage for soul

A brand-new, purpose-built jazz performance centre is San Francisco's newest hotbed for cool notes

For 30 years, San Francisco's SFJAZZ organisation didn't have a home of its own. It presented its annual festival and other performances in rented spaces scattered around the city. But not any longer. This year saw the opening of the SFJAZZ Center – the first freestanding facility built specifically for, and dedicated to, the creation, teaching and preservation of jazz in the USA.

Auerbach Pollock Friedlander and founding principal Len Auerbach were part of the planning and design process from the start, collaborating with SFJAZZ founder and executive artistic director Randall Kline. "Auerbach was instrumental in the creation and realisation of SFJAZZ Center," says Kline. "He listened to our wants and needs, guided us with his experience early on and helped us fulfil this ambitious dream. But most importantly, he brought heart into the project."

The firm initially assisted in studying vacant buildings that could be adapted into a jazz hall, including a retail space on Market Street, a warehouse space in the SOMA district and former military spaces in the Presidio. Although each of these buildings offered some suitable features, they did not fulfil all the criteria outlined by the team for the new SFJAZZ Center, which included access to public transit, high interior volume and a highly visible location. These spaces would have required substantial renovations yet still wouldn't have been the perfect building to suit the SFJAZZ programme. A possible joint-use venue with the San Francisco Symphony was also explored and a concept developed, but in the end SFJAZZ decided that it was time for a facility of its own.

Customised from scratch

Auerbach Pollock Friedlander then began collaborating with Mark Cavagnero Associates for a new-building project. Together they studied several locations before SFJAZZ acquired a site that was once home to a muffler shop. Even though the site had a smaller footprint than originally envisioned, it was a very good fit geographically as a result of its proximity to other cultural venues – the San Francisco Conservatory of Music and the San Francisco War Memorial & Performing Arts Center, which includes the Davies Symphony Hall, the War Memorial Opera House and the Veterans Building's Herbst Theatre. Notably, Auerbach Pollock Friedlander had previously provided consulting services for these venues.

"I look at the Civic Center/Hayes Valley area as a performing arts campus," says Auerbach. "The venues work together. Each contributes a different element that enhances the whole district but they also maintain their individuality and are a stronghold to performing arts in the city. We also considered how SFJAZZ Center would be used as it relates to our current work on the Herbst Theatre."

After finalising the location the design team – including SIA Acoustics – began the collaborative process of developing a concept for the building. From San Francisco to New York City, the team and representatives from SFJAZZ

Photos (right and above): Matthew Millman

(Above) **The auditorium design encourages a strong artist-audience relationship** (Below left) **The SFJAZZ Center is a community space and social hub** (Below right) **Its transparency makes it a beacon in San Francisco's cultural corridor**

Photo: Tim Griffith

toured and experienced a wide variety of jazz venues – from small back rooms for jam sessions, to intimate night clubs, to historical music halls. These expeditions were an essential part of the development of the design and determined not only the essence of the venue but also helped to further develop the identity of SFJAZZ.

"Underpinning all of the spatial and visual design priorities was the most important goal: to create performance spaces with the highest-quality performance and acoustic qualities throughout," says architect Mark Cavagnero. "We worked closely with Auerbach Pollock Friedlander and Sam Berkow, founder of SIA Acoustics, to create the highest-quality acoustics and a performance experience specific to jazz. While the public spaces are highly transparent, the performance hall is strong and focused. This great room is flexible and multidimensional, designed so audience members can have very different views of the performers, even from the side and rear. This required a great deal of creativity from the Auerbach team."

Flexibility and intimacy

The centre's main room, the Robert N Miner Auditorium, can be formatted in up to eight configurations – from 350 to 700 seats –

Photograph courtesy of Tim Griffith

The Robert N Miner Auditorium was visually and acoustically designed to enhance the creation of spontaneous music

depending upon the performance requirements. "Numerous iterations of the room configuration were developed for the auditorium, from the most formal to the most eccentric," explains Auerbach. "One of the biggest challenges was developing each of the various desired designs to fit within a very compact building site."

Miner Auditorium is configured for optimal intimacy, with the stage on four sides wrapped with tiered seating risers and terraces, ideal for experiencing jazz performances and other events. Flexible stage and seating configurations are achieved with manual and semi-automated platforms, stair plugs and custom portable seating. A resilient floor in the lower orchestra accommodates standing concerts and dancing by the audience and performers. The auditorium recently hosted a concert by pianist and composer Jason Moran accompanied by 10 professional skateboarders improvising tricks on a 36 x 20ft ramp installed at the front of the stage.

Designed for connection

Auerbach Pollock Friedlander was integral in the development and adaptive design of the centre's family of custom seats, which include fixed theatre seats, loose stacking seats and swivel stools. Tailor-made, they create a unified visual audience experience, providing excellent sightlines and comfort while meeting all ADA guidelines. The swivel stools, in particular, are one of the details that make the venue feel more like a club and less like a formal concert hall.

The firm also developed theatrical systems to support production flexibility, including a technical catwalk system, overhead rigging support, theatrical lighting, room-reduction banners, video projection systems, a broadcast infrastructure, piano lift and a material lift.

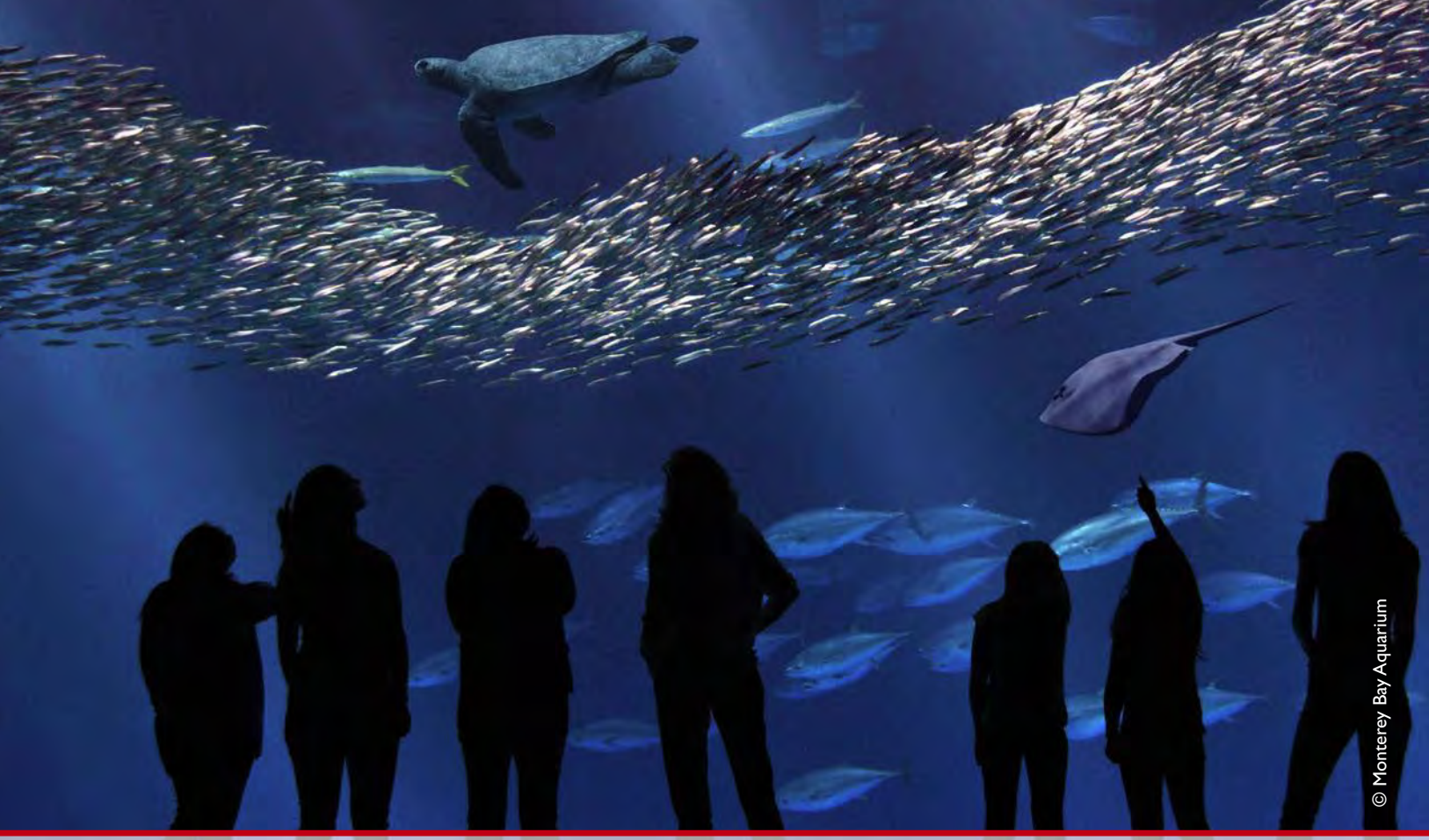
In addition to the main hall, the centre includes the Joe Henderson Lab – an ensemble room and rehearsal space that also hosts small performances. This intimate multipurpose space is accessed directly from the lower lobby and can accommodate 70 patrons.

The facility's interaction with the surrounding urban landscape plays a vital role in the overall visitor experience. The building is a three-storey glass, concrete and steel structure, with the two lobbies, street-level restaurant and ensemble room all visible to people wandering past outside.

"We wanted to lock it into the street and to have the sidewalk, the lobby and the café all open up into the public realm," notes Cavagnero. "There is no opaque wall between you and the SFJAZZ Center. Once you start engaging the neighbourhood, the neighbourhood can benefit from you – but you can benefit from it, too. The lobby isn't 25ft wide, it's 125ft when you look through an open window wall to the old brick schoolhouse across Fell Street."

The *New York Times* has called SFJAZZ Center, "a temple of jazz in California", while the *Wall Street Journal* affirmed, "This building sounds the right note". The *JazzTimes*, meanwhile, declared "jazz has an enviable new home in San Francisco". And indeed, it has. ■

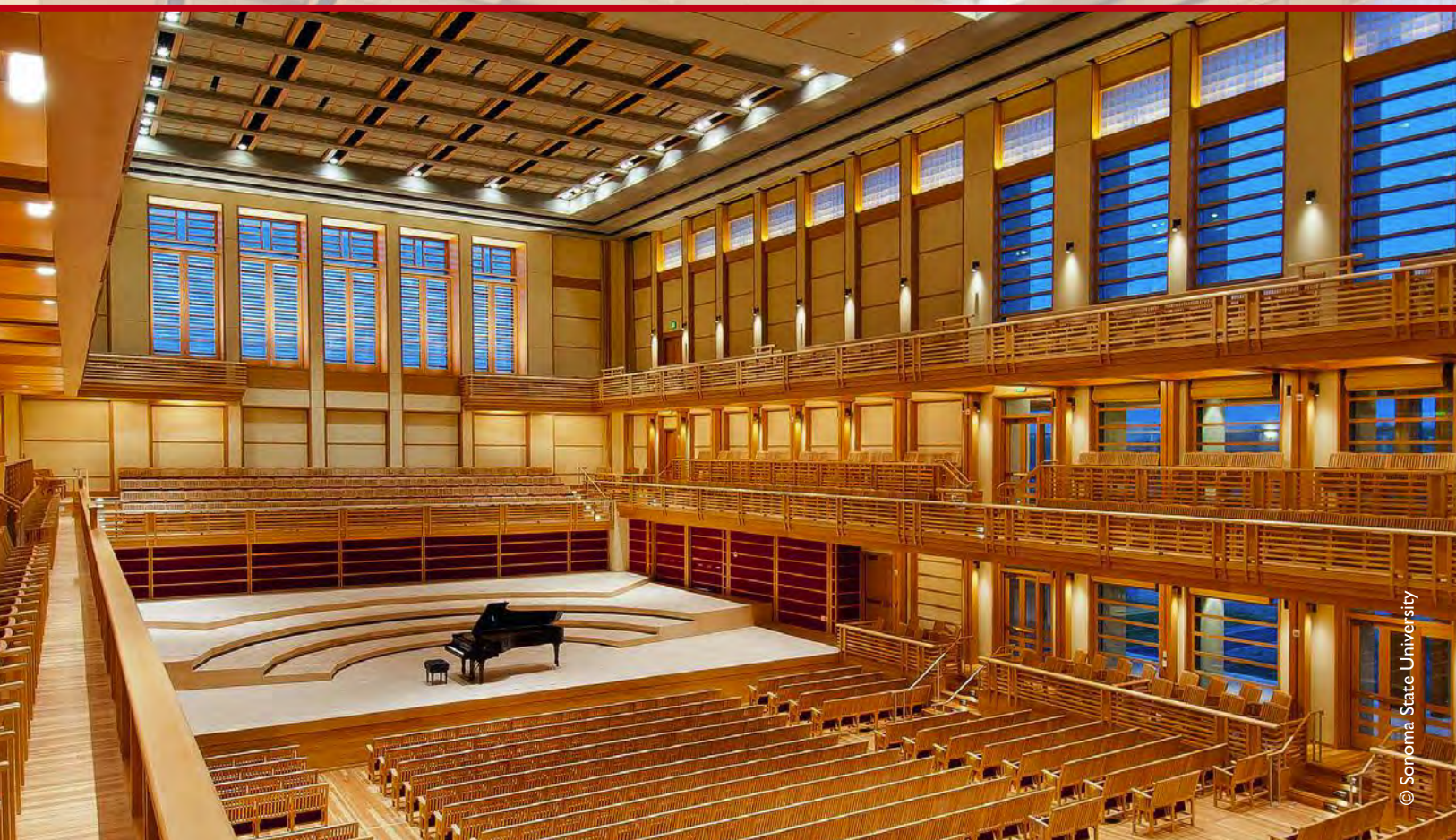
www.auerbachconsultants.com



AUERBACH · POLLOCK · FRIEDLANDER
Performing Arts / Media Facilities Planning and Design

AUERBACH · GLASOW · FRENCH
Architectural Lighting Design and Consulting

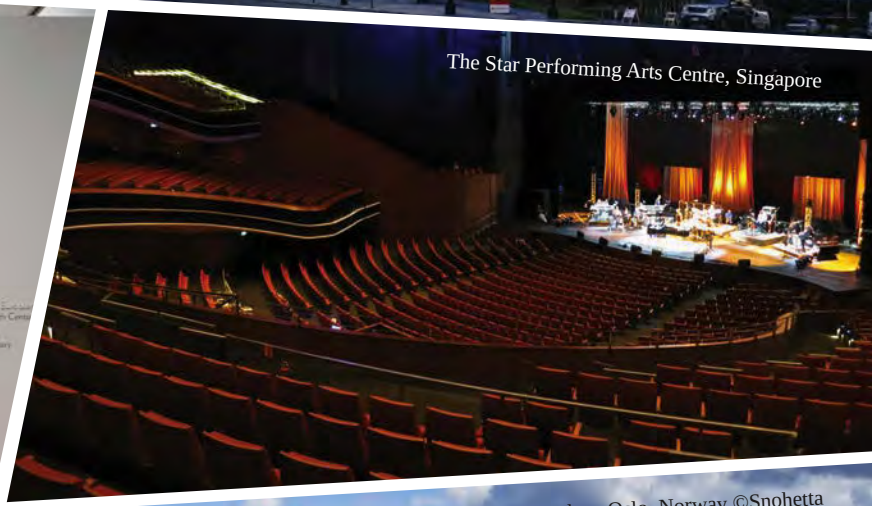
SAN FRANCISCO NEW YORK MINNEAPOLIS
www.auerbachconsultants.com · info@auerbachconsultants.com




Rose Theatre, Jazz at Lincoln Center, New York NY


Seattle Central Library, Seattle, WA ©Christian Richters


North Carolina Museum of Art, Raleigh, NC ©Scott Frances


The Star Performing Arts Centre, Singapore


HARPA, Reykjavik, Iceland


Nytt Operahus, Oslo, Norway ©Snohetta

Designing inspiring arts and culture spaces

Arup provides world class, integrated design from concept to completion, helping clients around the world deliver stunning venues for their audiences.

Acoustics, Audiovisual, Building engineering, Business and operations planning, Lighting, Multimedia, Project management, Sustainability, Technology, Theatre consulting and design

We shape a better world ARTS | www.arup.com

ARUP

www.lightingandsoundamerica.com

PLASA

April 2005

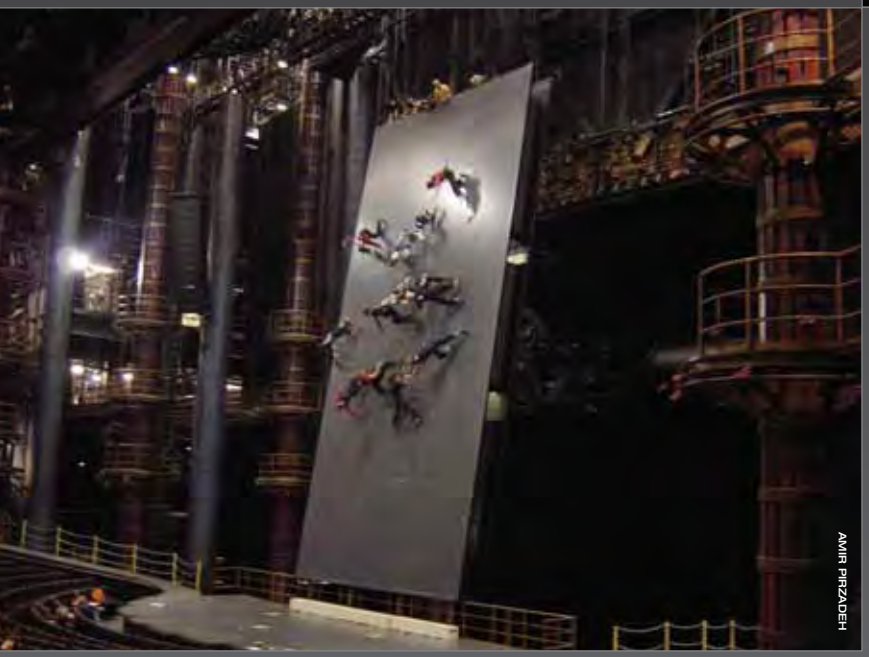
Lighting&Sound America

Entertainment, Presentation, Communication

KÀ :

THE DESIGN
THE TECHNOLOGY
THE ARCHITECTURE

Cirque du Soleil's astonishing achievement



Above: performers rehearsing one of the vertical battle scenes under work light on the Sand Cliff deck. Above right: The Sand Cliff deck rotated to a different position.

HOW DID

A look at the scenic automation,

By John Huntington

After 20 years in the business, it's rare that I see a live show and say, "Wow—how did they do that?" But when I saw *KÀ*, I was so amazed that I felt compelled to write a behind-the-scenes detail piece, something I haven't done in many years.

Under the brilliant creative leadership of Robert Lepage and the Cirque team, the technology in *KÀ* is completely at the service of the art. While *KÀ* certainly could be called a spectacle, it certainly is not a case where the technology trumps the art, like one of those depressing high-concept special-effects action movies. In many ways, *KÀ* is an example of the kind of show I've been hoping would exist—and have been advocating for—for many years, because the performers are often in control of the technology, rather than the other way around, and the technology is integral to the performance, not a gimmick. In *KÀ*, the technology allows the show to connect with and reach the audience, extending the performance; it doesn't get in the way.

Scenic Automation

There is no stage in *KÀ*. There is simply a huge pit, from which enormous performance spaces rise, descend, track, tilt, and swivel. The scenic elements were conceptualized by Mark Fisher; the Tatami Deck and the Gantry were designed by the entertainment team at the McLaren Engineering Group in West Nyack, New York, starting in late 2002; McLaren also engineered the Sand Cliff deck, which was designed by Tomcat. (The other sce-

nic pieces were done in-house at Cirque du Soleil, with the company also handling the integration of the pieces.) "Mark is a very clever man," says McLaren Engineering president Malcolm McLaren. "He thinks motion through, and he has a very good understanding of the mechanics that it takes to drive these things. So when he gives us his thoughts on how something could be actuated, he respects the laws of physics."

"so we actually had to write a cue automation front end for Nastran in Excel."

The smallest amount of power needed to make the gantry lift work as desired was "just less than a locomotive," says McLaren. After calculating all the trade-offs and determining the maximum move velocities, the resulting *KÀ* hydraulic power plant was designed for 1,250 HP continuous from electric pumps, and, according to McLaren, about 6,000HP

mic regulations resulted in a new answer of no. Therefore, the team had to come up with an enormous bracing structure for the tubes, creating a sort of freestanding 75' tall "building within the building," according to Stephen Sywak of McLaren. Many details were considered; the enormous vertical tubes are even fitted with acoustical dampers to keep them from acting like "pipe organ tubes."

A massive 6' diameter cross tube, called the "torque tube, connects the

THEY DO THAT?

projection, and show control systems in *KÀ*

The Gantry Lift

The enormous 50'x25' Sand Cliff Deck is actuated by the Gantry Lift, the largest and most incredible element of the scenic automation system—a mechanism you'd be more likely to see in an aluminum smelting plant than a theatre. The Gantry Lift mechanism can rotate the Sand Cliff Deck 360° at 2RPM (which is 12° per second) tilt it from flat up 100° (beyond vertical), and track the whole thing up and down vertically nearly 70' at 2' per second. Determining the maximum speeds of the Gantry Lift mechanism was a critical part of the design process, since a faster move meant more horsepower was needed. To make these horsepower calculations, McLaren made extensive use of sophisticated MSC Nastran design simulation software. However, Nastran "was designed for mechanics and assembly lines and so forth," explains McLaren's Murphy Gigliotti,

stored as hydraulic pressure in giant accumulators for peak usage during high-power cues. "The hydraulic power plant," explains James Tomlinson, the head of automation for *KÀ*, "will fully pressurize the accumulators (approximately 1,700 gallons) in about five minutes. The accumulator bank is reminiscent of the missile tube scene from [the 1990 film] *The Hunt for Red October*."

The Gantry Lift mechanism itself tracks on two enormous 4' diameter steel tubes that run from the lowest floor of the building to the roof, made, along with the rest of the "static" steel, by Fabriweld, of Salt Lake City, Utah, a company whose primary business is roller coasters and other enormous structures. McLaren Engineering was initially told that these tubes could be connected to the massive existing structure of the MGM's roof, but, partway through the design process, compliance with seis-

two 'hammerheads,'" says Tomlinson, "which are guided by 75- and 150-ton capacity Hilman rollers traveling on steel wear plates on the columns." The rollers, made by the Hilman company of Marlboro, New Jersey, are generally used to move massive loads, like oil rigs components, entire buildings, and bridges. Perpendicularly attached to the center of the torque tube is an arm which goes out, towards the audience, to a pivot joint called the "wrist," which, according to Tomlinson, "includes a 10' diameter Rotek bearing typically used in tower cranes," and connects to the Sand Cliff Deck itself. The moving parts of the Gantry Lift were made by Timberland Industries from Woodstock, Canada, a company whose primary business is offshore and timber harvesting equipment, giant winches and other huge mechanisms. The whole torque tube assembly and arm gets lifted, says McLaren,

"by what we understand to be the longest cylinders ever produced in North America—a 70' stroke. When they are fully extended, the cylinders are 145' long." The cylinders are so massive that they must only ever be in tension—if put under a compressive load, they might buckle.The cylinders were made by Parker, of Cleveland, Ohio and supplied (with the rest of the hydraulic system) by Atlantic Industrial Technologies, of Islandia, New York, working in conjunction with GS-Hydro U.S. Inc., of League City, Texas. Even getting the cylinders to the site proved a challenge. "We had to get special trusses fabricated," says McLaren's integration project manager, Jay Reichgott, "just to support the 75' hydraulic cylinders during transit."

The Sand Cliff Deck

The 80,000lb. Sand Cliff Deck was manufactured by Tomcat USA in Midland, Texas. Longue Vue Scenique of Montreal, according to Tomlinson, "supervised the artistic treatment of the playing surface by Tomcat staff." The deck is over 6' thick, and, according to William Gorlin, McLaren Engineering VP, consists of, "a steel primary truss structure that bolts to the slew ring. Mounted to that steel structure is an aluminum outer structure and deck system; it's configured so that you can have technicians inside to service all the pieces." During one part of the show, adds Tomlinson, "an 8 x 16' 'refuge' platform flies in from the grid and attaches to one end of the vertical Sand Cliff Deck, then moves with the Sand Cliff Deck as it rotates, tilts, and descends to the basement. It has a trap door for access to and from the Sand Cliff catwalk system."

In addition to lifts and other features of the deck, there are 80 pegs, each roughly 2' long, manufactured by Microtrol of Montreal, that can shoot out at 8' per second. At that velocity, the pegs appear to the audience in a quarter second, which is surprisingly fast since they are run by electric linear actuators. These pegs were designed so that performers can slide, swing between, and catch them when the Sand Cliff Deck is vertical. Many performers slide more than 60' from this platform to their "deaths," where they land on an enormous, hydraulically tensioned safety net in the pit, out of sight of the audience. Some falls are so extreme that air bags are placed on top of safety nets to break the performer's fall.

In one stunning scene, the Sand Cliff Deck is covered with "sand;" then the deck is raised before our eyes and the sand pours off. Real sand was originally considered but abandoned, due to weight and dust issues. The team considered walnut shells and Santoprene, but eventually chose cork. The material is contained on the edges of the deck by 3" "flippers," run by 18 electrical actuators, which are retracted when the material is dumped.

"No one wanted to be the one to flip the switch the first time. The system was so expensive and massive that there was no room for error."

The Tatami Deck

The 30 x 30', 75,000lb. Tatami deck is an amazing feat of engineering and construction, but it's actually the "small" piece on the show. The deck was named, according to Tomlinson, "because the opening scene with Tatami mats was to play there," but that scene was later moved to the Sand Cliff Deck. The Tatami deck is supported by a giant, 65' long, two-stage "drawer slide" mechanism, which is tilted at a 4° rake towards the audience from its anchorage upstage, with 45'-6" of cantilever. The Tatami deck and mechanism is actuated by 75 and 150 HP electric motors, and was built by Show-Canada in Montreal, with scenic treatment again by Longue Vue Scenique.

Scenic Automation Control

Controlling all this scenic automation equipment was the daunting challenge taken up by Stage Technologies, which has offices in London and Las Vegas. The company's Nomad system for *KÀ* controls over 40 arbor winches; 16 high-speed winches for the performers in the battle scenes, each axis with individual radio control; five lifts controlled by 26 motors; a giant bird flown over the audience, controlled via five 2,200lb winches with wings flapped by performers; the 80 pegs in the Sand Cliff deck; three small pod lifts [called "sand traps," according to Tomlinson]; 12 winches for the forest scene; 18 hydraulic safety net winches in the pit; and 16 actuators for the Sand Cliff deck's edges.

Control is highly distributed throughout the system. "We have 17 nodes in the theatre, each controlling up to 40 axes," explains Kevin Taylor, Stage Technologies' director of electrical engineering. "The desk sends commands to the nodes, and the nodes do the housekeeping, whilst the axes deal with actual position control. There are the Delta Tau [hydraulic control] nodes, 12 Siemens S7_400 PLCs, and the entire safety Estop [emergency stop] system is done using a Siemens safety PLC. In addition, we have two extra processors, one for the interlock system and the other to run the 3D flying of the bird. The consoles are connected over the primary command network, which is Ethernet, and the MaxisID internally positioning drives connect to the node PLCs over ProfiBus. A

separate high-speed deterministic network is used for synchronization. The crew uses four desks during the show, with a fifth backup in the event of a failure, and, happily, we have had no desk failures to date. In addition, we provide a local backup network with a completely independent path for controlling axes via a hand held HMI in a crisis. In the worst case, during the climb scene using the pegs, we could be running 90 axes at once. The majority of the time, we are running 20-25 axes at once. In the event of a motor failure, we can continue to run the lifts right down until only two are left. The lifts are the show, so there is a huge amount of redundancy there."

Hydraulic Control

While the Stage Technologies system provides overall control of the scenery, the hydraulics control is handled by Tisfoon Ulterior Systems, of Raleigh, North Carolina, using a Delta Tau motion-control system as a basis. "We provided Tisfoon with a spec at the beginning of the project," explains Taylor, "to enable us to make it mimic standard axes [in the Nomad control system]. The operator can instruct the axes to move to a different dead [target position] at a different speed for every cue as he so wishes." The Tisfoon system takes it from there, and also provides a local controller so that the hydraulic systems can be run independently of the Nomad. To protect the cylinders, the Tisfoon system provides "a closed loop 'charge-up' of the rod side of the cylinder before releasing the brakes," explains the company's president and chief software engineer Amir Pirzadeh. "This insures that the valves are operational and that there is oil in the rod side before the brakes are released. The load balancing is a closed-loop system on top of the regular positioning loop. This system uses the load cell information from the four cylinders to lead or lag an upstage axis (relative to downstage) for proper load balancing." The Tisfoon system incorporates a "VCR" feature, where all data related to the hydraulic systems is logged every 100ms continuously for 24 hours; if a problem develops, precise information is later available for troubleshooting. "No one wanted to be the one to flip the switch the first time," says Pirzadeh, only partly in jest. "The system was so expensive and massive that there was no room for error. I was not only the developer, but became the de-facto operator, as well."

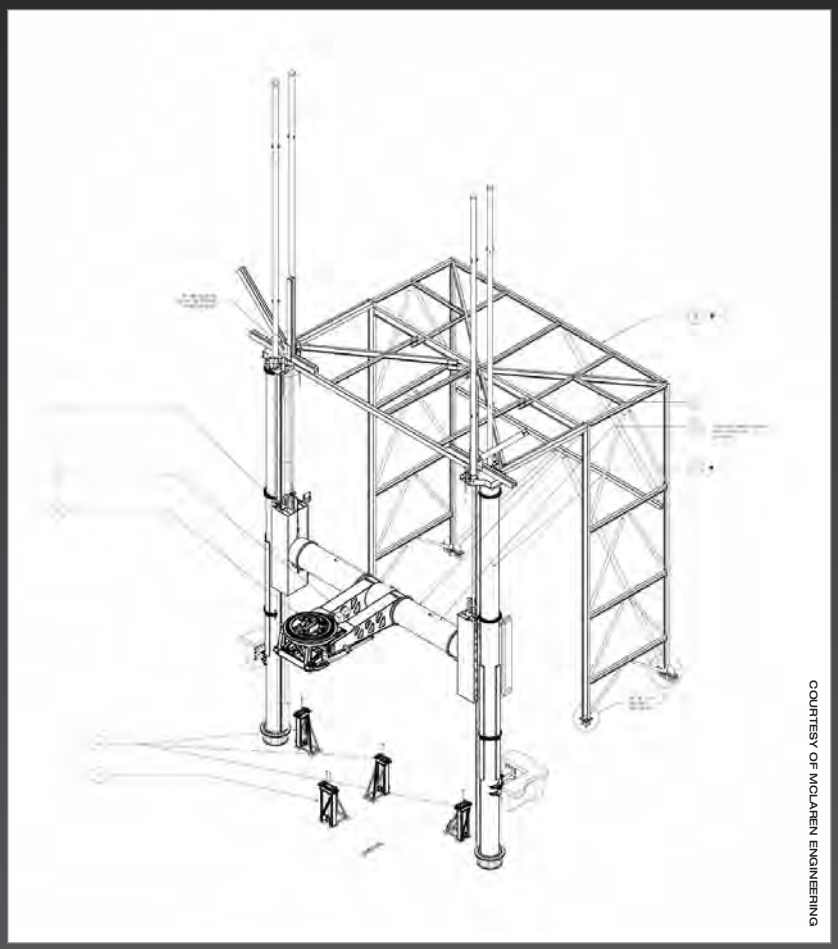
Performer Winches

Some of the most incredible scenes in *KÀ* are the "vertical battles," where performers appear to defy gravity while battling on the Sand Cliff Deck in an almost vertical position. In fact, they are supported on high-speed winches supplied by Stage Technologies. Each of the 16 performers controls his own movement through a radio control, with the transmitter in his costume, using a handset controller. "The winches", explains Stage Technologies' Taylor, "are capable of running at up to 14' per second, and accelerating and decelerating in .75 seconds. The radio units are a standard component supplied from Germany, meet the very highest standards, and, in the event of [interference], shut down to prevent unauthorized movement."

Malcolm McLaren, summing up the team's experience on *KÀ*, says, "When the Ford Motor Company releases a new car, they design it, test it, crash it, run it around the track a few thousand times, tweak it, alter it, and value-engineer it. We have to build one prototype and it has to work, with time and budget constraints. It's not easy, and the tricks just keep getting bigger and bigger."

In this work light shot, the massive Sand Cliff deck is at about mid-height, with the Tatami deck retracted upstage.

COURTESY OF MCLAREN ENGINEERING



COURTESY OF MCLAREN ENGINEERING

McLaren's schematic view of the Gantry Crane mechanism and bracing structure.

Projections

One of the most groundbreaking aspects of *KÀ* is Holger Förterer's interactive projection design. "I attempt to express poetry, emotion, and content in the language of mathematics and algorithms," he explains. "This is my artistic language, and the result on-stage is referred to 'augmented reality.' We do not use any real video footage in the imagery of the production—all images are generated on-the-fly by the projection computer in real time using physical or artificial simulation. Water, stone, clouds, air are all completely synthesized by the image computer—at the same instant they are shown—and react to the action on stage." This is the hallmark of Förterer and his team's work on *KÀ*—the performers are actually controlling the imagery that surrounds them in a fully interactive and meaningful way. While, of course, there is a tight structure and some general predictability to the performers' motions for story and safety reasons, Förterer says, "We give the performers the freedom to improvise and follow the set wherever it moves."

Tracking the Performers

The freedom to which Förterer refers is quite apparent when you see the show. In one example, a scene called "The Deep"—a giant ship full of performers is raised, and performers fall off and "drown," descending almost the entire stage space, followed by a trail of bubbles. Förterer is tracking the performers, *creating the bubble images in real time and projecting them onto the scrim*. "Here, we are using camera tracking," explains Förterer. "We are lighting the actors with invisible infrared LED light. The IR camera acquires their movement through a scrim onto which we project the bubbles. The use of infrared light is necessary to avoid feedback of the projected image into the camera and be able to light the scene brightly without the audience noticing anything. My tracker picks up movement in the scene and generates bubbles based on the size and motion of the objects causing it. This is one of the scenes where projection helps in telling the story."

Scenic Interactions

In "The Climb", "The Blizzard," and—the most astonishing scene of the show—"The Battle," Förterer not only tracks the performers themselves, but can sense how they are interacting with the scenery. For example, under the Taraflex performance surface of the Sand Cliff Deck, are sensing tiles manufactured by Les Ateliers Numériques of Montreal, which turn the entire deck into (to overly simplify for the purposes of explanation) a giant touchscreen. Förterer uses this information to create graphical waves and other images that radiate out from where the performers' feet contact the deck, or to create interactive falling "rocks" that they must dodge. "The system of sensors in the deck was specifically created for this show by the interface designer and inventor Philippe Jean from Montreal," explains Förterer. "It works on a technology comparable to the musical instrument theremin, which allows musicians to control electronic instruments by moving their hands in the air. The deck is literally able to 'sense' the proximity and presence of the artists to and on the surface. The maximum sensor depth is approximately 4". So it makes a difference if you are very close to the surface, tiptoeing, or sliding across it at a certain distance." JT Tomlinson, Cirque's head of automation, adds, "The sens-

McLaren: "When the Ford Motor Company releases a new car, they design it, test it, crash it, run it around the track a few thousand times, tweak it, alter it, and value-engineer it. We have to build one prototype and it has to work with time and budget constraints. It's not easy, and the tricks just keep getting bigger and bigger."

ing tiles system detects performer locations on a 6" grid pattern all across the deck and can simultaneously report every one of those coordinates, at 60Hz, via Ethernet."

With all that imagery created in real time, Förterer then projects it onto real, physical, three-dimensional, moving scenery, and the approach is so effective that many in the audience won't even realize they are looking at projections. To accomplish this, Förterer must track the movements of the scenery exactly. The projection system "listens to positions that multicast out through the Nomad system," explains Kevin Taylor, Stage Technologies director of electrical engineering. "The positions from this system are sent every 50msec, and because of the size of the pieces a lot of the data is sent in 1,000th or 10,000th of a degree resolution." To cope with the latency of the various systems, and potential encoder error, Förterer says, "We actually use an adaptive physical model that predicts the position of the stage into the future and smooths those values correctly to avoid both lag and jitter, so we're always on. I was surprised myself to see this work smoothly after punching in the maths for a month, but I think we mastered something you could never pre-cue or plan, since every show will not only be slightly different on the artistic, but also on the technical side."

Projecting it All

Three converged Barco Director R18 DLP projectors are used to give the required brightness and project from the back of the auditorium to create a canvas across a large part of the performance area. "Theoretically, we could project onto any moving surface within the show," explains Förterer. "We are using different convergence files [which call up different projector settings] to take care of the depth ranges. We are also using dousers in the drowning scene to avoid hard edges of video black resulting of the coupling, and to be able to kill all projection in an emergency." All projections on the main moving stage use 3D modeling, "but we use a technique [similar to] the bubbles in the drowning scene to match the position of the actors one-by-one,"says Förterer. "A two-dimensional distort[ed] image would not have hit the main stage without causing warping on the close or far edge."

Infrastructure

Förterer needed a lot of computer horsepower and I/O for this project, and also had to ensure that the system can be maintained and updated over the projected 10-year run of the show. "We are using dual-processor PCs," he explains, "to ensure fast calculations and display of all virtual simulation and imagery. We kept away from most proprietary packages. Windows-dependency was reduced to a minimum; we are using OpenGL, and we skipped using the Intel Performance Libraries, since I strived for minimum dependency on the platform or processors used. Not too many portions of the code would have to be rewritten if the [IT] market went berserk for whatever reason."

With projections so critical to the show, Förterer had to also ensure that there was sufficient redundancy in the system. "We have a backup PC for all vital systems," he explains. "Switching to backup systems is partly automated. On a crash of the main computer, the backup computer would automatically take over within a maximum of two seconds, causing the Barco projectors to smoothly fade into the new system's video output. This would be much faster than the operator could diagnose the problem and react by himself."

The front end for the system is actually a lighting desk, and, says Förterer, "we are not connected to the rest of lighting, to avoid both systems going down at the same time. Luc Lafortune prepared backup lighting if projections should fail—and if a certain part of lighting should, we are still ready to go."

Show Control

As a show control guy who has seen and enjoyed almost every Cirque production since 1991, it has always bothered me that some of the cue timings across and between departments were not as tight as they could have been. This is not the case on *KÀ*, and this is partly because of the use of show control for certain aspects of the show. A widely misused and misunderstood term, show control simply means interconnecting more than one pro-

COURTESY OF STAGE TECHNOLOGIES

Two screen captures from the Stage Technologies Nomad scenic automation system showing some of the show's systems.

duction element control system (scenery, projections, sound, etc.), and on *KÀ*, says Förterer, "our system is networked to quite a few systems in the theatre." The projection system receives positional data from the scenic automation systems as detailed above, and then also communicates via Ethernet to sound. "We get data from projections," explains sound designer Jonathan Deans, "and then convert it (via MAX MSP [software]) to MIDI to trigger our effects." In some scenes, this structure allows performers to not only generate imagery interactively, but trigger sound effects as well. Cirque has recently been implementing show control systems on its cruise ship projects. However, for the more traditional shows, *KÀ* is "the first attempt for two departments to link," according to Deans, who has worked on many Cirque productions for more than 10 years.

Rigid, time-based control is what most people think of when they think of show control, and this approach has become routine in many shows today. However, the distributed and interactive interconnection seen on *KÀ* and other recent projects is an even more interesting and powerful way forward, and is one that I hope we will see more of in the future from Cirque and others.

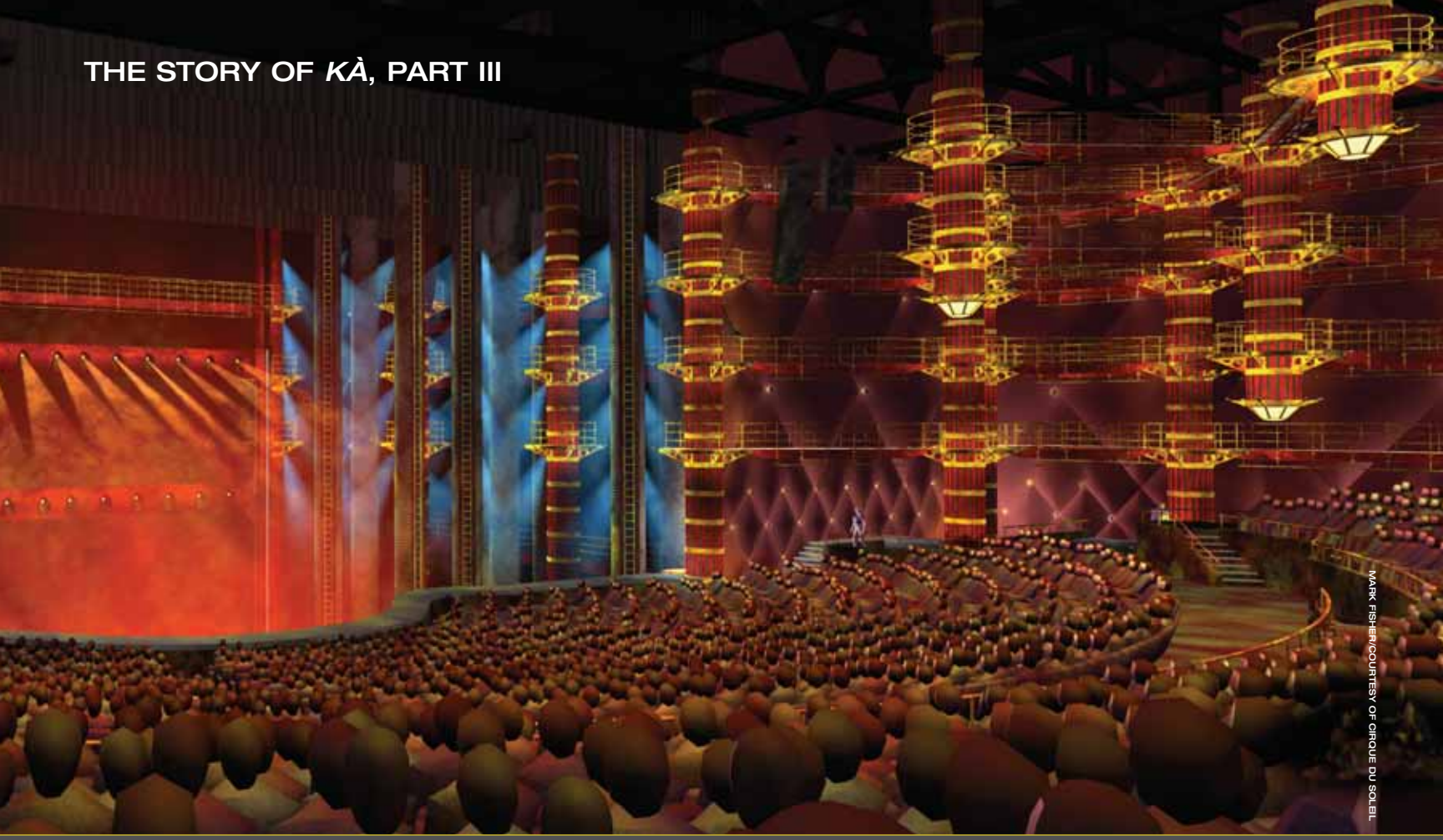
Everyone I know is tiring of me talking about this show, but I have to say that *KÀ* is now Mecca for anyone interested in the intersection of art and technology for live performance. You should make the pilgrimage yourself, and it's worth plopping down $150 for the ticket, as I did. *KÀ* sets a new standard in artistic use of technology, raising the bar so high I'm not sure who will have the imagination and resources to exceed it.

(John Huntington is an Associate Professor of Entertainment Technology at NYC College of Technology, and is author of the first book on entertainment and show control: Control Systems for Live Entertainment. *He can be reached through his consulting company at http://www.zircondesigns.com/.)*

Förterer: "I attempt to express poetry, emotion, and content in the language of mathematics and algorithms. This is my artistic language, and the result on-stage is referred to 'augmented reality.'"

TOMAS MUSCIONICO

Förterer's projections can be seen clearly in this photo, although to fully appreciate them you have to see them in motion.



MARK FISHER/COURTESY OF CIRQUE DU SOLEIL

INSIDE THE THEATRE

How a Vegas showroom was remade into the home of *KÀ*

By David Barbour

The theatre that houses *KÀ* has been described here as a unique space; its most extraordinary aspect may be that it was achieved within the confines of an existing building. The former home of *EFX* was reduced to a shell and a completely new theatre and lobby put in its place, accommodating the design and production requirements of Cirque du Soleil.

Although Mark Fisher is the designer of the theatre, its execution was an ensemble effort, involving architect Marnell Corrao Associates, theatre consultant Auerbach Pollock Friedlander, acousticians Pelton Marsh Kinsella, production manager Stéphane Mongeau, technical directors Paul Bates and Matthew Whelan, vice-president/production Luc Plamondon, assistant vice president, production Gabriel Pinkstone, and senior supervisor/theatre projects Don MacLean, among others. In addition, architectural lighting was designed and specified by Auerbach Glasow. The two Auerbach firms will be familiar to readers of this magazine—their many credits include the Judy and Arthur Zankel Hall at Carnegie Hall, the Borgata Hotel Casino and Spa in Atlantic City, and the theatre for *Zumanity,* another Cirque du Soleil show in Las Vegas. Pelton Marsh Kinsella has provided services for numerous theatres and performing arts centers across the country as well as venues such as the Golden Moon Hotel and Casino in Choctaw, Mississippi Marnell Corrao has worked for such hotel/casino players as Harrah's, MGM/Mirage, and Wynn Design and Development.

As has already been stated, perhaps the most unique aspect of the theatre is that it lacks a traditional stage. Instead, the show takes place within a 50' deep cavity filled with moving scenic elements. (According to Michael McMakin, project manager, a basement was already in place

from the building's previous life, but, he adds, "A fair bit of excavation was required for the gantry lifting columns.") Because the performance extends into the audience, the boundaries are blurred between show and spectators, a unity that could probably only be achieved in a situation where the theatre and set designers are the same person.

First, the floor area of the stage was removed, creating an abyss housing the five stage lifts, resulting in a total of 4,950 sq. ft. of flexible staging area. In addition, the theatre configuration was altered, from a cabaret space filled with booths, tables, and chairs, to a theatre that seats 1,951 audience members. In addition, a new set of catwalks and grid decking over the seating area was added for performer access and lighting and technical systems in the front-of-house area. The control booth was reconfigured to allow space for the production's extensive lighting, audio, projection, and automation controls. The control suite features 2,850 sq. ft. of booth space and 170 linear feet of glass; it offers a view of the entire performance area.

Meanwhile, the building's infrastructure had to be totally reworked to accommodate the production's extensive technical needs. All spaces, including rehearsals halls, technical offices, training rooms, dressing rooms, shoe and costume maintenance areas, green rooms, and a new annex (housing Cirque du Soleil offices, support facilities, and a rehearsal room with a full-span overhead gridiron) were interconnected with sound, video, and communications from the stage area. New structural supports were added for the extensive automated rigging system, including an 82' long hoist-support structure in the arbor pit, as well as a 37' long "battle-hoist" structure on the grid. A series of new company switches and equipment power were distributed throughout the theatre, for chain hoists, special effects, and specialty equipment. And a new multi-tiered rigging system was developed at the grid level to allow for sophisticated stage automation systems. (Jaque Paquin conceptualized and designed, with Pierre Mase the theatre's rigging and acrobatic systems; project manager Jeremy Hodgson, working with Tom Neville of Auerbach, developed the system).

Also, three high-speed data and communications networks were installed in the space. These independent systems are set up to ensure that the automation, lighting, and hydraulic systems can function separately and also be synchronized. Each system is provided with a minimum RAID-1 shared-drive array to help ensure system redundancy.

In order to achieve many of the staging effects discussed in the previous articles, Auerbach Pollock Friedlander developed an infrastructure for the stage machinery to Cirque's criteria. This included a number of elements, such as the five stage lifts previously referred to. Also, 40 individual counterweight-assist automated hoists were mounted in the newly configured arbor pit area. These hoists automate the operation of lighting pipes, special effects, curtains, and scenic elements. Five 1,000kg specialty hoists were designed for flying human scenery in a circular path over the audience and back into the stage area and six 1,000kg specialty hoists were designed for large scenic transitions.

An additional 16 high-speed hoists are used for flying human scenery for a dynamic encounter sequence involving several performers. Here is another instance in which the performers control the technology: each of them controls his or her own hoist via a wireless controller integrated into his or her costume. Using this system, one can travel up or down at a maximum of 4' per second. There are also 18 high-speed mooring hoists to enable the rapid deployment of the safety nets used in the battle sequence. These hydraulic hoists can deploy the safety nets in less than 10 seconds. Then there are the 80 high-speed scenic pegs, mentioned earlier, which are actuated from within the Sand Cliff Deck.

The implementation of the Gantry and Sand Cliff Deck was also a group effort. Jay Reichgott, the systems integrator of McLaren Engineering, coordinated the installation, tuning, and acceptance-test procedures of the Gantry. Jeremy Hodgson, Cirque's automation project manager kept an eye on the project. Project manager David Prior coordinated the fabrication, installation, and integration of the Sand Cliff Deck, working with Tomcat. During the acceptance test procedures, Tom Neville of Auerbach, served as facilitator. The Sand Cliff Deck system, the largest ever installed in a theatre, makes it possible to move a 280,000lb. scenic element at 2' per second.

There were extensive rigging and automation issues to be addressed, as well. The theatre's fly tower was re-rigged with manual and counterweight-assist linesets. The working areas over the stage and audience were equipped to support motorized spot winches.

Working together, the lighting staff at Cirque du Soleil, including lighting designer Luc Lafortune and lighting director Jeanette Farmer, and Auerbach Pollock Friedlander developed one of the largest and most complex theatrical lighting networks ever designed for a single venue. A completely new dimmer system was installed, consisting of 24 Strand SLD series dimmer racks in three dimmer rooms. Two thousand twenty-six 20A dimmers and forty-five 50A dimmers are network-controlled. All dimmers are status-reporting, with local PCs running Reporter Pro for this purpose in each dimmer room. In addition to

Mark Fisher's stunning picture of the theatre reveals many key characteristics, including the Post and Beam structure.

the main dimmer racks, two remote dimmer packs are located in the Sand/Cliff Deck and are controlled via wireless Ethernet.

There is extensive distribution of 20A and 50A dimmed circuits, utilizing custom-fabricated plug boxes. A wide-ranging system of cable trays was installed throughout to allow multi-cable distribution from these circuit boxes to virtually any light fixture hanging in the theatre. Emergency power transfer to selected architectural circuits is handled with six 24-circuit, UL 1008-compliant emergency transfer panels. All networked power circuits for consoles, PCs, and other sensitive computer-grade components are on dedicated centralized UPS circuits. A large system of switched loads of 120V single-phase and 280V single-phase are distributed throughout the theatre and are under network control.

Lighting control is provided by two Strand 550i 54-submaster consoles, each with 6,000 channels and quad video displays; four Strand 520i 24-submaster consoles with 6,000 channels and dual video displays; two Strand 510i rack-mount consoles with 6,000 channels, and two High End Systems Wholehog II consoles with Strand ShowNet network nodes. Forty universes of DMX can be mixed and matched to any of the 100 double-network taps distributed throughout the theatre. Sixty portable SN 110 nodes are available, all using power over Ethernet ports. There are five wireless data access points allowing use of handheld wireless remotes, and/or a remote wireless notebook for console video displays anywhere in the theatre. (Michael Lay was project manager for Strand).

All network equipment is housed in nine racks interconnected with three fully redundant fiber-optic backbones. All network switches/hubs are managed and patch bays are included for all taps and nodes. AMX-based card racks are also located in the racks for use of touch screens for network, house, and work light controls, and network video distribution electronics for touch screen feeds. In addition, the racks include space for system file servers and rack-mount consoles. Remote AMX-driven color touch screens, in both fixed and portable configurations, are located throughout the theatre for use by stage managers and lighting technicians to control cue lights, rehearsal lights (featuring digital virtual sliders) and to view remote stage video feeds.

Beyond lighting, extensive sound, video, and production communications systems were designed for the space in close cooperation with Cirque du Soleil's audio staff and Jonathan Deans. The Level Control Systems (LCS) computer-controlled audio matrix and processing system is in three sections: front-of-house, stage monitoring, and VRAS. The front of house system controls 144 sources in 184 matrix outputs. LCS is also used to control the stage monitoring system with a 112 x 80 matrix. Modular Cue Console control surfaces are used for sophisticated live mixing and routing control of microphones and other musical instruments and effects sources. The LCS Virtual Room Acoustics System (VRAS), as has been previously discussed, is used to enhance and augment room acoustics, providing real-time ability to alter reverberation time and delay characteristics as needed, using a 40 x 128 routing matrix and special DSP processors.

Much more gear was specified for the production. Eighty-eight channels of Aphex remote-controlled microphone preamplifiers are provided. More than 90 primary and surround loudspeaker systems by Meyer Sound (MILO, CQ, and UPA series) Nexo (PS series), and EAW are located throughout the stage and auditorium. Effect processors are by t.c. electronic, Presonus, dbx, Klark Teknik, and Aphex. Sennheiser provided 16 wireless mic channels.

In terms of communications systems, a 72-port Clear-Com Matrix-Plus-3 digital intercom system is interconnected with a Clear-Com 72x8 analog matrix and 24 channels of Telex wireless intercom. More than 16 channels of in-ear monitors and 10 IFB monitor channels feed 100 receivers. Backstage monitoring is provided by a BSS Soundweb computer-controlled monitoring and paging system. The lobby playback systems use Tascam 2424 hard-drive players and BSS Soundweb computer control and routing systems, which feed Electro-Voice special effects loudspeakers. Custom theatre seating was supplied by Irwin Seating; as Leonard Auerbach himself notes, "The customized chairs were critical to the integration of a stereo pair of loudspeakers for each patron concealed in the back of each seat."

Also, more than 25 production

In Fisher's design, even though the theatre is quite large, it retains a notable sense of intimacy.

fixed-focus and remote-controllable color video cameras are routed through a modulated video system for monitoring performers, musicians, and critical backstage systems. An FM assisted-listening system for the hearing-impaired is provided.

The theatre is designed to provide lighting that will begin transporting audience members to the magical world of KÀ as soon as they enter the theatre. Guests enter from the casino into a dark, low-ceiling space with lights the color of glowing embers. Large tree trunks, banded with light, marks the edge of the main lobby, where the ceiling soars to expose the full height of a wall, which appears to be an inverted ancient ship's hull. Colored light plays on the surface of the vessel wall. Before the performance, musicians located in the trees play the strings of a giant harp.

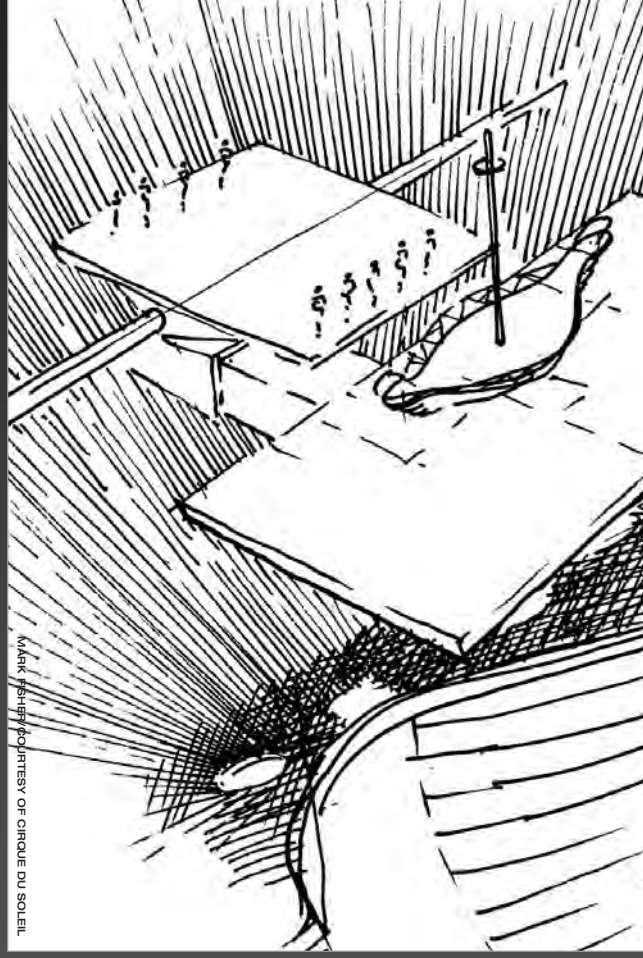
The main lobby theatrical lighting, designed and project-managed by Farmer (drawing inspiration from Fisher and Lafortune) is provided by ETC units, using color and pattern projectors to light the floors, metal mesh wall curtains, and stringed harp. ETC Source Four Zooms light the vessel wall. Other Source Four Zooms with gels light the lengths of the harp strings. Mole-Richardson Nooklites mounted to the exposed structural beams are inspired by the Post and Beam design. Surface-mounted MR16 monopoints, by BK Lighting, are recessed into the floor to reinforce the shape of the curved glass wall and uplight the glass fins.

Openings in the vessel wall led to the concession counters and public rest rooms. These spaces have an industrial feel, with metallic painted finishes and glow acrylic panels in the ceiling, walls, and the fronts of the counters. Fluorescent strips with dimming ballast and T8 lamps are mounted so as to be visible behind the acrylic panels. Prescolite recessed adjustable MR16 downlights with colored lenses light the counters. Compact Shaper Lighting fluorescent sconces with dimming ballast create a sense of glowing portholes leading to the rest rooms.

Entering the audience chamber from the lobby, one passes through a sheet of saturated blue light into a glowing blue entry vestibule. The blue light is created by a fiber-optic narrow beam wall-grazer by Glass Illuminations mounted in the ceiling behind the first set of doors. Mounted on the ceiling line at the side walls are Color Kinetics ColorBlaze fixtures with blue LEDs to fill the void with blue light. Recessed Prescolite adjustable MR16 units with blue glass filters provide pools of light at the entry doors.

In the audience chamber, the ramp is lit with Architectural Area Lighting Occulus fixtures above the entry doors. Architectural MR16 and PAR lamp fixtures are integrated into the Post and Beam structures. The house lighting system uses Kurt Versen fixtures mounted halogen downlights, each customized with a yoke and top relamping feature. The fixtures are mounted to the technical catwalks above the house and have narrow or medium distributions based on throw distances. ETC Source Four PARs mounted to the Post and Beam structure and Prescolite recessed adjustable downlights under the control booths supplement the catwalk fixtures to provide uniform lighting. Bega low-voltage halogen step lights are recessed into the walls for egress lighting. Tivoli warm white LED seat lighting, on dimmers, provides egress lighting during the performance. (Again, division of labor was key; Auerbach's house lighting system, with the exception of the Occulus fixtures and a few others, is mostly used as work light; Lafortune designed the pre-show lighting).

All this happened in a very short 12-month schedule. It's another case of typical Cirque magic, with a little help from their friends.



An early Fisher sketch shows the absence of a stage with one of the deck's rising up, bearing performers and scenery.

DESIGN
HGA ARCHITECTS AND ENGINEERS

Valley of dreams

It's been a long-time coming, but the Valley Performing Arts Center in California was certainly worth the wait

The history of Los Angeles' San Fernando Valley (the Valley) is one of optimism, resilience and tenacity. As recently as 1935, a new mountain pass spurred development among rural farms and orange groves. After World War II, the Valley became the nation's fastest-growing region. Today, almost two million people and half the land area of Los Angeles are within the Valley.

The story of the Valley Performing Arts Center (VPAC) at California State University Northridge (CSUN) shares these same qualities – for more than 30 years Valley residents dreamed of having a major performing arts venue. Persevering through the 6.7-magnitude Northridge earthquake in 1994 and statewide budget cuts in 2008, the venue opened in January 2011.

In 2002, HGA Architects and Engineers, along with acoustician McKay Conant Hoover, and theatre consultant Auerbach Pollock Friedlander, developed a feasibility study and project brief for CSUN. Design work began several years later. "HGA immediately recognised the challenge of designing the first large performance venue in the Valley," says Jamie Milne Rojek, project manager for HGA. "With inevitable comparisons to the Kodak Theatre and Disney Concert Hall, the VPAC would be an important venue in Los Angeles. But it needed to exceed expectations and respect the Valley context."

The stunning new VPAC is a five-level, U-shaped building with central courtyard designed as an integrated facility supporting academic and cultural programmes, regional, national and international performers, and entertainment including the film industry. The VPAC includes space for the Theatre Department – a 178-seat experimental theatre with dressing rooms, light lab, costume shop, design studio, and scenery/props shop. It also houses a 230-seat lecture hall, rehearsal and events spaces, and KCSN Radio. Throughout the facility, the architectural and engineering systems are designed to meet the most stringent acoustic and technical requirements for learning, teaching, performance and live broadcast.

At the heart of VPAC is the 1,700-seat Great Hall – a multipurpose performance hall for

Photos: Tom Bonnet Photography

Valley Performing Arts Center (clockwise from top left)**: VPAC central courtyard; Great Hall rehearsal and events room; grand lobby; lobby view from west**

orchestra, opera, contemporary music and dance, film, and the spoken word. Few halls are programmed for everything from classical music to cinema with the expectation of great acoustics, but VPAC has achieved that goal without compromise to acoustics, ambiance or aesthetics of the space.

The concert hall features sinuous wood ribbons wrapping the front of auditorium walls and balconies, while a ripple effect is created at the ceiling. These unique design elements are carefully integrated to accommodate acoustic, audio, lighting and technical adjustments to successfully host a wide range of performances. Stainless steel mesh panels line the side and back walls and conceal the acoustic absorption when deployed in the room. Through this innovative design, the hall accommodates fine-tuning, yet retains its dramatic appearance regardless of acoustical transformations, allowing for an acoustic environment that is second-to-none in Southern California.

Acoustic levels

Before opening night, the acousticians tested the limits of tuning during several beta-test performances including orchestra, jazz, strings, piano, chorus and solo voice. This resulted in nine primary variable-acoustic settings for the owner to start with. Deploying all absorption creates a low 1.25-second reverberation time for film and other heavily amplified works. When all absorption is stored, the reverb time becomes 1.8 seconds with a full audience, like many of the world's finest concert halls. This tuning capacity is garnering high marks from top sound mixers, performers and music critics. The digitally controlled sound-reinforcement system has three loudspeaker line arrays, eight subwoofers, surround sound speakers and an entirely unobtrusive system to facilitate addressing the audience during unamplified concerts.

The VPAC can support any touring productions. Moveable screen-wall gates hide the trash and loading dock space for two

semi-trucks. The stage, 35m-wide and 15m-deep, has an adjustable proscenium frame and 60 manually controlled line sets for stage scenery, draperies and lighting. An easily accessible grid iron is 23m above the stage and the sprung wood floor has a 4 x 8m modular structurally framed trap. The 636 theatrical lighting circuits can be individually controlled by computer or remote touchscreen panels.

A custom orchestra shell complements the audience chamber and provides the necessary acoustic performance, while the 8m modular tower units along with ceiling reflector panels can be set up in less than an hour. The orchestra pit lift can be raised for audience seating or to create a stage extension. The house 'sound-mix' lift allows the console to be lowered into a storage area under the auditorium and replaced by removable seats. Pre-opening testing was also conducted by the theatre consultants to ensure success on opening day.

Architecturally, a compelling aesthetic composition was created by marrying the modern aesthetic sensibilities of the campus and community with a contemporary sculpting of space. Prominent placement on the south campus edge presented a new public face for the university. From the drop off, a curved stone wall and a reflecting pool wrap the entry. Glazed lobby spaces with their stepped balconies

Great Hall view from Parterre towards stage with orchestra shell in place – sinuous wood ribbons wrap the audience; (bottom) **Great Hall with orchestra shell towers spaced apart**

make the audience the stars, while offering crowdpleasing views of the surrounding mountain ranges. A roof terrace also allows for spectacular views.

Patrons in the lobbies, art gallery and founders' room can view the VPAC central courtyard below, where the theatre rehearsal studio can spill out by raising a glass panel door. The large rehearsal and events room, meanwhile, overlooks one of the last remaining orange groves in the Valley.

KCSN Radio surveys the site's 170 new trees, and the campus mall from its prow on the arts walk, which connects to parking via a botanical garden. The thoughtful convergence of plazas, balconies, and stairs weaving in and out of the building create unique gathering spaces and surprising vantage points.

How green is my Valley?

When setting sustainability goals, the university was not motivated by certification possibilities but rather by doing the right thing. HGA architects' and engineers' commitment to sustainability resulted in an environmentally sensitive and resource-efficient building and site, and ultimately LEED Gold. On top of that Los Angeles now has a new icon in the Valley. ■

www.hga.com

INTERNATIONAL
artsmanager

Grand designs

Maria Roberts meets the theatre consulting masterminds behind some of the world's foremost arts venues

Based in San Francisco, and with offices in New York and Minneapolis, Auerbach Pollock Friedlander is an international design consultancy firm for performing arts projects worldwide. Its portfolio includes state-of-the-art work on opera houses, professional repertory theatres, concert halls, performing arts training facilities, museums, planetariums, and even popular entertainment venues in theme parks, casinos, cruise ships and nightclubs, spanning from Las Vegas to Beijing.

Shanghai Grand Theatre, Carnegie Hall's Judy and Arthur Zankel Hall and Berkeley Repertory Theatre are just some of the many projects that APF have impressed with its very modern stamp.

Services cover all aspects of theatre design, from planning and programming through design, documentation and construction administration to the detailed development of all theatrical systems, including sound, video and communications. (Its client base includes the spectacular Cirque du Soleil.)

In California's wider Bay Area, the firm, which was founded in 1972 by current company president S Leonard Auerbach, has left a lasting impression on the arts community. Furthermore, APF has worked on some of San Francisco's most prominent arts institutions – many situated in the city's Hayes Valley district, close to Van Ness.

The company has contributed to the renovation of the San Francisco Opera House, made its mark on the San Francisco Conservatory of Music, as well as the Yerba Buena Center for the Arts. Its latest project, and newcomer to the golden cultural corridor, is the SFJAZZ Center.

As the first stand-alone facility dedicated to jazz on the West Coast, and one of only two such purpose built venues in the US, the SFJAZZ Center's completion is hotly anticipated.

> 'We meet regularly to coordinate our work and there's always an understanding of utilisation because the spaces are so different'

The modern venue is to become a permanent home to the 28-year-old organisation that previously presented its shows, as well as the San Francisco Jazz Festival, in rented facilities throughout the city.

Auerbach was involved from the very beginning. 'In the case of SFJAZZ we started very early on when they were looking for a venue to go to, and we looked at a number of existing spaces that were vacant,' he says. 'We designed the theatre itself and collaborated with the architect on the building and the site but the design and the theatre spaces were a result of working with Randall Kline [executive artistic director and founder of SFJazz], to get the essence of what he wanted that space to be.'

The centre's scaffolding was pulled down just under a month ago and now with its swish exterior finally revealed to the public, it makes for a spectacular sight.

Above: Interior of Joan and Sanford I Weill Hall at the Green Music Center

Photo: © Kristen Loken

The USD60m (€46.2m) modern three-story building, with acoustic design by SIA Acoustics, is made of glass, steel and concrete and features lobbies that are clearly visible from the street. The main space accommodates 700 and the steeply raked seating elicits an atmosphere intended to match the intimacy of a New York jazz club.

Other spaces include the 80-seat ensemble room/rehearsal space, which will be used for smaller performances, rehearsals, classes and lectures. APF worked with architects Mark Cavagnero Associates, and the project is designed to LEED (Leadership in Energy and Environmental Design) Gold specifications.

Of course, one of the advantages of the company's involvement in the cultural quarter's ongoing development of its venues is that a harmony and synchronicity can run throughout the sites.

'It is essential to consider Herbst Theatre [at the War Memorial Veterans Building Performing Arts Center] and the Opera House and Davies Symphony Hall as an entire campus of arts organisations,' he says. 'We meet regularly to coordinate our work and there's always an understanding of utilisation because the spaces are so different. Herbst, for example, has no resident company. There has to be a cooperative understanding when you are doing the planning.'

Over on the sunnier side of the state, at Sonoma State University, sits another jewel in APF's crown. Here the impressive Donald and Maureen Green Music Center (known as Green Music Center) boasts the recently completed Joan and Sanford I Weill Hall, a multi-use space that will host concerts by leading classical musicians, as well as other performing art forms, and even present lectures for its students.

The firm provided theatre design and consulting services in collaboration with acoustician Kirkegaard Associates and the design architect William Rawn Associates. Kirkegaard is a long-term friend of Auerbach; they worked together early on in their respective careers.

'It is a very interesting concept because the situation was that there was a brief that was pretty much developed and legislated by the state university system to build this performance space – and they had their ideas of what they wanted it to be. They wanted to focus on music because of the Greens, who became a major benefactor of the project,' says Auerbach.

Dr Ruben Armiñana, president of Sonoma State University, went to Tanglewood some years ago and heard the Boston Symphony Orchestra in the then new Seiji Ozawa Hall. He famously declared: 'I want one of those'.

Photos: top © Kristen Loken; right © David Wakely

A period of time followed as the committee tried to raise the money to make a concert hall happen. With funds drying up, the centre was built phase by phase, provoking protests from community members along the way. It was considered an expensive pursuit in light of a nationwide economic recession in the US, not to mention soaring building and material costs. It was a USD12m donation by Joan and Sandy Weill in 2011 that gave the flagging project a much-needed boost. Other donors then came forward to offer support and the concert hall inaugural concert by Lang Lang took place on 29 September. By this point the project's estimated cost had soared to an estimated USD145m.

By all accounts, Green Music Center is a striking venue that seamlessly joins interior and exterior spaces, effortlessly marrying understated elegance with academic practicality. The end result is a big-bang 'wow factor' that will draw locals and tourists alike: the vast landscape of the Sonoma Mountains, set against an expansive skyline, create the perfect mise-en-scène for productions taking place inside the hall. For patrons at a table on the lawn, the effect is like peering through an enormous television to see real-life characters playing within.

APF's services included consultancy on the layout and sightlines,

Above: The grounds at Green Music Center; a rear view of Weill Hall; S Leonard Auerbach

> ‘We find that audiences expect a lot more in terms of presentational gratification, such as multi-media projected images’

a custom-made stage lift for orchestra, a flexible overhead rigging infrastructure, programmable theatrical lighting, automated variable acoustics banners and custom designed theatre chairs, all of which were handmade. Weill Hall seats 1,400 indoors, whilst outside the rear wall opens up to provide visibility for 5,105 patrons (3,457 on the lawn and 1,648 at tables and chairs) on a series of terraced risers for casual or formal dining and picnickers.

The rear wall can also remain closed and act as an exterior stage area for outdoor performances. Weill Hall will be used for the university’s performance programme, as a regular venue for the Santa Rosa Symphony, the San Francisco Bach Choir and other Bay Area orchestras.

‘The difference [between the Green Music Center and Seiji Ozawa Hall] is that is has to work more as a year-round venue. It has to be a lot more of an appropriate building for the environment, plus the programme of activities goes beyond just classical music, and so consequently the building became a lot more highly developed,’ explains Auerbach. ‘If you look at the site, it not only addresses the community and access requirements – you don’t have to go through campus to get to it – but is also totally open to the academic part of the university and is totally accessible. By marrying the performance side for the public with the academic spaces that are on campus, such as the academic wing and the recital hall, it’s perfectly guided to encourage this cross traffic.’

Of course, the commercial requirements of a touring orchestra, or popular performers, also had to be considered; the artists can, when necessary, be safeguarded by restricted access.

‘They have, by contrast, complete exclusive use of the building for reasons of security, soundchecks and touring schedule requirements. It had to be designed with sensitivity to internal circulation. It needed to be a totally open complex that could be used by students on a daily basis, and yet also function independently while a touring group has exclusive use of the performance space.’ APF is also providing theatre design consulting for the Green Music Center’s 250-seat Schroeder Recital Hall, currently in construction, and named after the pianist character in Charles Schulz’s beloved *Peanuts* comic.

Schroeder Recital Hall will accommodate choral, organ, chamber and jazz concerts, community performances and lectures. The design was inspired by European churches and features a soaring ceiling. A further phase of the project will see the 2015 completion of an outdoor amphitheatre with seating for 10,000.

Auerbach has more than 40 years experience in theatre consulting industry, and throughout this time requirements have altered dramatically.

‘The expectation of the audiences have been greatly expanded with the different generations that have evolved over the years. We’ve gone from purpose-built spaces to large multi-purpose halls – these didn’t work very well for everybody – then back towards more purpose-built concert halls, Broadway theatres, repertory theatres and the like.

‘What we’re finding now is that audiences expect a lot more in terms of presentational gratification; such as multi-media and projected images. The difference now is that this special concept of presentation is now being planned in the design of concert halls, even where you have the traditional subscription or patrons of classical music. They [venues] are trying to engage a younger audience and so there’s a lot of media presentation, video projections, special projections and changes to enhance the music and make the concert – where its appropriate – a lot more dynamic.’

Though the team at APF are architecture and tech specialists, experience in the arts runs right through the firm. ‘Essentially everyone on our staff has worked in the arts – the architectural designers have been involved in the theatre; either they have been dancers or have worked in scenic design,’ says Auerbach. ‘We have a broad base of people in our highly advanced audiovisual department, who have broadcast experience or have toured with Rock’n’Roll. We have people who have done rigging and we have Broadway lighting designers, so the skills that are necessary come out of practice.’

‘We’re not consultants that are theoreticians,’ adds Auerbach. ‘We are practitioners.’

www.auerbachconsultants.com

Above: SFJAZZ Center

Photos: courtesy of Mark Cavagnero Associates

Lighting&Sound America

BUILDING THE HOUSE OF LOVE

THE FORMER HOME OF SIEGFRIED AND ROY IS REVAMPED FOR THE CIRQUE'S NEW SHOW

By: David Barbour

Once again, a new Cirque Vegas spectacular has found a home in a theatre designed for another show. Just as *KÀ* occupies the home of the now-closed *EFX,* so *LOVE* is ensconced in the site of the former Siegfried and Roy spectacular. (It's interesting to see how shows like *EFX* and Siegfried and Roy, once the avatars of a "new" Las Vegas, have made way for the Cirque's domination of the Vegas strip.)

It would be a very great mistake to think that Cirque du Soleil just moves into a theatre, however. As was the case with *KÀ*, the original space was more or less gutted to the walls, then thoroughly reimagined; through this process, an already-existing custom-designed venue has been completely reworked for a new purpose. At the end of the day, it might be simpler to build an entirely new theatre.

Which, in a way is what happened. Responding to the designs of Cirque du Soleil scenic designer Jean Rabasse, the theatre consulting firm Auerbach Pollock Friedlander worked closely with the architect and construction manager Marnell Corrao Associates, and a host of other specialists, to reconfigure the space, redo the acoustics, and install a complex infrastructure.

Reconfiguring the space

Perhaps the most fundamental change has to do with the configuration of the space. The Siegfried and Roy show took place in a proscenium arrangement. *LOVE* is performed in the round and the show takes place essentially throughout the arena, with scenery and performers entering from all directions. In addition, there are large projection screens that wrap around the space. The work of Auerbach Pollock Friedlander was to create a total integration of audience, performers, and theatre technology, to allow for full audience immersion in the production, as conceived and designed by the Cirque creative team.

"The stage is essentially a broad area of lifts, traps, and slipstages that resides at the line of the [former] proscenium," says Len Auerbach. "It's a full surround audience, with the theatre appearing as one unified space."

He adds that the firm's role here is different from other projects. "Jean Rabasse, the show's designer, conceived the seating; we dealt with sightlines, elevations, the typical work that we do on any project. We were contracted with Marnell Corrao, in the usual fashion. Our work was incorporated into the architectural plan. At a certain point, however, for reasons having to do with the time frame, Cirque also hired us directly to assist with the overhead elements related to scenery. We ended up in a bifurcated role, assisting with the building's infrastructure and also facilitating the additional overhead system having to do with the scenery and acrobatics. We were in a situation where we were coordinating with all parties."

A full theatre split-level technical grid over the entire stage and seating area supports performer access, lighting system, projection, rigging, high-speed trolley hoists, scenery storage, and special effects. Also specified were four separate control booths—for automation, rigging, lifts, lighting and projection, and one in-house sound mix position—and the center floor stage, which combines lifts, traps, and sloats/slipstages contributing up to 2,300 sq. ft. of operable staging area.

In order to accommodate the production's scenery, "we had to double the size of the existing basement," says Don MacLean, senior supervisor, infrastructure department. "There was a small excavation for sound gear down there, but we excavated another 5' and pushed out downstage of the plaster line another 40 or 50'. We had to dig down another 7' to accommodate the stage lift machinery."

ALL PHOTOS, EXCEPT WHERE NOTED:
TOMAS MUSCIONICO C2006 CIRQUE
APPLE CREATION PARTNERSHIP.

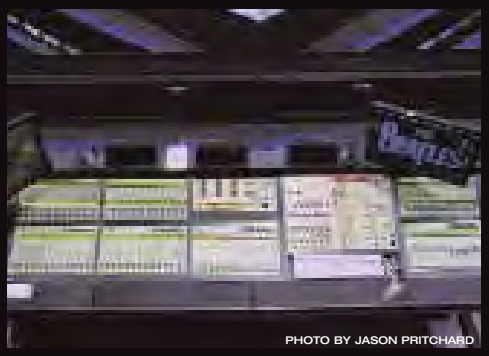


PHOTO BY JASON PRITCHARD

PHOTO BY JASON PRITCHARD

Above: Backstage views, showing two of the show's control systems. Opposite: "Being for the Benefit of Mr. Kite." Previous page: "Revolution."

Also under Auerbach's purview, supervised by Tom Neville, were the systems for the automated rigging, including 25,000 sq. ft. of technical gridiron, power distribution throughout the theatre, new multi-tiered rigging for the stage automation system, and three high-speed data/communications networks, set up to insure that the trolley hoists, lifts, and sound, video, and communications systems function flawlessly during complex cueing sequences.

Acoustics in the round

At the same time, Mark Holden of JaffeHolden, was faced with the challenge of creating the best possible acoustics for a show that is all about the music. "There was a lot of pressure for the room to be acoustically excellent," he says.

That was easier said than done, however. "In-the-round spaces are notoriously poor for amplified acoustics—and we knew we'd have 6,000 loudspeakers," he says. "It was an immensely complex task to analyze every possible sound reflection off of any surface. It was a real challenge to get sound that was smooth, even, and well-balanced."

Holden says he worked closely with Jonathan Deans and Don MacLean as well as Anik Patry, theatre design director for all Cirque projects. The acoustician notes that certain aspects of the design caused him great concern, most notably the 100 x 20' curved projection screens, which threatened to cause a terrible echo in the room.

"Through a collaborative process with the Cirque projection staff and Scharff Weisberg," says Holden, "we evaluated a half-dozen screen materials in our labs—we have a testing chamber where we test fabrics. Then we sent them to Cirque—they have their own video labs where they test projection screens. We went back and forth and eventually came up with a kind of filled scrim that was sonically transparent, with no reflections, and which met their projection needs."

In addition, says Holden, "We created bass traps, using special bass trap banners, hanging them behind the screens to soak up the low-frequency energy. By spacing, angling, and suspending them in a certain way, we eliminated the boominess that can rattle around in an arena."

Not all of Holden's job involved taking away noise and reverberation. "One criticism of some Vegas facilities is they're kind of dead," he says. "When some people start clapping, others don't hear them; it makes for an isolated, individualized experience. Cirque wanted audiences to be more engaged in the process. Our challenge was to create a room with a better sense of audience participation. Our standard approach would have been to cover everything with sound absorption, but that would make the room dead, so we left enough sound energy in the room to conserve audience participation energy—it meant adding materials to the balcony fronts that would diffuse sound."

As always with Cirque, there were unexpected challenges. "Before we opened," says Holden, "Giles and Sir George Martin wanted to mix their digital tapes in a way that would work with the room's acoustics—and they wanted to do it onsite. Of course, they needed a studio to do it. We had a rudimentary sound room planned in the basement; then Don MacLean said they needed a recording studio in a week! We did a quick survey of the room, then specified materials. We had to take stock bass traps and acoustical panels wherever we could find them. To everyone's amazement, the studio was satisfactory; in fact, it exceeded their expectations!"

Integrating stage lifts and machinery

In order to facilitate the many effects in Rabasse's scenographic design, Auerbach Pollock Friedlander, closely coordinating with project manager Mike McMackin, developed an infrastructure of stage machinery. There are five stage lifts, built by Montreal-based Show Canada and installed by Pook Diemont & Ohl of New York.The stage is shaped like two diamonds, says MacLean and "each diamond has two stage lifts, in the north and south ends of the stage, plus one rectangular lift." The lifts cover a total surface area of 1,390 sq. ft. and have combined horsepower of 370. The center, rectangular lift can travel from the trap room area to 8' above stage level; the other four can travel to 18" above the stage. The lifts travel at a rate of 1' per second.

In addition, there are two horizontally traversing sloats or slipstages, 135 sq. ft. each, each with two onboard lifts of 68 sq. ft., which allow the stage floor to be closed over the center lift while scenic elements are removed in the trap area; as new pieces are put on the center lift, the sloats open and the new elements are revealed. Also, four 54-sq.-ft. hinged trap decks, combined with the stage lifts, allow the stage area to be transformed into a 1,600-sq.-ft. black hole, giving the appearance of a void. These elements were built by Conception D. Bédard. Scenic automation is by Stage Technologies' Nomad control console.

The combination of these elements makes for a constantly changing stage, allowing for a wide variety of looks.

Flying scenery and performers

However, scenery doesn't only track onstage or appear from below. Auerbach specified 11 motorized overhead trolleys, which are integrated with wireless controls and travel at a maximum speed of 6' per second to transport both scenery and performers. (These units are key to the overhead acrobatics that figure in the show.) The trolleys are fitted with vertical hoists on a rotational axis; a typical trolley unit consists of four vertical hoists mounted on a rotating chassis, allowing performers or scenery to be moved vertically or horizontally while rotating simultaneously. There is a total of 22 vertical hoists and eight rotating chassis. In addition to the production's giant curving projection screens, which remain stationary, an additional four motorized screens, plus six traveling scrims, provide many projection surfaces.

Interestingly, MacLean says, "The original high grid from Siegfried and Roy was left intact and we use it for other tracks that are underhung from that original high grid, in order to have tracks that manipulate scenery and artists on top of the working grid. They can drop in scenic elements and or performers through two diamond-shaped holes placed above the diamond-shaped parts of the stage. There are two horizontal tracks over those holes, as well as a large rectangular slot that runs the width of the proscenium arch from east to west at the midline of the stage."

The custom screens are by Lesna, Inc, while the scrim traveler track is a custom installation by Triple E, which is represented in the US by Rose Brand. (According to Rose Brand's Peter Finder, "There are four 120' long Triple Chain Track systems, each one running 6' per second. The scrims are 48' high x 70' wide; the Chain Tracks' tight radius stacking system allows them to stack in a compact space while remaining flat and unwrinkled.") The performer flying carriage systems' hoists and rotation assembly are by Stage Technologies and make use of that company's Big Tow winches. The 22 possible counterweight rigging locations—five of which are currently utilized, are by AMC Fabrication and were installed by Pook Diemont & Ohl.

Communicating *LOVE*

In addition to consulting with Deans on the creation of the production's sound system (see previous story), Auerbach specified the communication system, using products from Clear-Com. It includes a 72-port digital matrix intercom system interconnected with a digitally controlled analog matrix, which is capable of switching 216 stations into eight party lines. The system also provides ten channels of wireless intercom feeding 20 wireless belt packs.

According to Matthew Ezold, of Auerbach, the reason for the mix of digital and analog products is a practical one. "Cirque shows place such heavy demands on communications that the amount of cabling can add up very quickly. If you have too much cable in the analog portion of the system, the gain, noise floor, and frequency response of the systems would be adversely affected," he says. "We decided to set up multiple eight-channel party line systems and tie them together using the Compact 72 digital matrix. We have four remote locations and each one runs anywhere between 24-72 channels from the RCS-2000 [programmable source-assignment panel]. Then we take the channels from the RCS-2000, and run them on four-wire back to the Compact 72 matrixes. It reduces the overall amount of cable; the maximum home-run length was under 200' instead of 1,000'.

Paul Garrity of Auerbach adds, "That way, we effectively have separate analog systems in different quadrants in the theatre, which we tie together into the digital matrix. Cirque uses an eight-channel party line, but each location is home-run to the matrixes. If you ran all this analog in a traditional way, you'd have miles of cable—and wouldn't be able to hear anything."

Auerbach also specified backstage monitoring and paging over 82 loudspeakers. A series of 20 remote color video cameras are routed through a 26-channel modulated video system for monitoring performers, musicians, and critical backstage systems. A fiber and CAT 5 backbone provides interconnectivity for current systems and future expansion. An FM assisted-listening system for the hearing-impaired is provided throughout the space. More than 230 panels and wall plates are fed from an analog and digital wiring infrastructure using both copper and fiber-optic cabling.

As MacLean notes, the challenges just go on: "The placement of a grid over the audience poses issues for the fire inspector. Also, we had to relocate the bulk storage tank for the liquid nitrogen at least 50' away from the building, for safety reasons. There are all sorts of little challenges that occur when you're retrofitting an existing building." Still, the Cirque has worked miracles, technologically and aesthetically, and all of them add up to *LOVE*.

Guide, Show Concept Creator, Director:
Guy Laliberté.
Writer, Show Concept: Dominic Champagne.
Director of Creation, Show Concept: Gilles Ste-Croix .
Associate Director of Creation: Chantal Tremblay.
Theatre and Set Designer:
Jean Rabasse.
Costume Designer:
Philippe Guillotel.
Sound Designer:
Jonathan Deans.
Lighting Designer:
Yves Aucoin.
Video Projection Designer:
Francis Laporte.
Choreographers: Hansel Cereza, Dave St-Pierre.
Acrobatic and Rigging Designer: Guy St-Amour.
Acrobatic Performance Designer: Daniel Cola.
Make-up Designer:
Nathalie Gagné.
Props Designer: Patricia Ruel.
Puppet Designer:
Michael Curry.
Aerial Acrobatic Designer:
André Simard.
Dramaturge Consultant: Alexis Martin.
Comic Audio-clips Designer:
François Pérusse .
Music Director:
Sir George Martin .
Music Director: Giles Martin.
Executive Producer:
Neil Aspinall.
Theatre Consultant:
Auerbach Pollock Friedlander.
SVC Consultant:
Auerbach Pollock Friedlander.
Architect and Construction Management:
Marnell Corrao Associates.
Mechanical/Electrical:
Bennet and Jimenz .
Structural:
JBA Consulting Engineers.
Acoustician: JaffeHolden.
Automation Controls, Winches, Tracks and Trolleys:
Stage Technologies, Inc.
Lifts: Show Canada.
Counterweight Rigging and Stage Lift Installation: Pook Diemont & Ohl.
Slipstages/Sloats, Sloat Lifts, and Traps:
Conception D. Bédard.
SVC: Solotech.

SOUND:
Main Arrays and Overhead:
Meyer Sound M1-D, M2-D, CQ-1, CQ-2.
Subwoofers: Meyer Sound PSW-2, USW-1P, Danley Sound TH-1151.
Surround: Meyer Sound M1-D, Innovox custom fabricated units.
Stage edge: Meyer M1-D.
Portable: Meyer UPA-1.
Power amplifiers: Crown CTS2000, CTS3000, CTS4200, CTS8200.
Monitoring: Meyer Sound RMS with iLon Ethernet adapters.
Power distribution, rigging and installation components:
Solotech.
Equipment Racks and Accessories: Middle Atlantic
FOH Console:
Level Control Systems Console with VRAS (Variable Room Acoustics).
Playback System:
(2) Rain Recording Custom Element 64.
Tascam GigaStudio 3.
Realtime Music Solutions Sinfonia.
(2) RME ADI-642 MADI-to-ADAT optical converter.
(4) Apogee DA-16x digital-to-analog converter.
(1) Apogee Big Ben master word clock.
Miscellaneous:
(6) Waves Maxxbass processor.
(18) Lectrosonic VRT trans/receiver.
(1) Yamaha PM5D console.

PROJECTION:
(24) Digital Projection Highlite 12000Dsx projector.
(4) Digital Projection Lightning 30sx+ projector.
(20) Green Hippo Hippotizer-HD media server.
(1) grandMA Light.
(4) Brother, Brother & Songs v-Base moving projector yoke.
(3) Dtrovision 18 x 18 DVI matrix switch.
Stardraw remote control software.

LIGHTING:
Automated Units:
(54) Vari*Lite VL3500Q.
(64) Vari_Lite VL3500S Spot.
(56) Vari*Lite VL2500 Spots.
(40) Vari*Lite VL3000Q Wash.
(21) Martin Atomic 3000.

Conventional Units:
(24) ETC Source Four 5°.
(48) ETC Source Four 10°.
(200) ETC Source Four 19°.
(125) ETC Source Four 26°.
(6) ETC Source Four PAR.
(40) Altman Micro Strip.
(8) Robert Juliat Ivanhoe
(16) Wildfire WF-LT40S. Eclipse 2.
(12) Wildfire Fluorescent DMX.

LED Units:
(130) Color Kinetics ColorBlast6.
(5) City Theatrical PDS 750TR.
(5) City Theatrical PDS 375TR.
(12) Color Kinetics iW Blast 12.
(6) Color Kinetics iW PDS-150 DMX.
(20) Color Kinetics iW Profile.

Atmospherics:
(6) MDG Atmosphere.
(4) MDG Low Fog Q.
(6) MDG Max 5000.
(8) MDG Max 3000.
(2) MDG Mini Max.

Lighting Control:
(2) MA Lighting grandMA.
(1) grandMA Light.
(1) grandMA PC.
(9) MA Lighting NSP.

Production Video System:
Panasonic AS-E560 cameras with pan, tilt, zoom control, and AW-RP501 controllers.

Panasonic AW-E600 & WV-CP470 fixed cameras.

Panasonic WV-BP330 monochrome cameras (IR).

Cantronic Systems CSI-IR 100m60 IR illuminators.

Leitch video distribution amps.

Blonder-Tongue modulators, amps, combiners, and taps.
Rane audio distribution amps.
Bittree patching panels.

Assistive Listening System for the Hearing Impaired:
Listen Technologies LT-800-216 wide-band wireless FM assistive listening system with antenna and receivers.

Production Intercom and Backstage Paging Headend System:
Clear-Com Matrix Plus 3, Compact72 digital mainframe.
Clear-Com I-stations, I-1210, I-1370, I-1470.

Clear-Com RCS-2000 eight-channel analog switching matrix.

PS-464 four-channel power supply.

Clear-Com RS-501, RS-522 beltpacks, KB-211 loudspeaker stations.

Sennheiser HMD-410 headsets.

Telex BTR-800 wireless base stations and TR-800 belt packs.

Program Monitor/Page System:
Peavey Mediamatrix X-Frame.
QSC CX-204V power amplifiers.

EV 409-8T and EAW SMS3 loudspeakers.

Ethernet Audio Network:
Linksys workgroup switches and 801.11G access point.

D-Link Ethernet 2witches with SC fiber ports.

Fiber-optic interfaces and panels by Hubbell and Black Box.

Portable Equipment:
Microphones by Shure, Sennheiser, and others.

Whirlwind stage boxes.

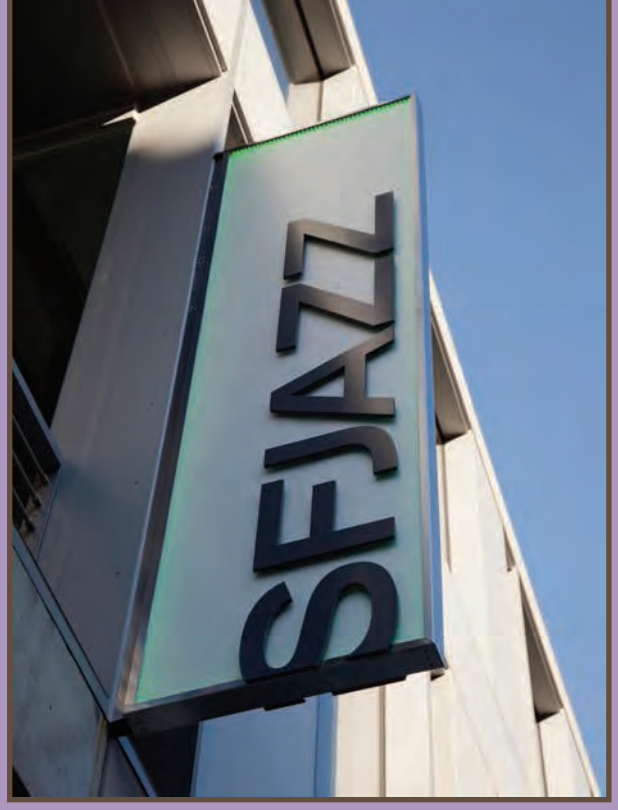
Yamaha and Mackie submixers
Stands by AKG.

Portable monitor s by Anchor.

MIDI distribution by JL Cooper.

AUERBACH·POLLOCK·FRIEDLANDER
Performing Arts/Media Facilities Planning and Design

SAN FRANCISCO • 225 Green Street, San Francisco, CA 94111, Tel 415 392 7528, Fax 415 392 7530
NEW YORK • 266 West 37th Street, 10th Floor, New York, NY 10018, Tel 212 764 5630, Fax 212 764 5632
MINNEAPOLIS • 6113 Arctic Way, Edina, MN 55436, Tel 952 930 0818, Fax 952 933 8167
www.auerbachconsultants.com • info@auerbachconsultants.com



Jazz Town

SFJAZZ is the West Coast's center for America's signature art form

By: Mel Lambert

Jazz is probably the only truly American musical genre, with roots from European harmony and form blended into African-based music, moving through improvisation, polyrhythms, syncopation, and swung notes. But in live performance, jazz music often needs to work against unsympathetic environments that hinder spontaneity between the players and, in turn, their ability to communicate with the audience. As trombonist J. J. Johnson said in 1988, "Jazz is restless; it won't stay put, and it never will."

Opened in January of this year in San Francisco's arts-centric Hayes Valley neighborhood—adjacent to Davies Symphony Hall and Conservatory of Music—the three-story SFJAZZ Center is considered to be the first performance and education complex to be built on the West Coast exclusively for jazz. "The challenge was to design a hall that has the effect of an acoustical performance even when amplified," says SFJAZZ founder and executive artistic director Randall Kline. However, it also has to work "when used purely acoustically—say with a solo-piano recital. Most jazz is performed on acoustic instruments but is typically reinforced for the audience and for the artists via stage monitors. It was important that the audience hear the music as transparently as possible."

The 35,000-sq.-ft. complex houses Robert N. Miner Auditorium, which can be formatted with as many as eight configurations from 350 – 700 seats, depending upon the performance requirements. An ensemble room directly off the lower lobby is used for intimate performances and rehearsing larger acts. It was christened Joe Henderson Lab and is augmented by three practice rooms and a digital laboratory. The architect of record was Mark Cavagnero Associates, of San Francisco—winner of the 2011 American Institute of Architect's California Firm of the Year—with Auerbach Pollock Friedlander, of San Francisco, handling general theatre consulting and production video elements. SIA Acoustics served as acousticians, taking the lead with sound system design and acoustical issues. Structural engineering was supervised by Forell/Elsesser Engineers, of San Francisco, with WSP Flack+Kurtz, of New York, overseeing mechanical, electrical, and plumbing, and Hathaway Dinwiddie, of San Francisco, as lead contractor. Construction, which took seven years to complete, is reported to be $65 million.

"Openness and proximity were two big words used often and early," Kline says. "The first big aspect to settle was the shape of Miner Auditorium; there was an early bias from me to use an amphitheatre as a starting point. The ancient form—with steeply raked seating surrounding a stage—is a natural choice for jazz. But since we also present a lot of music that is related to jazz—world music and some chamber music—we needed an acoustically flexible hall."

"Randall Kline saw our Community School of Music and Arts project [in Mountain View, California] and felt it was

Photos: Courtesy of SFJAZZ

close to the spirit he desired," Cavagnero says. "The goal was to develop a space with the intimacy of a club but the acoustic quality of a music hall. This meant moving the performer out into the audience area and positioning audience seating on all four sides of the stage. Acoustically, the project was extremely challenging and required full integration of the architectural design and materials with acoustic needs. Similarly, because the SFJAZZ Center would host small, medium, and large bands, lighting positions needed to be flexible and have multiple locations. Keeping these elements and maintaining the club-like intimacy was the overarching challenge of the entire design.

"My first thoughts were to have a steeply raked auditorium so that the audience could see the performers with the shortest possible sightlines, and the performers could see the audience's faces engulf them. The Miner Auditorium is designed to be highly flexible to accommodate different seating setups and acoustic needs, from a solo pianist to a large ensemble on stage. The raked seating allows for storage and operational accommodations under the main area. This space also allows for low-velocity, quieter air to be delivered under the seats to the audience."

Inside Miner Auditorium

"We designed the seating, stage, and auditorium configuration in collaboration with the architect," says S. Leonard Auerbach, ASTC, Auerbach Pollock Friedlander's president and founding principal. "Up to 700 patrons can be accommodated in the custom theatre, with seats no further than 50' from the stage. By wrapping the stage on four sides, with tiered seating risers and terraces, the [Miner] is configured for optimal intimacy [and is] ideal for experiencing jazz concerts and other events." The firm developed a family of custom solutions, including fixed theatre seats, loose stacking chairs, and swivel stools, which "created a unified visual audience experience while providing excellent sightlines, comfort, and meeting all ADA guidelines," says Auerbach, who served as principal designer on the project.

The stage itself was fitted with twenty 3'-x-6' platforms and ten custom platforms, supplied by Clare, Michigan-based Stage Right, along with two custom stair units and one portable exit stair, all integrated with custom hardwood flooring.

Flexible theatrical systems developed by Auerbach Pollock Friedlander included a spiral piano lift supplied by Gala Theatrical equipment, a material lift, overhead rigging support and technical catwalk system, theatrical lighting, room-reduction banners, video-projection systems, and a broadcast infrastructure. "Seating surrounds the stage in various asymmetrical locations and elevations for intimacy and a variety of viewing experiences," Auerbach says. "Six variable-acoustic AcouRoll banners, from Bronx, New York-based acouStaCorp, have been concealed from the audience behind the upstage wall; configurations were determined by the acoustician and programmed by the owner at a control panel backstage." Two custom AcouRoll banners were added for window treatments in the auditorium stage.

Eleven retractable AcouRoll banners, integrated into the ceiling with mesh closure panels, shape the hall visually for various types of performances, with configurations that allow for reduction to approximately 350 seats for more intimate performances. Steeldeck custom-built 22 NivoFlex platforms, semi-automated scissor platforms stored flush to the main finished floor for dance and flat floor events; raised from the storage position, these platforms provide flexible seating risers. Stage extension platforms allow multiple stage configurations and, combined with the semi-automated platforms, provide more than eight seating and stage configurations.

"The acoustical canopy contains an integrated hidden film screen [supplied by Stewart Filmscreen], with overhead lighting catwalks, balcony rail, and soft-fit lighting positions that enable various theatrical lighting angles consistent with the asymmetrical room design," Auerbach explains. "Finally, pathways, technical power, and camera-mounting positions accommodate a broadcast TV-production truck for documenting high-profile events."

Joe Henderson Lab

Configured as a multipurpose space, Joe Henderson Lab is situated directly off the lower lobby. "The flexible space allows for up to 70 patrons and is located at street level with glass walls on two corners emphasizing a connection to the surrounding area," Auerbach points out. "Like the main auditorium, automated variable-acoustics AcouRoll banners shape window walls acoustically for various types of performances. A computerized lighting-control system and power is also provided. The floor is sound-isolated." Configurations were determined by the acoustician and recorded by the owner at the touch screen control panel backstage.

"Overhead is an integrated series of strut and theatrical-purpose bus power tracks for theatrical lighting and speaker hang points, which allows for flexible lighting while maintaining a cleanly designed ceiling. A video screen is integrated into the ceiling for projection," Auerbach says.

Flown Meyer Sound line arrays for Miner Auditorium

Sam Berkow, of SIA Acoustics, designed the performance sound, acoustic canopy, and banner systems for Miner Auditorium. "SFJAZZ wanted an ultimate room for musicians to play in, for the audience to listen, and for engineers to record," he says. "To do it all in a relatively small space that allowed flexible seating for up to 700 wasn't easy."

The adjustable auditorium allows a variety of performances, seating between 350 and 700 audience members.

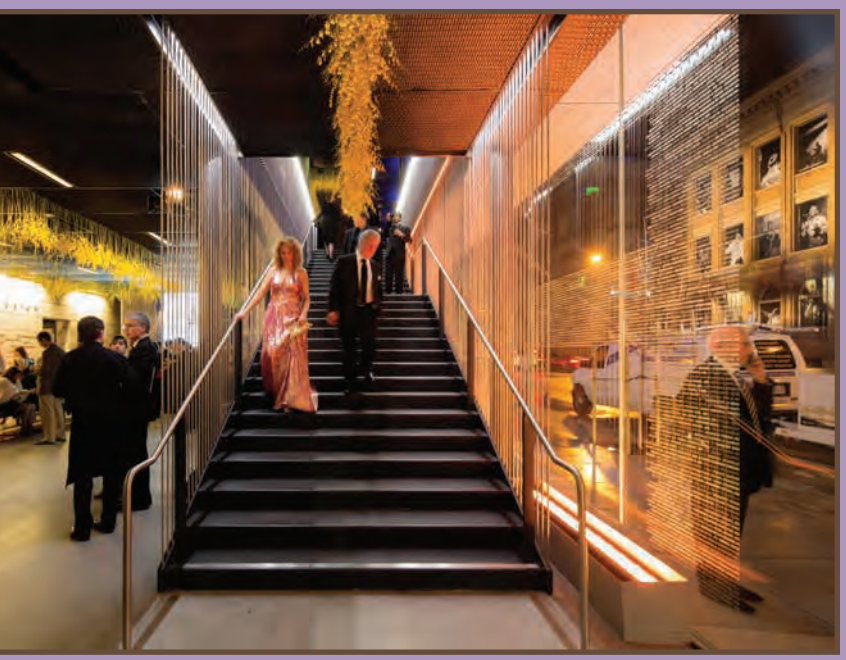
Photo: Matthew Millman

The sound system's role is about balancing and augmenting the natural stage sound while remaining sonically transparent. Thus, Berkow, Kline, and production manager Cecilia Engelhart selected Meyer Sound MINA loudspeakers. "We picked Mina cabinets for several reasons," Berkow says, "including a great high-frequency response, great dispersion characteristics, and their compact size. Overall, we strongly preferred the sound of Mina because we could be confident that the sound from the speakers would match the sound from the stage. In particular, the cabinet's acoustic manifold ensures a very soft, 'silky,' high-frequency sound that brings out the nuances of instruments like saxophones. And Mina is a small cabinet, in keeping with the scale of the room; it is also extremely well-behaved in long line arrays, performing almost exactly as [MAPP Online Pro, Meyer's acoustical prediction software system] predicts it should."

The dual arrays of 16 Mina cabinets per side are augmented by five Meyer 500-HP subwoofers flown in a three-front, two-rear cardioid array. "The sub array works extremely well," he says. "It has a null on stage, allowing musicians and microphones to be free from the off-axis low-frequency energy that a traditional cluster would generate. Keeping such energy from muddying up the on-stage sound is extremely important for jazz. Although the system can rock, it's intended to provide a natural sound and to enhance the energy from the stage, not overwhelm it!"

Eight Meyer JM-1P arrayable loudspeakers, two UPJ-1P VariO boxes, and four M1D-SM line array cabinets were specified as side-, rear-, and front-fills. A Meyer Galileo loudspeaker management system with two Galileo 616 processors handles signal routing. BBI Engineering's principal Mark Roos and project manager Pete Maiers served as AV integrator/contractor.

"We defined a set of three criteria for the sound system to meet: uniform coverage of the audience seating areas, low distortion for high-frequency devices, and minimal off-axis energy reaching the stage," Berkow says. "The use of long line arrays creates uniform coverage and reduces the amount of off-axis energy on the stage. Flying subs is a bit unusual, but, given the lower height of the stage, the floor mounting would result in both disruption of sightlines and tonal balance for those seated



The names of Giant Steps donors appear within the SFJAZZ sign on the center's Franklin Street glass wall.

SFJAZZ hosts a variety of educational programs, including family matinées, jazz history courses, and a digital lab program.

directly in front of the subwoofers."

For mixing consoles, SIA specified an Avid Profile at the front of house, an Avid SC48 at monitors, and an Avid ICON D-Command feeding a full Pro Tools rig in the recording/broadcast booth. The sound system offers both digital and analog splits for recording purposes.

Variable acoustics control

"The program, or intended use for the space, presented a number of challenges," Berkow says. "First, we faced the challenge of two performance spaces that allowed simultaneous usage in close proximity. So we needed to allocate space and resources to create two acoustically isolated spaces. It was also apparent early in the design process that in order to accommodate a 700-seat-count space, we would not be able to use room-shaping techniques—meaning that one of the most effective tools available for acoustical design, slanting walls, could not be used. This implied that our selection and positioning of acoustical materials, both sound-absorbing and sound-diffusing, would be critical.

"Jazz spans a wide range of styles, volumes, and sizes of ensembles. Early on, we decided on a limited number of acoustically variable elements [because] the team was challenged by Randall Kline to create a space that was 'acoustically alive' and use the sound system to enhance sound from the stage rather than being the primary source of sound reaching the audience. In order to do this, we proposed an acoustically diffusive acoustical canopy above the stage, a diffusive upstage wall, plus extensive use of diffusive materials on the side walls and ceiling." SIA worked with the team to help the architects find a set of wall and ceiling treatments that could provide control of reflections and meet the visual requirements.

"Miner Auditorium was designed to project sound from the stage uniformly to the audience," the acoustician continues, "whereas the balcony is asymmetric and shallow, which, in many aspects, is a very interesting design! The 24'-wide and 12'-deep acoustical canopy area above the stage is filled with a total of sixty-four 2'-by-2' variable-depth panels manufactured by RPG Diffusor Systems [based in Upper Marlboro, Maryland], which provide a critical acoustical element within the auditorium. The goal of this canopy is twofold: to create a responsive and supportive stage environment for acoustic instruments and to help project the sound into the audience. The only variable acoustical elements are some retractable AcuRoll absorptive banners hidden within the lower section of the upstage wall. This section holds a 16'-wide acoustical diffuser that can be covered by banners when more absorption is needed.

"In this project, we put forward several elements, such as the diffusive acoustical canopy that houses more than 64 wooden diffusers, the cardioid subwoofer cluster, and the diffusive side wall and ceiling treatments, all of which are nonstandard. By getting these elements into the design early and emphasizing their importance throughout the project, we were able to achieve a very positive result. I also think that the entire design team worked to achieve the client's vision.

Left photo: Matthew Millman; Right photo: Tim Griffith

SIA Acoustics has been involved with a number of projects related to jazz music. “Our team worked on Jazz at Lincoln Center, New York City, and the new JALC facility in Qatar. We also served as acoustical and sound system designer for The Jazz Standard in New York as well as many other venues. Having opened an LA office more than seven years ago, we have also been working in and around the Bay Area for many years. As a fan of jazz music, I was able to talk about the specific design challenges [that genre] presents,” Berkow says.

“At SIA Acoustics, we believe that reverberation time, as a single number, is not as useful or critical as widely thought. Instead, we spend tremendous effort looking to create a spectrum of reverberation times that result in a tonally balanced decay of sound. We strongly believe [this] is a critical factor in creating a successful venue. Tonal balance is generally believed to require that the decay of sound energy at low frequencies should not exceed the upper-mid frequencies by more than a predetermined amount. For this hall, we spent considerable effort trying to find a set of finishes that balance the LF decay with the higher frequencies.”

Joe Henderson Lab presented its own audio challenges. “The room is rectangular, with two solid glass walls,” Berkow says. “Additionally, the room was programmed to host a wide range of events in two staging orientations, length-wise and cross-wise. We used a wide range of sound-absorptive and diffusive materials on the non-glass walls to control reflections from the glass. Additionally, a set of acoustical banners was included to allow the glass to be covered when required. Lastly, the architects proposed a glass wall segment, allowing the room to be visually connected to the main lobby. We suggested slanting this piece of glass to direct reflections upward to the sound absorptive ceiling.

“After this facility opened, and from experience during subsequent concerts [in Miner Auditorium], we will be recommending many more cardioid subwoofer arrays in sound critical fixed-audio installations. And for venues where the stage sound is an important part of what the audience is hearing, we’ll be quicker to recommend diffusive upstage walls.”

Video and lighting systems

“The video systems were developed to support ‘guerilla broadcasting’, live streaming, and large-scale, real-time IMAG and content-developed video projection,” Auerbach says. “We designed the video infrastructure and control center to enable a readily adaptable setup, including the interface of outside broadcast trucks.”

Housed in a series of Middle Atlantic equipment racks, the video equipment installed in Miner Auditorium includes a Crestron DM-MD16X16 digital media matrix switcher with 8G optical fiber I/Os, AJA HD10DA distribution amplifiers, Denon DBP-2012UDCIP universal disc players, a Panasonic PT-DZ12000 projector feeding a Stewart motorized projection screen concealed in the acoustic canopy, a Panasonic AW-HE120 HD-SDI camera with IP control and a Crestron control system and touch panels. Video includes Samsung 1080p LCD monitors and an LG 42" flat panel with Innovox Flex speaker bar. A Da-Lite custom screen in Joe Henderson Lab is fed from a Panasonic PT-DZ50U projector.

Theatrical lighting systems are built around a series of ceiling concealed catwalks and distributed positions throughout the auditorium. The power and control is provided with traditional dimming, distributed power, and data for standard fixed and advanced automated moving lights. Selected for its flexibility across a wide range of productions, the hall’s theatrical lighting package includes a pair of ETC Sensor dimmer racks that are production-linked and a single Sensor dimmer rack for architectural and house lighting. A total of 148 ETC 2.4kW dimmers handle production lighting, while 44 ETC 2.4kW and 14 ETC ELV10 low-voltage dimmers are used for architectural/house lighting. Some two dozen 120 VAC and four 208 VAC DMX-switched relay circuits are available with a DMX multiplexer for LED architectural/house lights.

A single MA Lighting grandMA2 Lite console connects to the dimmers via a total of eight portable ETC NET3 gateways. Theatrical rigging includes a Skjonberg Controls control system with a pair of one-ton C&M chain hoists and an LCD handheld interface with 13 chain-hoist power and control receptacles.

The lighting rig consists of eight ETC Source Four PARnels, five Clay Paky Alpha Profile 800 STs, 12 Martin Professional MAC Auras, 62 ETC Source Fours, and four ETC Source Four PAR EAs.

A positive acoustical experience

To codify an approach, the entire design team visited a variety of venues, from small intimate jazz joints to historical jazz venues such as the Village Vanguard and Jazz Standard, Jazz at Lincoln Center, Carnegie Hall’s Zankel Hall, and St. Anne’s Warehouse in Brooklyn.

Numerous iterations of room configurations were developed, from the most formal to the most eccentric. “An auto muffler shop used to stand on the site, and one of the biggest challenges was fitting the desired design configuration within the very compact area,” Auerbach says. “All members of the design team and SFJAZZ staff worked in an integrated fashion to make it successful. The separate performance, public, and administrative areas were conceived to function to specific needs and work together as a whole.”

Berkow says that the design team first started listening

The building, located in San Francisco's Hayes Valley, includes an adjustable auditorium, a multi-purpose ensemble room, rehearsal spaces, digital learning lab, and administrative offices as well as a café, lobby, retail shop, and box office on the ground floor.

to the room about a month prior to opening. "At that time, the room was still a construction site, but we began four days of system tuning. We were immediately impressed with the sound. In the weeks prior to the opening, we held a series of 'super-secret testing concerts,' which were not really all that secret but did allow us to bring in audiences of varying sizes and listen in real-world conditions. During these concerts, tweaks were made to the sound system, helping us to get closer to our goals. Feedback from both musicians and audiences has been impressive. We are extremely proud of both the acoustical and sound system design of this facility."

"My first reaction to Miner Auditorium was based on the acoustics," Kline says. "We could see how the room was shaping up architecturally as the finishes were being put into place, and it was all that I hoped for. The acoustics are always a nail-biter until the end. When Sam [Berkow] was doing his first tests, it was clear that we might have something special. This building is a perfect example of the sum being greater than the parts, except that the parts are of the highest quality and that the people designing them were the best in the world.

"The sound system is flawless, crystal-clear, transparent, and perfectly matched to the hall; the sounds of the instruments were the most natural I have heard in a hall this size. I especially noticed the vibraphones of Bobby Hutcherson and Stefon Harris [during the venue's grand-opening spotlight, a Bobby Hutcherson birthday celebration], which sounded intimate but powerful.

"Comments I have heard from audiences, artists, and critics in the months since opening are a true measure of what the SFJAZZ Center is becoming. A typical comment is: 'This is the best-sounding hall for jazz I have ever been in.' What makes it work so well is the way the architecture, theatre design, and sound design work together—like a great jazz band."

"The realization that we helped to achieve the client's vision of a place for jazz was very special," Auerbach says. "The entire venue has been very well-received by the public and the music community. It is always thrilling when the first note is struck; opening night at SFJAZZ was especially significant. Each project has its own criteria and dynamic. The SFJAZZ Center site was compact and a bit challenging, but the art of compromise without losing sight of the goal enabled all of us to produce amazing results. No matter what the scale of a project may be, this level of collaboration is essential."

Mel Lambert has been intimately involved with production industries on both sides of the Atlantic for more years than he cares to remember. He is now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, and can be reached at mel.lambert@mediaandmarketing.com or 818.558.3924.

Photo: Courtesy of SFJAZZ

IN THEATERS NOW!

X7 COLOR SYSTEM
FLEXIBILITY

SOURCE FOUR LIGHT
QUALITY

ATTACHED TO ANY
SOURCE FOUR LED

EASY
SETUP

SMOOTH, EVEN
DISTRIBUTION

Source Four LED CYC

SUPERIOR TOOL FOR LIGHTING CYCLORAMAS SOURCE FOUR LIGHT QUALITY WITH THE FLEXIBILITY OF THE X7 COLOR SYSTEM WORKS WITH ANY SOURCE FOUR LED ARRAY FEWER CYC UNITS NEEDED TO COVER AN ENTIRE CYCLORAMA LIGHT IS EVENLY DISTRIBUTED SEAMLESS BLENDING WITHOUT VISIBLE GAPS HIGHLY TUNED OPTICS

PG PROFESSIONAL GRADE
All Colors Emitted

WWW.ETCCONNECT.COM/CYC

AMERICAS EUROPE ASIA
WWW.ETCCONNECT.COM

Close encounter

The Performing Arts Center and Wangari Maathai Hall on Soka University of America's Southern California campus have been fine-tuned to host a variety of performances in a highly intimate setting. One could compare its 1,200-seat multi-purpose hall, the centrepiece of the project, as a meticulously crafted instrument, with precise natural acoustics and sightlines designed to deliver an excellent audio and visual experience for performers and audiences alike.

The new complex – located on a sloping site on the private, non-profit university's campus – features the multi-purpose hall, a 180-seat Black Box Theatre, support spaces and classrooms. Envisioned in the school's campus masterplan and representing the institution's first addition since the campus was largely completed eight years ago, the project marks the first real performing arts spaces for Soka – an educational facility founded on the Buddhist principles of peace, human rights and the sanctity of life.

The university, in planning for a performing arts and teaching facility, wanted to create an exciting, innovative environment for both the campus and the broader community.

"The goal was to design a world-class space that from exceptional acoustics to architectural finishes would serve emerging and preeminent artists and the campus community, create highly memorable experiences for audiences, and complement the understated elegance of the campus", explains Archibald Asawa, the university's CFO as well as vice president for finance and administration.

The new performing arts complex at the Soka University of America has been attuned for acoustic perfection and functional versatility in an intimate setting

Photographs courtesy of Nick Merrick, Hedrich Blessing Photography

Two adjoining buildings comprise the Performing Arts Center and Wangari Maathai Hall: an L-shaped academic building and a multi-purpose hall. The academic building's top three levels feature classrooms and offices that wrap around the Black Box Theatre. The first level is back-of-house space, including dance studios, which provides support for performers.

The centre has been designed to blend in with the school's ensemble of buildings, yet simultaneously stand out as a unique structure. Like other campus buildings, the Performing Arts Center is clad in tan plaster stucco and features travertine marble accents and a red terracotta roof. However, the lobby of the hall – the more public of the project's two buildings – is surrounded by glass, permitting natural light to flood the space.

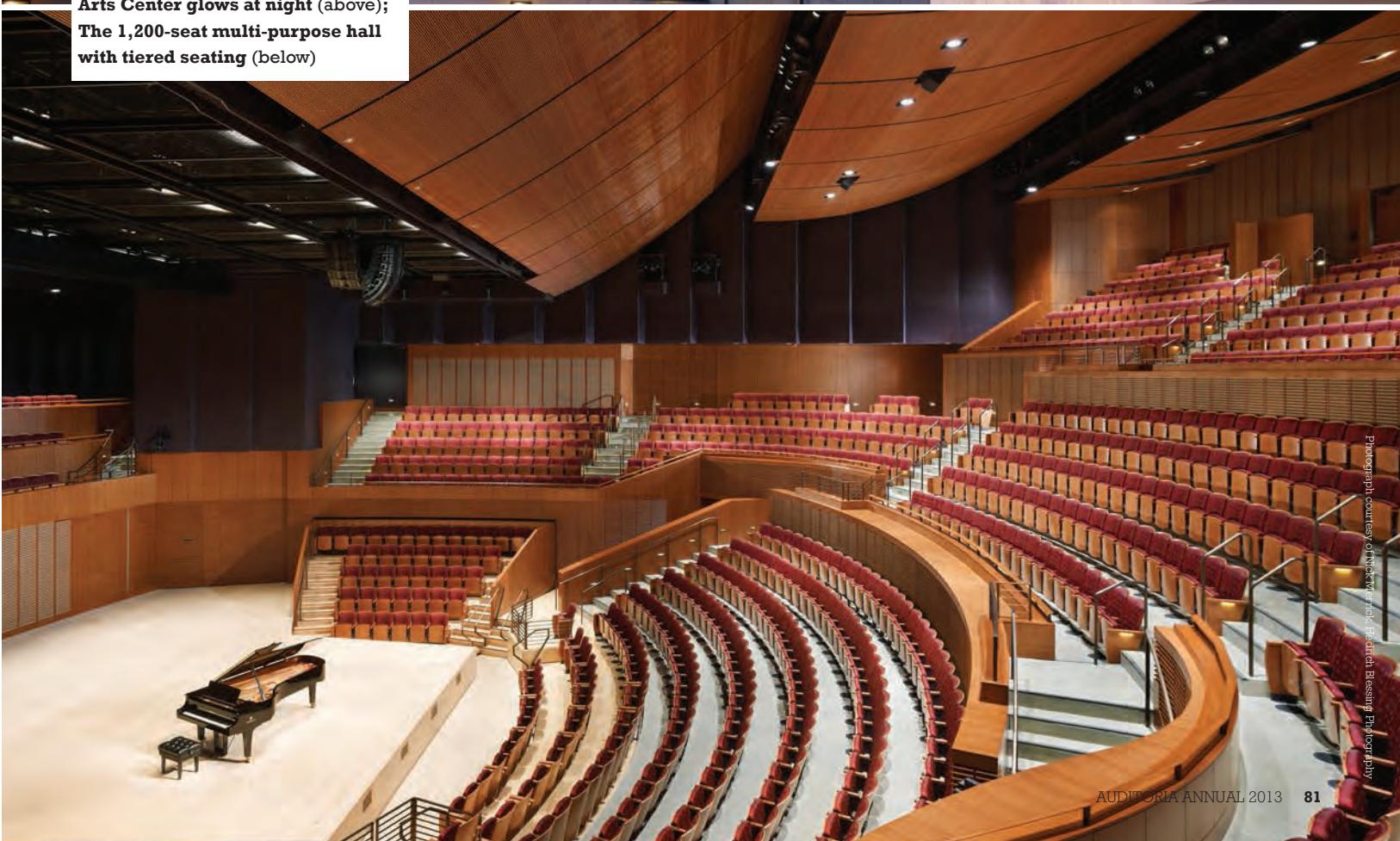
"We wanted to make sure the centre was a good neighbour and extended the architectural language of the campus, but also that it made its own statement," explains Doss Mabe, design partner with ZGF Architects.

The notion of intimacy is a hallmark of the multi-purpose hall. The project team and client approached the design from the inside-out, with sightlines and acoustics taking centre stage.

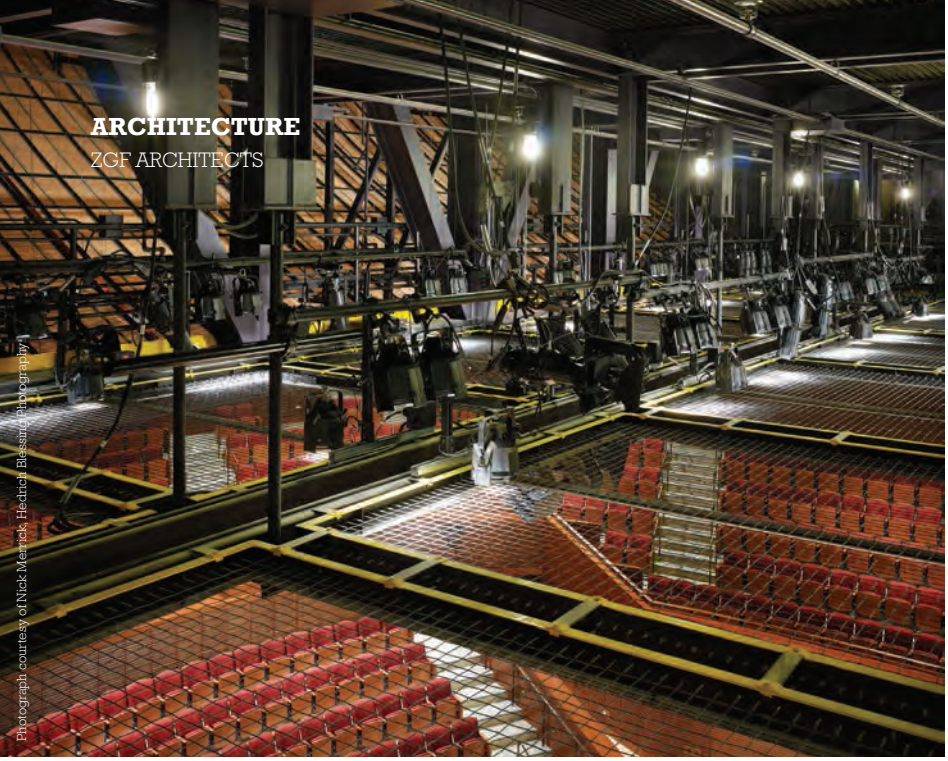
"We started with the audience experience, and the bond between the performers and audience, because this is what makes performances enjoyable and memorable," adds Mabe. The decision to create seating 'in-the-round', with the audience encircling the stage, evolved as the project team investigated ways to optimise natural acoustics without reliance upon amplified sound. In effect, similar to an outdoor venue carved into a hillside, the multi-purpose

Photograph courtesy of Nick Merrick, Hedrich Blessing Photography

The glass-walled Soka Performing Arts Center glows at night (above); **The 1,200-seat multi-purpose hall with tiered seating** (below)



Photograph courtesy of Nick Merrick, Hedrich Blessing Photography



Photograph courtesy of Nick Merrick, Hedrich Blessing Photography

Dual-level rigging and lighting grid over the stage in the main hall

hall's stage is located at the bottom of a 'hill', with the majority of seats on terraces that rise to the lobby. The site's natural slope supported such a layout well.

"The acoustics and the sightlines are the core of this project," continues Mabe. "The public spaces – the lobbies and support spaces – are a threshold between the campus and the experience of the hall's inner core."

Although in-the-round, tiered seating was favoured due to the variety of performances to be held at the hall. The space is designed to be flexible, with reconfigurable stage and seating made possible by hydraulic lifts and seating 'garages'. These features ensure intimacy, ease of circulation, optimum sightlines, and strong audience-performer relationships for music, theatrical performances and convocation needs.

Tuning the hall

Renowned acoustician Yasuhisa Toyota, president of Nagata Acoustics America (who provided acoustic services for the Walt Disney Concert Hall in Los Angeles and many other worldwide projects), said the Soka hall's layout ensures audience members see and hear performances at the same time that they see each other's faces, enhancing both acoustic and visual intimacy. Toyota, in close collaboration with Soka, ZGF and Auerbach Pollock Friedlander, fine-tuned the venue's materials, dimensions and shape – elements central to both acoustic performance and architectural aesthetics. Specially designed walls placed after every seven rows of seats, for example, reflect sound back into their respective seating tier.

Weight and density also play a key role in acoustics. The outer walls of the hall are layered with conventional building materials – such as concrete, gypsum board, plaster and cherry wood – to provide isolation from outside sounds, while reflecting sounds inside. Slatted wood, meanwhile, was used for the interior wall design to cover the acoustically geometric shapes behind. A heavy ceiling, designed to reflect sound, is stepped up and features two elements.

"Conventional materials have been tuned to perform almost like a musical instrument, with the help of state-of-the-art technology," Mabe explains. A good example is the dual-level rigging and lighting grid over the stage, which represents a unique application of theatrical architectural structures conceived by Auerbach Pollock Friedlander. The lower grid is a tension-wire lighting grid that provides safe access and flexibility for lighting positions; the upper grid is a heavy, load-bearing grating gridiron that provides safe access and flexibility for hanging scenic, lighting and sound systems over the stage. Motorised pipe battens allow rapid set-up and striking of overhead elements – a necessity for a hall designed for music and drama performances.

High performance strategies

Sustainability was a central component of the earliest discussions about the project, which has now received LEED-Gold certification through the US Green Building Council. "We wanted to make a real statement about sustainability," Asawa says. "To have a big dream and then see it come to fruition is amazing."

The performing arts complex is expected to consume about 25% less energy than if it had been built to conventional building codes. Photovoltaic panels on top of the centre will generate an estimated 7.5% of the facility's energy use, while fixed sunshades on the centre's exterior are designed to reduce heat in the main lobby, while retaining visibility. Meanwhile, vegetated green roofs on top of both the Performing Arts Center and the Black Box Theatre portion of Wangari Maathai Hall help to manage and treat stormwater runoff. ■

www.zgf.com

www.lightingandsoundamerica.com

December 2011

Lighting&Sound America

plasamedia

Entertainment, Presentation, Communication

California State University, Northridge

Valley Performing Arts Center

Down in the Valley

The San Fernando Valley gets a major performing arts center of its own

By: Mel Lambert

For many years, the San Fernando Valley, which runs along the northern edge of Los Angeles, has lacked a major performance venue for both local productions and touring shows. When, in 1994, a major earthquake laid waste to large sections of California State University, Northridge (CSUN), it was decided that the rebuilt campus should include a new focus for cultural activities. Hence was born the new 166,000-sq.-ft. Valley Performing Arts Center/VPAC, which opened in early 2011 with the 1,700-seat Great Hall (a multi-purpose auditorium) and a 180-seat black box theatre, plus classrooms, a 232-seat lecture hall, rehearsal and events spaces, costume and scene shops, support spaces, and a studio for KCSN, the public radio station. The new center cost a reported $125 million.

The venue's inaugural season featured soprano Dame Kiri Te Kanawa, The Russian National Ballet, The China Philharmonic Orchestra, the Mexican brass ensemble Metales M5, and Rosanne Cash. "I must admit that this hall is really wonderful to sing in," Te Kanawa told her concert audience between songs. "It has such a beautiful ambience; I hope that other singers can enjoy [the acoustics] as much as I have." Other artists performing in the new center include Betty Buckley and Marvin Hamlisch, Joan Rivers, Parsons Dance, and Ed Asner in *FDR.*

The center was designed by Minneapolis-based HGA Architects, under principal-in-charge Gary Reetz; VP/project manager Jamie Milne Rojek; design architect Kara Hill; and project architect Rebecca Krull Kraling, with Auerbach Pollock Friedlander/APF serving as theatre consultant for the performing arts spaces. APF's S. Leonard Auerbach was design principal, Michael McMackin principal-in-charge, and Howard Glickman project manager. Acoustical design and AV systems were handled by McKay Conant Hoover, under the primary direction of David Conant, along with William Chu, Randy Willis, and Kyle Ridenour. Pro Sound & Video, based in North Hollywood, handled A/V integration. HGA also served as MEP, civil, and structural engineers,

Photos: Lee Choo

The Great Hall comprises an acoustically flexible proscenium venue with a three-tier seating configuration, a full fly tower, motorized and manual rigging systems, and a custom-designed orchestra shell, among other amenities.

working with general contractor and construction manager C. W. Driver; the landscape architect was Pamela Burton & Company.

"By successfully integrating creative design with state-of-the-art technology and engineering innovation," Milne-Rojek says, "the Valley Performing Arts Center balanced four important goals: to create a beautiful building, stay within the university's budget, set a new standard for sustainability, and ensure superior acoustical quality."

"Consultation with the chairs of the department of music and department of theatre—together with their faculty and staff—was critical to our understanding the university's pedagogical needs," stresses Auerbach. "Input from the university was of a functional nature, enabling the design team to assimilate various requests and observations, and, through an iterative process, present various solutions. We fully collaborated with HGA Architects and MCH on the programming, planning, and design through construction of the center, with the goal of supporting CSUN's programs and serving the broader community's needs."

The Great Hall and large rehearsal room are intended for use by national and local touring companies, smaller arts organizations, and for film premieres, conferences, meetings plus other film-industry events. The black box theatre, rehearsal studio and terrace, scene shop, lighting lab, costume shop, design studio, and related support spaces will be used by the theatre department, part of the university's Mike Curb College of Arts Media & Communication.

"It was very important for us to identify and understand the day-to-day functional criteria of the new facility," adds APF's Michael McMackin. "The project was conceived to service academic theatrical programs for the Mike Curb College; professional touring productions, lecturers, film, and video; the campus radio station KSCN; and general lecture needs. Consequently, planning of the professional multi-use hall with an academically-driven flex [black box] theatre led to a relationship of spaces that required careful grouping of functions and spaces, because they had to be individually self-sufficient yet work

Photo: Dat-Tuyen Nguyen

synergistically as well as independently. As a touring venue, the Great Hall needed to be secure and not have cross-circulation with any of the other academic activities. Yet academic activities need to function concurrently. These considerations formed the basis for overall planning and design."

The Great Hall

The Great Hall comprises an acoustically flexible proscenium venue with a three-tier seating configuration, a full fly tower, motorized and manual rigging systems, a custom-designed orchestra shell, computer-controlled theatrical lighting, an orchestra pit lift, and a front-of-house audio mix lift. "As the newest large touring show venue in Southern California," Auerbach says, "the stage configuration and equipment will support any production." The stage measures 114' wide by 50' deep, with a proscenium that can be adjusted in width from 40'-54' and in height from 25'-31'. "Two semi trucks and one panel van can load simultaneously directly onto the stage," he adds.

"A desire for intimacy and close proximity to the stage required a multi-tiered audience seating configuration with wraparound gallery seating and an efficient stacking of balconies," says McMackin. "At 1,700 seats, the furthest seat from the stage is only 120'." The flexibility to accommodate a variety of performance types "dictated the need for a large orchestra enclosure, an elaborate system of variable acoustics, orchestra and audio mix lifts, and automated technical support to enable rapid and economical changeover between different events," he adds.

"The detailing of the hall's interior with wood ribbons and the custom screen panels enhance both the aesthetics and acoustics and provides a richness and level of attention to detail not commonly seen in a university PAC," adds Gary Reetz, HGA VP/principal. "Design and detailing of the back- and front-of-house spaces and amenities serve performers and audience with extra attention given to comfort."

Sound-reinforcement systems

The Great Hall's sound-reinforcement system comprises left and right arrays of 10 JBL Professional VerTec VT4888DP cabinets per hang, with integral Crown DPDA modular amplifiers; a center hang features nine VT4888DP boxes. Low-frequency augmentation is handled by eight VT4882 subwoofers with external power amps fed from a BSS London signal processor. A Peavey MediaMatrix, with Crestron controller, handles facility and back-of-house feeds. Front-of-house mixing is handled by a DiGiCo SD7 digital console.

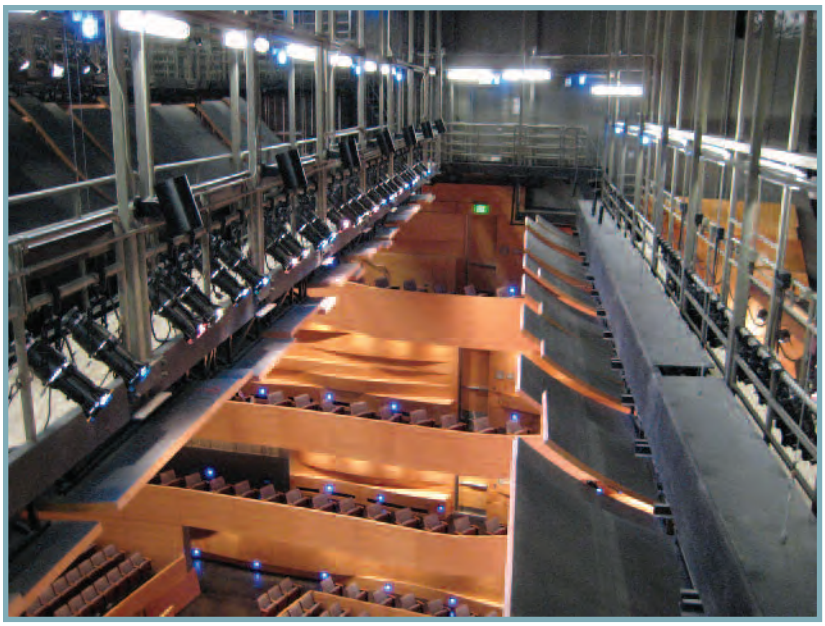
"We had three primary concerns for the main arrays," explains Kyle Ridenour, senior consultant with McKay Conant Hoover. "The first was high-quality, uniform coverage of the entire seating area, which was a non-negotiable item. The second concern was ensuring the choice was highly compliant with a wide spectrum of technical riders. Finally, we needed to ensure that the chosen technology would be responsive to the project budget. We looked at many options, did extensive research, and scrutinized technical performance. In all honesty, there are several good options for halls of this size and nature. In this particular complex equation, the VerTec ended up being the best composite solution. More specifically, we are using the powered VT4888 loudspeakers with the DPDA input module—the digital ports serve as primary input with a simultaneously active analog backup." The line arrays can be raised into the fly space when not needed.

"The DiGiCo console came into the project fairly late," Ridenour recalls, "since the originally specified console reached the end of life in the time frame between specification and implementation. We knew, going in, that the VPAC was a major space in a big market and would see a lot of road shows. Which means that we were targeting not only excellent performance and flexibility, but also longevity—the need to look into the crystal ball, and identify systems and components that were either in the middle of, or early in, their life cycles.

"We also wanted the operator at the FOH position to be able to freely route signals throughout the space, without having to run to a patch bay somewhere else, or trying to fit a huge analog input/output patch field at the mix position," he says. "We needed a very large I/O field in the digital domain, the ability to distribute signals widely to multiple remote boxes on a digital backbone, and a console that was sonically pure, accepted in the touring industry, and on the front end of its life cycle. In this instance, the SD7 was the best fit."

"The fact that all mic- and line-level I/O from the stage panels run back to the DiGiCo racks and are then carried to and from the racks to the control surface over fiber—including pre-amp control—makes the SD7 an impressive system, as well as being rock-solid and very quiet," says Joe Byrne, Pro Sound & Video's project manager. "The SD7 is so powerful and well-designed that there is literally zero outboard processing."

"It was decided early not to supply a monitor console as a part of the design process," says Ridenour, "although the capability to flexibly feed multiple monitors from the front-of-house desk is fully established. In addition, we provided interrupts within the analog infrastructure to allow for easy monitor splits or guest consoles, as well as the infrastructure necessary to flexibly buss digital and analog signals from the main console



Drapes can be raised from within these catwalk enclosures to provide sound absorption.

backbone, which could be used as a digital split for monitors or recording or future I/O expansion."

The designers advocated a hall and balcony configuration that would not need additional delay fill speakers. "Use of fill is often necessary, but not ideal, and can be problematic for any number of reasons," Ridenour says. "Full credit is due to our co-conspirators—the architectural, theatrical, and acoustical design team—who kept the distances and angles appropriate and the acoustical behavior uniform throughout the seating area. There are extensive loudspeaker locations throughout the main hall audience chamber, but those are targeted more for effect and cinematic surround, rather than as a part of the primary reinforcement system."

The variable acoustic system

"Although the acoustic criteria to meet a wide program of functions were established by McKay Conant Hoover," McMackin says, "integration of the acoustic criteria with the building infrastructure, the interior architecture, and theatrical machinery was a collaborative effort by the entire design team. Auerbach Pollock Friedlander conceived of four different types of variable acoustic devices, each motorized and computer-programmable to deploy 8,000 sq. ft. of drapery in the Great Hall that supports the acoustic criteria set by MCH. Our coordinated efforts enabled us to seamlessly weave the variable-acoustics elements out of sight in the Great Hall, so that the acoustic response can be changed without affecting the architectural aesthetics."

He adds, "Side walls and ceiling of the custom orchestra shell are comprised of modular units designed for rapid setup of ensembles and orchestras of all sizes. The orchestra shell can be set up by a minimal crew in under an hour." Manufactured and installed by SECOA, "The entire shell ceiling can be demounted for infrequent occasions where their loft space may be needed for very large touring productions." The custom enclosure comprises nine articu-

Photos left: Mel Lambert/content-creators.com

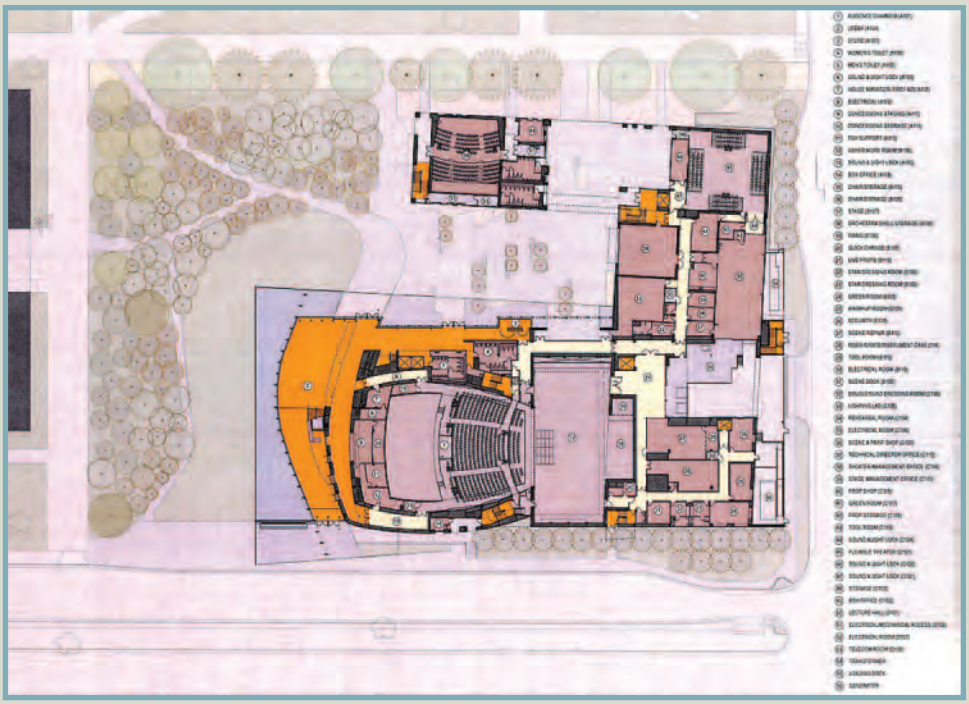
lating towers, each measuring 12' wide by 24' high, with three folding/flying ceilings elements measuring 11' deep by 36'-56' wide.

The variable acoustic system reduces the room's reverb time for orchestral performance to a range appropriate for film playback. "A combination of custom-designed and modified standard motorized variable acoustic draperies are integrated into the audience-chamber architecture and out of view from the public," McMackin explains. A push-button preset station enables user-selectable automated positioning of the drapery systems.

"In addition to a suitably quiet ambient noise level—NC20, achieved via an inherently low-velocity displacement air system design—we attempted to achieve a fully-occupied mid-frequency RT60 ranging from 1.2 to 2.2 seconds to meet requirements of film, drama, and amplified pop/jazz to romantic and choral works," says MCH's Conant. "We were also seeking an absence of acoustical anomalies, suitable acoustical intimacy, warmth and envelopment, and an immediacy of sound.

"Our design for the orchestra shell and variable acoustic systems had to acknowledge that venue personnel could rapidly change the room's acoustical configurations as specific needs arose," he adds. "We began by establishing the need for the requisite 'good bones,' comprised of hard, stiff finish construction and sufficient clear, acoustical volume—which led to detailed planning for variable acoustic systems, side- and rear-wall shaping, and the important proscenium 'eyebrow.'

"Only a very few performance halls [on the West Coast] are programmed to handle nearly everything from serious music to cinema," Conant says. "And those are principally our restorations of vaudeville rooms, from San Diego's Balboa Theatre to the Phoenix Orpheum to Santa Barbara's Granada. Because



This floor plan shows the layout of the Great Hall and associated spaces.

of their historic significance, such renovations normally preclude applying as heavy a variable acoustics hand as the VPAC required and permitted. While most of our newer and larger multipurpose, variable acoustics spaces effect the dominant change above catwalks, and the vaudeville-era rooms employ decorative—and operable—sidewall drapery, the VPAC employs both to good effect. Heavily amplified works, especially cinema, benefit by substantial control and considerable absorption over lateral/sidewall reflections and a heavy hand on control of LF reverberation.

"Additionally, although the rear walls of VPAC's orchestra and loge levels are angled to interact beneficially with the balcony undersides, manually engaged, highly efficient absorptive panels are deployed there as well to further damp both LF response and reverberation. These panels cover much of the control room glazing, but only for cinema presentations. The sidewall absorptive treatment is unique in that one of the principal design intentions was to ensure that, irrespective of the reverberation required, the room's appearance would remain unchanged. To effect this, and with APF's guidance, we positioned Acoustac—Pook Diemont & Ohl's novel variable-acoustic device—between the acoustically shaped plaster walls, and metal grillage—permitting a lighting arrangement that effectively hides the absorbent material from view whether or not deployed.

"Above the catwalks, six heavy acoustical drapes are independently deployed as required to control reverberation via up-to-deploy and down-to-deploy mechanisms. Additionally, 18'-tall heavy drapes, proud of a 12' deep airspace cavity, are available for tracking out from storage boxes along each of the upper rear side walls. Together, all this absorption, with a generally sound-absorptive stage house—i.e. soft goods without orchestra shell—the mid-frequency RT60 without an audience reaches 1.4 seconds, and, with the audience, is calculated at 1.25 seconds. With all absorptive drapery and panels fully

retracted and with the full orchestra shell deployed, the reverberation time is 2.5 seconds without audience and 1.8 seconds with a full audience."

Theatrical lighting

Designed by Auerbach Pollock Friedlander, the Great Hall's theatrical lighting system comprises seven ETC Sensor SR48+ dimmer racks and a single Sensor SW24+ sinewave dimmer rack, with eight Sensor CEM+ control electronics modules connected to six hundred eighteen 2.4kW, sixteen 6.0kW, twenty 2.4kW, and forty-eight 2.4kW sinewave dimmers. An ETC Eos console provides overall lighting control. The basic house fixture inventory includes 15 ETC Source Four 36°, 66 Source Four 26°, 42 Source Four 19°, 20 Source Four 14°, 15 Source Four 10° and 40 Source Four PAR instruments. Also available are 40 Altman PAR 64s, 12 Altman Sky Cycs, 12 Altman Ground Cycs, 12 Altman Q-Lites, two Strong Super Troupers, and a GAM Command II backup and testing tool.

A pair of Lighting Control & Design GR2400 single-pole DMX-controlled relay panels was also specified, along with an ELTS 620-120 emergency-lighting transfer system. An ETC Paradigm architectural system is used for house lighting and work-light control, with custom portable cue-light and architectural control stations. Ethernet components include various custom patch panels, two 24-port switches, four eight-port fanless switches, 39 tap stations, six ETC Net2 four-port DMX portable nodes, and an ETC Net2 full-function node.

A full-width forestage rigging grid, located above the orchestra lighting canopy, provides a work platform for installing touring lighting trusses as well as a support and service area for all of the front-of-house motorized rigging, including a pair of lighting battens, a three-column loudspeaker line array, and an articulating architectural eyebrow. "By raising them on individual computer-controlled hoists and lifting the center array through a motorized hatch, the loudspeakers can be stored out of audience view," adds McMackin.

During Tuning Week, the Northridge Singers, Borromeo String Quartet, Moscow State Symphony Orchestra, and Doc Severinsen and the Clayton-Hamilton Jazz Orchestra, plus some solo piano, operatic work, and spoken word were used to determine optimal system settings. "The results were outstanding," reports Brett Curry, VP of operations with contractor C. W. Driver. "The Great Hall sounded open and rich; the variable acoustics were truly remarkable, controlling the sound as expected."

"These Beta test performances were very important," says HGA's Reetz. "They allowed the university to refine the technical systems in the hall and stage, particularly the variable acoustic, audio-visual, theatrical lighting, and rigging systems."

"It was very exciting to watch the Valley Performing Arts Center develop from a concept early in the programming and design phase to its completion with an eager audience waiting for the first performance," says Auerbach. "We have seen the shops filled with students building scenery, costumes, and props, and the flex theatre in rehearsal with a full set of scenery in place. This building is humming with creative energy."

"The new space breathes life into both the campus and the community," says Robert Bucker, Valley Performing Arts Center's executive director. "There is not a bad seat within the Great Hall. From the front of the orchestra to the upper balconies, the sound is remarkably balanced everywhere, with wonderful sightlines. The variable acoustics have worked out extremely well for a number of events we have held here, and the sound system fills the space wonderfully. As we intended, the hall is remarkably flexible and audience-friendly. People love to come here; it is a see-and-be-seen space. We hope to build a tradition of world-class productions here, with the new center becoming an artistic nexus for the region."

(Mel Lambert is principal of Media&Marketing, a, LA-based consulting service for the professional audio industry, and can be reached at mel.lambert@MEDIAandMARKETING.com; +1/818.558-3924.)

Sonoma State University's Joan and Sanford I. Weill Hall draws inspiration from a modern classic

The Tanglewood Model

By: Mel Lambert

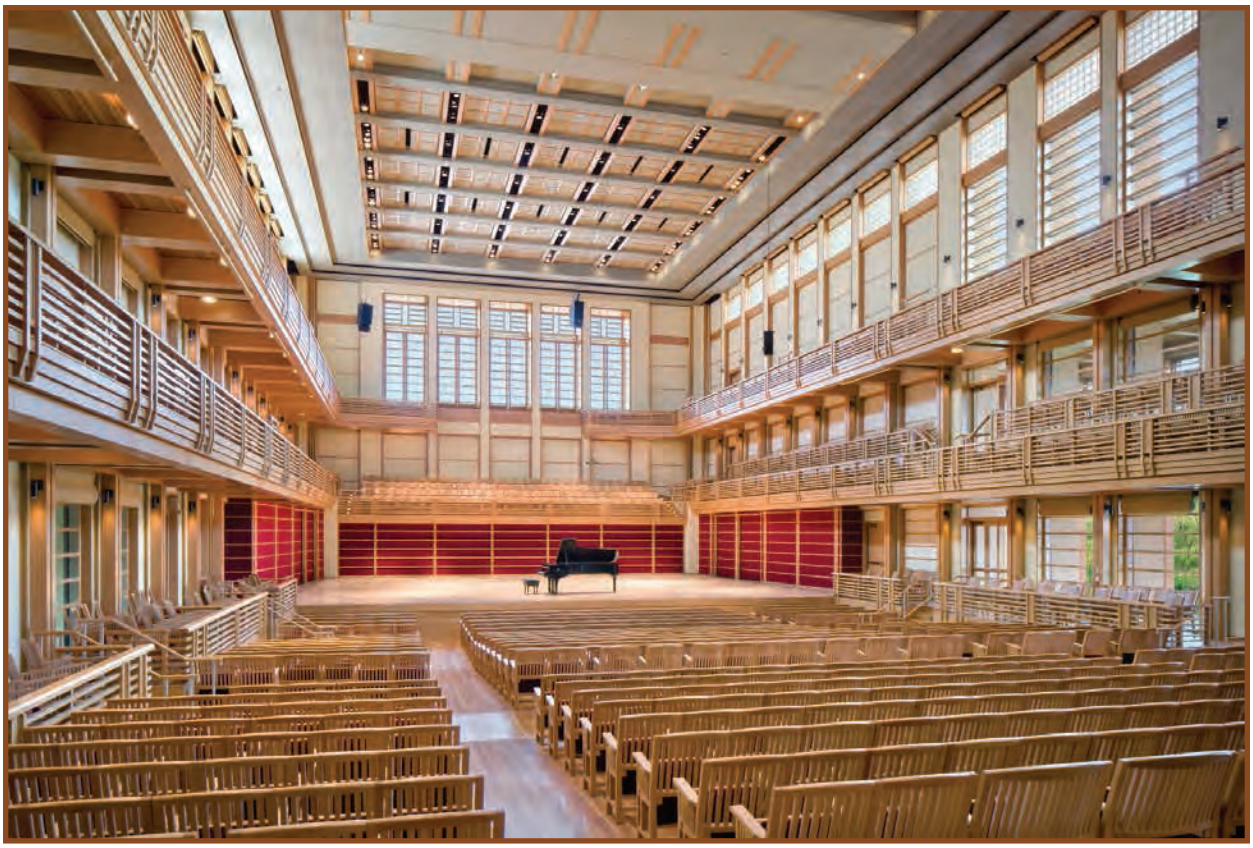
Seiji Ozawa Hall at Tanglewood Music Center, nestled in the landscape of Massachusetts' Berkshires, serves as Boston Symphony Orchestra's summer academy for advanced musical study. The venue's main features, including wooden surfaces and a wide door opposite the stage that leads into an outdoor seating area, has become the model for a number of concert-hall designs within a natural setting.

When Sonoma State University, in Rohnert Park, California, made the decision to add a new concert hall, the organization chose to emulate the look and ambient feel of Tanglewood Music Center in Lenox, Massachusetts. As SSU president Ruben Armiñan recalls, "We went to Tanglewood to listen to music and were having a picnic on the lawn while a trio from the Boston Symphony was playing. The sound was spectacular, so we went into the hall. The openness and congruity of music and performance was amazing. I said, 'This has to be in Northern California, at Sonoma State.'" The resulting Joan and Sanford I. Weill Hall within the Green Music Center, which opened last September, is on the Sonoma State University campus in the heart of California's wine region, just north of San Francisco.

The exterior of the Sanford I. Weill Hall, with the rear wall of the auditorium open to the lawn.

Photo: David Wakely

William Rawn Associates served as project designer for Weill Hall, working closely with AC Martin as executive architects, Kirkegaard Associates as acousticians, and Auerbach Pollock Friedlander as theatre consultants. BAR Architects served as architects for the hospitality center, music education wing, and the planned Schroeder Hall; Rudolph and Sletten was the general contractor. Christopher Dinno, Sonoma State University's senior director for facilities management, capital planning, and design, headed the project administration team. The Santa Rosa Symphony is Weill Hall's resident orchestra; San Francisco Symphony also held a four-concert series during the current season. The total estimated cost for the project was $148 million.



Fabricated by Theatre Solutions from European steamed beech wood, each seat features an open back and a burgundy cushion.

Indoor/outdoor hall design

The initial concept, formulated in the 1990s for SSU's Green Music Center, involved building a choral recital hall for the campus; this plan expanded into the establishment of an arts center. "Extensive acoustical and theatrical design went into creating an environment almost identical to that of Ozawa Hall at Tanglewood," says Leonard Auerbach, lead theatre consultant from Auerbach Pollock Friedlander. "We were approached by Floyd Ross, the owner representative for Sonoma State University, to engage in a programming study for the new music school; the basic concepts for the venue were defined in that study, prior to the involvement of architects. The university was looking to replicate the acoustic experience of Ozawa Hall with its hybrid indoor/outdoor design," which led to the hiring of William Rawn and R. Lawrence Kirkegaard, who were principally responsible for the design of Ozawa Hall. "Bill and Larry were tasked with creating a new concert hall that would honor the spirit and sonic quality of Ozawa Hall, while drawing on the special physical and cultural environments of the Sonoma County setting," Auerbach says. After more than a decade of planning, fundraising for the project slowed in 2006. In 2011, Joan and Sanford I. Weill donated $12 million to complete the concert hall and adjacent lawn area.

Weill Hall is a traditional shoe box-shaped building with 1,400 seats custom-designed by Auerbach Pollock Friedlander with input from the university, Kirkegaard & Associates, and ergonomic consultants from Seating Dynamics. Fabricated by Theatre Solutions from European steamed beech wood, each seat features an open back and a burgundy cushion. Total capacity is 784 on the orchestra floor, 312 in the first balcony, and 321 in the second balcony.

"Extensive acoustical and theatrical design went into creating an environment almost identical to that of Ozawa Hall at Tanglewood." –Auerbach

The hall's internal construction features a combination of beech, white maple, and Douglas fir. Large windows line the north and east walls, with seating areas on a main orchestra floor, two side galleries that connect to a chorus balcony at the rear of the stage, and an upper balcony in the hall's rear. As a nod to Ozawa Hall, an operable acoustic wall at the back of Weill Hall opens onto terraced patio levels and lawn seating. "This will be a very important academic building with the ability to be used for concerts,

Photo: David Wakely

While extensive glass windows within the hall fill the space with natural light and provide concertgoers with a view of the hills to the east, they posed challenges for the acousticians in terms of ensuring proper bass response.

performance, and conventions, as well as education," Armiñan states. "Developing a world-class performing arts center will help our students understand the perspectives of others, contributing to the creation of more globally aware, collaborative, and responsible future world citizens."

In addition to performance areas, Green Music Center also houses a music education wing with classrooms, practice studios, and ensemble spaces. Schroeder Hall, a smaller 250-seat venue named by Jean Schulz in recognition of her late husband Charles Schulz's piano-playing *Peanuts* character, awaits final funding and completion. A planned outdoor performance pavilion with approximately 10,000 seats will accommodate symphonic music and dance in addition to amplified concerts, with a combination of fixed seats and lawn areas reminiscent of such venues as Ravinia, Highland Park, and the Hollywood Bowl.

Acoustically, the 38,500-sq.-ft. Weill Hall was designed to support a broad range of programming, from full symphony orchestra with chorus to vocalists, smaller instrumental ensembles, solo recitals, jazz, and world music. To provide a variety of flexible acoustic environments for amplified performances as well as lectures, a system of motorized sound-absorbing banners can be progressively deployed to control reverberation time. Audio and video recording equipment has also been provided, with full AV connectivity throughout the complex.

By design, orchestra-to-ceiling height and balcony-to-balcony width are both 53', with 75' from the front of the stage to the front face of the rear balcony, where a 20'-by-54' modular rear door runs the width of the south wall and extends the hall's reach to an additional 5,000 patrons located on the adjacent Weill Lawn. The 48'-by-60' stage is made of white maple, with adjustable lifts and risers to accommodate a full orchestra and fine-tune ensemble communications and sound on the main floor. A system of inverted screw jacks drives two orchestra risers; the inner section contains retractable chevron risers for string sections.

Initial system programming

"The initial programming began independently from the desire to base the Weill Hall design on Tanglewood's Ozawa Hall," recalls Michael McMackin, ASTC, Auerbach Pollock Friedlander's principal project manager. "Our goal was to merge the wide variety of year-round performances with the concept of a purely musical venue that would be open-air. Working with Bill Rawn brought about a true synergy of function and design."

"In addition to its formal acoustic environment," Auerbach says, "the hall provides unique staging flexibility,

Photo: Dan Stone

variable acoustics, overhead rigging, and backstage support for a variety of popular performance events. As an example, we designed automated stage lift systems—installed by J. R. Clancy—to vary the tiered configuration of the stage for different performance ensembles. The automated and programmable acoustics banners are variable but also integrated into the architecture of the room; they match the color tones and mesh with the predominant architectural gestures."

"The natural acoustic was inspired by the sound of Ozawa Hall," adds Kirkegaard. "We were charged with enhancing the hall's capabilities and modifying the acoustic design to respond to project-specific conditions, which is more difficult than it sounds! Compared to Ozawa, Weill Hall has extensive adjustable absorption, which allows it to support amplified music performances such as jazz ensembles. Weill Hall also has a lot of glass that fills the space with natural light and allows concert-goers to view the hills to the east while listening to music; we were able to accommodate all this glass and still maintain bass response. Another significant difference is the hall's acoustical ceiling, which is constructed of wood—making it a giant sound board. A wooden construction was chosen to minimize the up-high seismic load—this was not a factor at Ozawa Hall, which has a precast concrete acoustical ceiling. And Weill Hall is an academic facility that is operated year-round; as such, it needed a more sophisticated heating, ventilation, and AC system than Ozawa Hall. The mechanical system is designed to provide comfort any time of the year and do so quietly."

Patrons on the lawn get ready to enjoy an outdoor concert.

In terms of overall planning, Kirkegaard says, "We knew from the beginning that Weill Hall would have to support a broad range of events; therefore, adjustable acoustics were essential to the project. There were numerous occasions when value engineering of the absorbent banners was considered but ultimately rejected. The design team reduced the cost by moving from a custom integrated banner system, deployed from the floor up, to incorporating into the building design an early prototype of the acouStac variable acoustics banner deployed from the top down," with a custom control system supplied by J. R. Clancy. "Considering the types of events held at the hall—from Alison Krauss and Union Station, to Wynton Marsalis and the Santa Rosa Symphony—it's a good thing that the banners survived the cost-cutting!"

A system of motorized, absorbent banners acoustically "shapes" the hall for various types of performances. "Configurations were determined during system commissioning and programmed into a touch-screen control panel located backstage," says Anthony Shou, of Kirkegaard Associates. The J. R. Clancy Scene Control 500 is connected to a portable Siemens Simatic mobile panel that oversees movement of 44 acouStaCorp acoustic banners, a pair of manual bi-parting travelers, four motorized bi-parting travelers, and eight motorized travelers. (acouStaCorp is part of the PDO Group, owned by rigging specialists Pook Diemont & Ohl.)

"Internally, we had specialists who focused on room acoustics, noise, and vibration control of the mechanical/electrical systems and audio systems plus a project manager who oversaw all three disciplines," Shou continues. "What further complicated matters were the

Photo: Kristen Loken

often overlapping design and construction schedules as various components of the facility were designed and built in phases."

The results of extensive testing and listening at Seiji Ozawa Hall provided primary acoustic input. "In many ways, we used Ozawa Hall as a full-scale model of Weill Hall," Kirkegaard explains. "Early in the project, we created full-scale mockups of adjustable absorption and sound-transparent wood screens. Later on, we evaluated fabric and perforated metal for sound transparency. During construction, we tested the custom seating at Riverbank Acoustical Laboratories. These in-depth investigations informed the design and construction of Weill Hall."

The hall's permanent sound system, specified by Kirkegaard Associates, is comprised of left, center, and right clusters of d&b audiotechnik Q7 full-range cabinets flown from the lighting truss, augmented by stage-lip fill loudspeakers, balcony delays, and subwoofers. The d&b E6 cabinets provide down-fill coverage, with a d&b xS Series 10S-D for the choral terrace loudspeaker, two d&b xS 10S cabinets for the balcony, and Meyer Sound MM-4XPs underbalcony loudspeakers. Several d&b Qi-SUB boxes are available as portable main subwoofers, with d&b E0s for portable front-fill stage-lip loudspeakers. Multiple d&b D12/NL4 amplifiers power the LCR, subwoofer, and balcony speakers, plus D6/NL4 amps for the down-fill, choral terrace, and stage-lip cabinets. All signal distribution, delay, and equalization is handled by BSS London processors. Crown XLS 2500 amplifiers power the stage monitors.

Photo: Kristen Loken

Available microphones include Shure wireless models, AKG C480B/CK61s, Audio-Technica AT-4051a omnidirectionals, Audio-Technica AT-4053a and AT-4053a-EL hypdercardioids, AKG C414B/XLS large-diaphragm and AKG C451B small-diaphragm models, Neumann KMS105-MTs, and beyerdynamic M88TG handhelds, plus Sennheiser MD421 IIs, Audix OM3s, Audix OM5s, Shure SM57-LC, and Shure SM58s; direct boxes include Radial JDI-MK3 passive and J48 active models.

Within the South Lawn, Electro-Voice EVH-1152D/94-PI boxes serve as rear-wall left, center, and right loudspeakers, with Renkus-Heinz PNX 82/9W powered by Crown amplifiers as pole loudspeakers augmented by Crown-powered JBL ASB6112WRX subwoofers integrated within custom, in-ground landscape elements.

"Our top criterion for the hall loudspeakers was for them to be as discreet as possible," Shou says. "The selection process for the main LCR cabinets also included a demonstration in Weill Hall, the end result being we selected d&b for the main system, which is used frequently for reinforced speech and commentary as well as concert performances with the Santa Rosa Symphony." Removable seating platforms accommodate a Soundcraft Vi1 digital production console handling front-of-house and monitor mixing duties.

"The loudspeaker system is quite modest but very capable in terms of sound reinforcement for the day-to-day academic schedule," Shou concedes. "Heavy amplification would be provided by temporary side stacks used in conjunction with the permanent systems to cover various seating areas. Typically, significant portions—if not all—of the adjustable banners and curtains would be deployed for such events."

The large, double-thickness side windows are fabricated with an outer 3/4" pane and an inner 1/4" pane separated by a 1" air gap. "We angled the glass slightly by about 1/8" per foot to reflect sound back into the audience and prevent parallel geometry across the hall's width," Shou recalls. "We have proposed the addition of a recital screen to shield late sound from the upstage wall and provide in-fill early reflections for the audience, which will have a profound effect on the sound of the hall for recitals and small ensembles.

"Although, for a whole host of reasons, the project took longer to complete and required more money than expected, the glorious results came from an unfaltering dedication by everyone involved, from construction workers to donors. There is no comprehensive model to simulate the level of data that the human ear picks up. So upon hearing the first musical sounds in the hall, we were extremely pleased with the acoustics, not to speak of all the other aspects of the completed center," Kirkegaard says.

ETC Paradigm touch screen permits use of a general stage wash and other presets for most performances. The orchestra platform is illuminated by dimmed down-lights—primarily ETC Source Four PARs—mounted overhead and ellipsoidal fixtures from front-light positions. ETC [Sensor+ SineWave] dimmers are used for quiet operation. Additional circuits are provided in the attic, on-stage, and at the surround galleries for use with the house ETC Ion 1000 lighting console with a two-by-ten fader wing or a rental board."

A total of seven ETC Sensor+ 24-module dimmer racks features 240 dimmers for production lighting and 74 dimmers for architectural and house lighting; the theatrical rig includes 110 ETC Source Fours in various models and sizes.

"Realizing the design of any concert hall is a very involved process," McMackin says. "They are inherently complex spaces; the interweaving of infrastructure, acoustics, architectural design, theatre functionality, and

"Although, for a whole host of reasons, the project took longer to complete and required more money than expected, the glorious results came from an unfaltering dedication by everyone involved, from construction workers to donors." — Kierkegaard

"Before the grand opening, we had the opportunity to work with various student ensembles, including jazz, faculty musicians, and the Santa Rosa Symphony, to fine-tune the acoustics. It was an emotional experience to hear music played in the completed hall. That tuning exercise allowed us to make adjustments to the banner settings for different ensembles. Furthermore, it allowed us to listen critically to the acoustics of the hall and identify opportunities to enhance the hall's sound."

Stage lighting system

"Lighting positions are recessed into the architectural ceiling slots behind glass lighting bays and at the perimeter galleries," Auerbach continues. "Due to the long throws, incandescent sources were selected to provide the necessary foot-candles at the music stands. The attic space is walkable and allows access to the rigging beam at the architectural ceiling slots for overhead rigging." Rigging points and power are provided in the attic for lighting trusses, loudspeakers, and scenic elements.

"The lighting system was designed for easy day-to-day use by music instructors and nontechnical staff, with enough flexibility and capacity for more demanding productions," the theatre consultant says. "A backstage code compliance—while all the time anticipating the best experience for the audience and performers—is a process that can easily take over a year to complete. The team generates sketches, renderings, physical models, virtual models, and technical drawings to study the various aspects of the room. This process continues well into the documentation phase, allowing for adjustments along the way."

"The responses we've received with regard to not only the design and acoustical quality of the hall but to the overall experience, have been nothing less than exemplary," concludes Dinno. "The positive reactions from both audiences and artists alike have provided us with such strong momentum. Isaac Stern once said that, 'Everywhere in the world, music enhances a hall, with one exception: Carnegie Hall enhances the music.' We at the Green Music Center know that there is now a second exception to this rule, and that is Weill Hall."

Mel Lambert has been intimately involved with production industries on both sides of the Atlantic for more years than he cares to remember. He is now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, and he can be reached at mel.lambert@mediaandmarketing.com.

The Cross-disciplinary Approach

By Randi Minetor

In the Carnegie Mellon theatre architecture program, architects and theatre practitioners learn from each other

"The best work in school and in real life is when you have collaboration between two groups," says Kevin Rodriguez, a fifth-year architecture student at Carnegie Mellon University (CMU). "The people who use the building are going to view it very differently from the way we view it as designers."

In this program, students from the schools of architecture and drama come together for a semester to understand each other's approach to their work. The final product: Design of an actual theatre building, based on a real project already in progress in New York City. In essence, the theatre majors become the clients of the architecture majors, sharing the common goal of a great theatre design.

> **"In school, you usually don't really have a client. I thought it was very interesting to have a client who would really tell you what they want, and how they do what they do."**—Kevin Rodriguez

It may seem like an obvious point, but to students who are used to working solely with a professor or instructor in an academic situation, the opportunity to collaborate becomes a revelation. This is exactly what leaders of the CMU School of Architecture and School of Drama had in mind in 2001, when they created a new interdisciplinary program in theatre architecture—an innovative collaboration between two schools in the College of Fine Arts.

The program aims to open architecture students' eyes to the unique challenges of designing a space for theatrical performance—creating a new generation of theatre architects who understand issues like sightlines, wing and loft spaces, load-bearing structural strength, lighting and sound, dressing rooms, scene and costume shops, and many others.

"In school, you usually don't really have a client," explains Rodriguez, who participated in the program in the fall 2010 semester. "I thought it was very interesting to have a client who would really tell you what they want, and how they do what they do."

One consultant's vision

The one-of-a-kind program got its start in 2001, when CMU alumnus S. Leonard Auerbach, founder and president of the theatre consulting firm Auerbach Pollock Friedlander, became the consultant for CMU's new Purnell Center for the Arts.

While studying at CMU in 1966, Auerbach received a Heinz Fellowship for an interdisciplinary graduate study of theatre architecture—the first of its kind at then-Carnegie Tech. "I worked with the graduate architects in the urban design studio, focusing on the design of theatres," he says. "My thesis project was an expansion and functional renovation of the Tyrone Guthrie Theatre."

The program played an instrumental role in Auerbach's career, enough so that he conceived the idea to create an academic program based on his experience. The Purnell Center project opened the door for a discussion with Martin Prekop, dean of the CMU College of Fine Arts at the time. "At the end of construction, Martin asked if I would like to become a donor and sponsor a room in the new building," Auerbach says. "I responded that more importantly, I would like to see a theatre architecture program fashioned after the study I had participated in as a graduate student."

Auerbach and Prekop brought together the heads of the schools of drama and architecture—then Peter Frisch and Vivian Loftness, respectively—to determine the best way to move forward. With the help of funding Auerbach provided, the two schools launched a pilot semester. Lectures delivered by top theatre architects and acoustics consultants, a theatre design seminar, and an architecture design studio engaged fourth-year architecture students and drama graduate students in a semester of intensive collaboration.

As the program got underway, Auerbach approached Bob Theis, then president of J. R. Clancy, Inc., to

make a significant corporate contribution as well. A major designer and manufacturer of rigging equipment for theatres around the world, J. R. Clancy has a vested interest in educating future theatre architects.

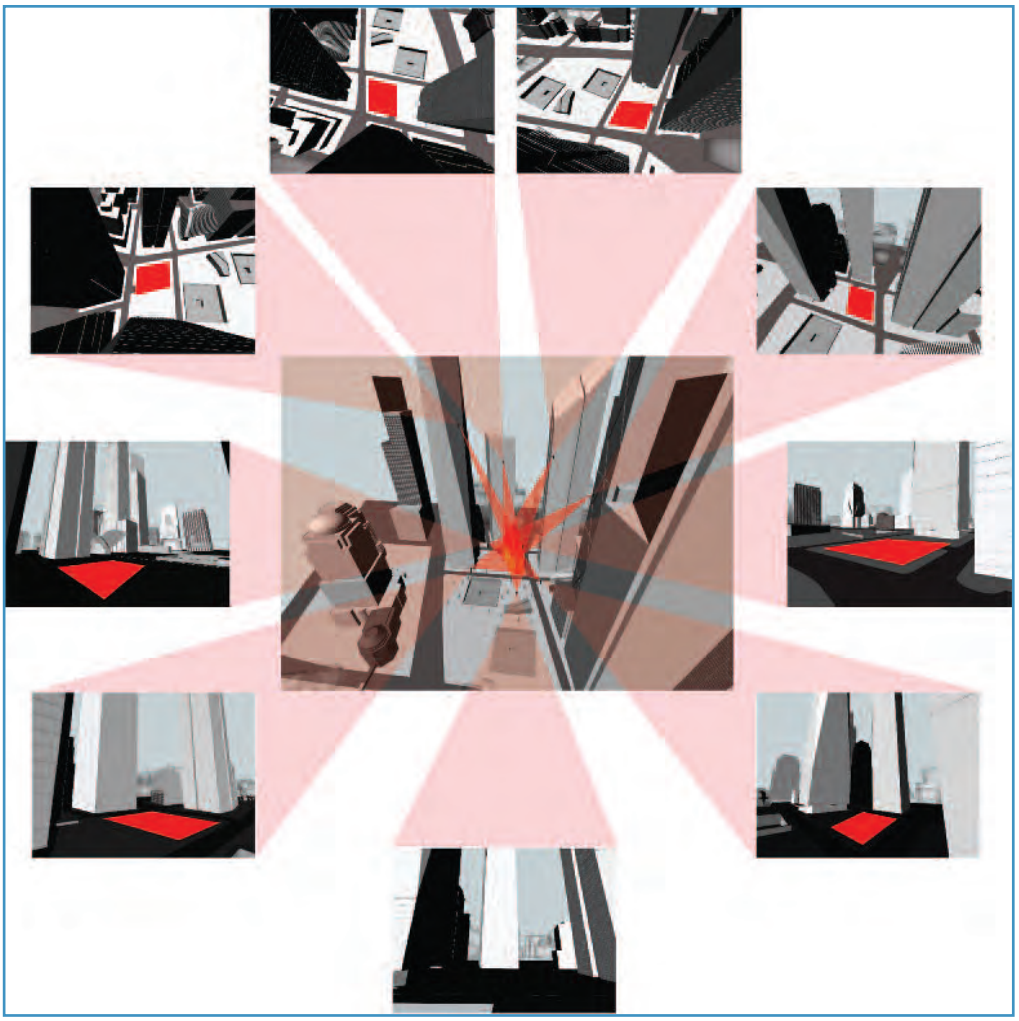
"We were absolutely delighted to be able to participate with Len in the startup of this program," says Theis, now J. R. Clancy chairman. "This will be a great success for a lot of young people, while creating the next generation of highly specialized professionals who understand all aspects of theatre design."

The gift established the J. R. Clancy Endowment, which, together with Auerbach's contributions, funds lectures and field trips for students and their instructors to New York City, Las Vegas, and other areas to see theatres under construction, as well as some of the most complex performance facilities in the nation.

"It's a fantastic program that Len's initiated," says Peter Cooke, head of the CMU school of drama. A native of Australia, Cooke shares Auerbach's understanding of the need to educate architects about the peculiarities of theatre design.

"In Australia, there was a whole spate of theatres built in the 1980s and 1990s," he says. "Every town wanted a theatre complex, so these buildings went up everywhere with extremely poor communication between the architects and the theatre world. There had been and there continues to be bad halls built, and you just can't do theatre in these venues. So having an informed and bright cohort of students who understand the needs of the artist will make a much better landscape down the road."

To teach the course, CMU has connected with a number of theatre design professionals. Kevin Wagstaff, adjunct assistant professor of architecture and a principal at the Pittsburgh architectural firm Perfido Weiskopf Wagstaff + Goettel, taught the spring 2010 semester with Dick Block, associate head of the CMU School of Drama. Matthew Fineout, a partner with Smart Architecture in Pittsburgh, also served as an instructor.



Above: A conceptual drawing by Jiwon Hur, a student in the program, for the Joyce Theatre at One World Trade Center.

Most recently, the School of Architecture recruited one of its own alumni: Hal Hayes, a practicing theatre architect in New York City. "Hal is very connected to the New York theatre scene," said Stephen Lee, head of CMU's school of architecture. "He's very involved with the World Trade Center project, and he's a wonderful designer."

The creative cauldron

Bringing theatre students into the architectural studio creates an exciting learning environment, Cooke says. "In drama, we have designers, we have technicians, we have directors, but we don't know a lot about building systems and infrastructure, like heating and air conditioning," he explains. "We know the things that make a good theatre. So having that sensibility, having that interaction that informs each other's process…it's a wonderful cauldron in which they're all swimming."

Kevin Rodriguez had exactly that experience as a student: "I had questions about how lighting works. Is it one room where they control everything, and is there sound in there as well? So I talked with the lighting

majors, and they really were able to go into how they do everything, and the questions I had were answered. Then they asked about how the construction process works, and how we do what we do. We had people to help us understand what we were supposed to be doing."

And the result? "I found that they picked it up; they were very quick on the uptake on both sides," says Cooke. "When I went to the last big pin-up [where students share their final designs], the architecture students really understood the staging issues. And then how to bring everything into the building with street entrances and subways—were they actually going to bring everything in through the front door, for example. I found it as interesting as the students did, I'm sure."

From the outside in

As part of the semester-long seminar, students create their own designs for a site on which a real theatre is under construction. In the fall 2010 semester, the class engaged with Len Auerbach and Steve Friedlander in New York, where the firm is currently the theatre consultant for Signature Center, the new home of the Signature Theatre Company in New York City. Construction had just begun on a 70,000-sq.-ft. space designed by architect Frank Gehry. Students had the opportunity to meet with Jim Houghton, Signature's artistic director, and learn about the challenges involved in creating a center in a mixed use high-rise with three performance spaces: a 299-seat theatre with a stationary stage and seating, a 199-seat flexible space, and a miniature opera house with just 199 seats.

"The Signature was just starting construction, and one of the staff people took a real interest in our activity," says Lee. "The students got far more time on the job site than we would ever have hoped would happen. It's a balancing act, because we're not producing work that can be legally incorporated into the project, but the students can envision things and help the architect think in a slightly different way."

This fall's studio assignment is the new Joyce Theatre Company's 1,000-seat performance center, currently under construction in the World Trade Center in downtown Manhattan. The

A concept drawing by Ranjit Korah, another student, for the Joyce Theatre's interior.

> "While going to the theatre is very important from the audience point of view, there is nothing like getting into the inner workings of the building in helping to understand how design affects the experience." Auerbach

J. R. Clancy Endowment provides the funds for multiple field trips from CMU's Pittsburgh campus to New York City.

In addition to the Manhattan junkets, students travel with Auerbach annually to visit some of the nation's most complex stages.

"The J. R. Clancy funding and my personal funding have enabled several valuable field trips to visit Cirque du Soleil theatres in Las Vegas and multiple venues in New York," says Auerbach. Once on site, the students benefit from Auerbach's commentary about the building design process as they take a backstage tour of the facility, and again as they watch a performance on the stage he designed. "While going to the theatre is very important from the audience point of view, there is nothing like getting into the inner workings of the building in

helping to understand how design affects the experience," he says.

Last year's trip to Las Vegas to tour the backstage facilities of Cirque's *KA* and *The Beatles LOVE* exposed 14 students to the most advanced theatre technology in the world, Auerbach says. Students viewed stage machinery, lighting, and sound systems, and other elements involved in designing a performance venue: "In my orientation lecture, I said that no matter how complex the venues you are about to experience may be, all of the elements, in different scales and scope, are required for theatres of all sizes and forms. Everything is applicable."

A bright future for theatre design

How effective is the CMU program in opening future architects' eyes to theatre design?

Several studio graduates have gone on to positions at Auerbach Pollock Friedlander, in the company's New York City and San Francisco offices. "Over the years, we have hired CMU graduates who have risen to principal, senior associate, and associate levels within our firm," Auerbach says. Another graduate obtained a senior design position with J. R. Clancy.

"The really important lesson that I want my students to take away is that buildings are becoming so complex in our society that the architectural practice today is collaboration," says Lee. "We are very protective of the numbers we have in studio, so we embrace every opportunity we have for students to work across disciplines. I want them to know that they don't know everything, and they will be asking a lot of questions."

"The collaborative merging of many design and technical disciplines is now critical to the success of creating effective buildings," says Auerbach. "Just consider the new presentation media, theatre machinery, automation, production and directorial values, video and projection, 3D imagery, 3D tracking of flying performers, audience viewing and comfort criteria, ADA, sustainable architecture, and expressive architectural design as icons of the arts and architecture. These facets need to come together with design leadership, not only from the architect but also from multiple disciplines."

This drawing, by Hur, offers a cutaway view of a version of the Joyce Theatre.

If Rodriguez's experience is typical, CMU is on the right track "The final project really showed how much we had worked together, and how much we learned from each other,," he says. "This was exponentially better than other studios, because we learned so much from the other students."

Mike Murphy, president of J. R. Clancy, sees the value in bringing theatre students together with future architects as well. "With the complexity and imagination we see applied to new theatres of every size, it's critical that architects understand all of the systems that go into the building," he says. "CMU has taken an important step in teaching its architecture students to be aware of the ways that the finished building will be used, from the stagecraft to the audience experience. We at J. R. Clancy are proud to be a part of this excellent effort."

TECHNOLOGY PLANNING & MANAGEMENT

Keeping Control: Integrating Technology in the Classroom

The myriad technology used in today's college classroom is simply managed with the right interface, making professors' jobs easier and lightening IT's workload.

by ELLEN KOLLIE

With 2,100-plus students, Bay Path College (BPC) in Longmeadow, MA, is a small college. Until recently, it suffered the same problem that plagues colleges and universities of all sizes: classrooms outfitted with multiple types of technology, each requiring individual control.

For example, a classroom may have a television, DVD player, laptop, projector, whiteboard, microphone/speakers, and dimmable lights. That is a lot of equipment for a professor to master to present a lesson. "One common problem is audio-video systems that are complicated to operate and not intuitive for most instructors," confirms Mike McMackin, ASTC, principal with Auerbach Pollock Friedlander, a media facilities planning and design firm headquartered in San Francisco. "Audio-video

PHOTO COURTESY OF BAY PATH COLLEGE

PUTTING THE PIECES TOGETHER. Classrooms at Bay Path College were outfitted with a number of technology tools — and controls. A flexible software solution integrated these tools resulting in something easy to use for professors and IT staff.

ISTOCKPHOTO / STUDIOVISION

To complicate matters, classrooms are not consistently outfitted with the same technology: Room A may have a television and DVD player but no laptop, and Room B may have a laptop but no television and DVD player. Even if they are consistently outfitted, the projector in Room A may not be the same brand as the projector in Room B and, therefore, may operate a bit differently.

equipment and systems are often designed by engineers, not teachers. What seems intuitive to an engineer is not always intuitive to an end user."

To complicate matters, classrooms are not consistently outfitted with the same technology: Room A may have a television and DVD player but no laptop, and Room B may have a laptop but no television and DVD player. Even if they are consistently outfitted, the projector in Room A may not be the same brand as the projector in Room B and, therefore, may operate a bit differently.

Fortunately, controls are available to integrate all the different elements and bring much-needed and much-desired simplicity at the touch of a button. Sometimes, however, even the controls can be a challenge, as McMackin notes: "The lack of uniform equipment and a uniform user interface means that instructors are required to learn to operate different systems depending on what room they are teaching in."

Integration at BPC

These challenges are similar to what BPC was experiencing. "We have so many disparate control systems on campus, such as Questron and AMX," says David Demers, Ph.D., vice president for Academic and Administrative Technology. "Faculty had to learn how to teach in every classroom in a different manner. It was complicated by an inability to easily swap equipment out because of proprietary controls. This required some down time because, in order to reprogram control boxes, a vendor had to be called in."

Then Demers saw an article in a trade magazine about a control system that was new to him: Santa Ana, CA-based Utelogy. The article included contact information at a campus that was using the system, so he reached out to the contact to discuss the system. "Once I saw that it would be easy to roll out here," he recalls, "I contacted the company and asked for a

demo." In June 2011, he signed a contract for the comprehensive and flexible, pure-software solution for integrated control and management of his AV systems.

For Demers, the benefits were immediate, including no additional hardware costs, upgradable software that keeps up with his evolving AV needs, control over the configuration and customization parameters, management of AV systems can be done from anywhere, and it's scalable to grow with the college. "Because it's menu based and on the network," says Justin LeTellier, manager of New Media Services, "technicians can access the system remotely to troubleshoot and set up the classrooms; we don't have to know the coding."

For BPC instructors, the system makes teaching a breeze. After logging into the instructor PC, they are presented with a dashboard that allows them to control the various devices. The interface is broken into three sections: volume, display, and sources. The volume offers a slider to control the volume level in 10-percent increments. The display section allows the projector to be turned on or off. The sources section details the options, which vary depending on what's available in the classroom that can be shown on the projector. If additional controls are available for the selected source, they appear in this section. For example, if the document camera is available and chosen, the controls appear to alter the zoom, focus, and lights.

After a year of use, BPC administrators surveyed professors who had taught in Utelogy-enabled classrooms. One hundred percent said the system was easy to use, 89 percent said it was much easier to use the enabled classroom than a non-Utelogy classroom, and 77 percent said it allowed them more time to teach. "The most common response," says LeTellier, "was that it was easy to use."

Advice From the Experts

"Standardization is almost impossible to achieve with fast-changing technology," says Nick Deslonde, CTS, president of Aavid Presentation Systems, with offices in Florida and Louisiana, "so the classroom itself has to be prepared to accept all the different devices." If you have that understanding and are ready to integrate your classroom devices to accommodate everyone who doesn't know — but uses — technology, then the experts have some advice.

▶ **1. Design:** If you're able to start at the beginning, then start with design. "Our first question is, 'Does the institution have instructional technology standards?'" says McMackin. "We want a good understanding of how social interaction works in the teaching environment and what is being taught." For example, are chalkboards and whiteboards used in conjunction with electronic images and audio enhancement? Is the room required to support distance learning? Are special teaching tools required, as for a culinary program or a biotech lab? "Then we look at appropriate room design and apply the appropriate technologies," he says.

▶ **2. Budget:** If you want to integrate your classroom technology, says Deslonde, it's best if you know your budget and design an interface solution around that. McMackin agrees, stressing that it's important to have an adequate budget for appropriate technology. He sees two common pitfalls: budgets based on antiquated technology and projects that do not include equipment in the construction budget. Striving for open architecture in the design allows for the anticipation that audio-video systems will change though the building's life; this is one way to stretch the budget.

▶ **3. Support:** Talk with other clients who are using the product you're interested in, asking if they find the tech support department responsive to their needs. "We have found Utelogy tech support willing to help when we have a question," says Demers, "and they're receptive when we desire to add functionality."

▶ **4. Training:** Having integrated controls doesn't mean an educator is ready to embrace the use of technology in the classroom. Here's where training comes in. "If integrators take the time to train the users, then they will learn to love the technology as opposed to hating it, and they will choose to use it," says Deslonde.

When all is said and done, integrating classroom technology should make life easier for everyone and, most notably, it should improve educators' classroom time. "If our educators know an interface is there, we haven't done our jobs well," says Deslonde.

It's working so well for BPC administrators that they're expanding their program, having added more classrooms this past summer. "Setup is easy," says LeTellier. "It's just a matter of copying and pasting, so we can get a classroom up and running quickly. Plus, there are powerful reporting capabilities built into the system, such as device usage and lamp hours left on projectors."

Further, the team has started to deploy the system at one of their two satellite campuses. Demers notes the benefit: "It enables us from a central location to monitor equipment without ever having to drive there, thus saving both time and money." Problem solved. CPM