CASE STUDY

Laboral Ciudad de la Cultura
Gijón, Spain

Meyer Sound®

Constellation

Constellation at Teatro de la Laboral

Constellation electroacoustic architecture, part of Meyer Sound's line of digital audio products, marks a breakthrough in acoustical technology for performance venues. Constellation can instantly enhance a venue's acoustics at the touch of a button, thus enabling the acoustical characteristics of a room to be tailored to achieve the optimal response for any type of event. This extraordinary flexibility, combined with natural sound quality and a lower cost compared to most physical or mechanical alternatives, makes Constellation the preferable option for multipurpose performance venues.

SUMMARY

Teatro de la Laboral Revival Takes 21st Century Approach to Acoustics

Teatro de la Laboral was built in 1945 to be the house theatre for the Fundación José Antonio Girón, designed by the celebrated architect Luis Moya Blanco as a vast orphanage for the children of Asturian mineworkers killed in occupational accidents. (Girón was then Spain's Minister of Labor.) No expense was spared in the construction of what was almost a new town on the outskirts of the northern coastal city of Gijón.

By the time the complex was finished, however, it had been recast as Universidad Laboral de Gijón, a vocational training institute for industrial workers. It maintained this role until 2000, when the government of the Principality of Asturias launched a plan to transform what had become a rather run-down assortment of buildings into a new center for the arts, to be called 'Laboral Ciudad de la Cultura.'

Work on the center began in 2005, retaining Moya's imposing façades while modernizing and enlarging the buildings. In early 2007, Laboral Ciudad de la Cultura opened its doors.

What was formerly the campus's lecture hall was reborn as the 1,426-seat Teatro de la Laboral, complete with a modern, fully equipped stage house that substantially increased the venue's volume. The theatre began operations in October of 2007.

Key to both the artistic and commercial success of the refurbished theatre would be its ability to host a very wide variety of events, from chamber and orchestral music to amplified rock concerts, drama performances, movie presentations, lectures, and corporate events.

Envisaged as the performance centerpiece of the Laboral Ciudad de Cultura, Teatro de la Laboral is required to provide a focal point for, and serve the disparate needs of, the many artistic, educational, and business institutions that now occupy the rejuvenated site. These include new studios of RTPA, the main radio and TV station of the Principality of Asturias; the Laboral Centro de Arte y Creación Industrial, which aims to further the development of the creative arts in an industrial context; the ESAD school of dramatic arts; and the University of Oviedo, which occupies an extensive campus opposite the theatre.

To accommodate these needs and give the theatre the ability to switch easily from one usage to another, the Laboral's managers chose to install Meyer Sound's Constellation electroacoustic architecture, a unique system that enables the acoustic signature of a venue — its reverberation and early reflection characteristics — to be altered to suit each performance type, without the cost, aesthetic, and construction issues of mechanical methods of variable acoustics. In addition, a main sound reinforcement system and cinema sound system from Meyer Sound were installed in the hall, providing a single source for a complete audio solution.

Challenges

- Refurbished theatre needs to host a wide variety of event types
- "Dry" physical acoustics unsuitable for some uses
- New stage house area has no physical acoustic shell to help musicians hear each other
- Venue is a historical structure, mandating aesthetic and architectural acceptability for any solution
- Traditional mechanical solutions unsuitable due to high cost, difficulty of implementation in a historical structure, and limited benefits

Requirements

- High intelligibility for events involving spoken word
- Clarity for musical performance
- Ability to provide similar acoustics for performances or rehearsals (with no audience)
- Improve audibility of performance onstage
- Ability to change characteristics at the push of a button
- Integration of Constellation system with theatre's main and cinema sound systems

Benefits

- Constellation system controls key acoustical characteristics: reverberation, intimacy, loudness, clarity, envelopment, warmth, etc.
- Quality and quantity of early reflections (essential for clarity) controllable separately from reverberation, with capability for the relationship between the two to differ in each preset
- Eight preset settings for different uses
- Cinema sound system maximally leveraged by additional use as part of Constellation system
- Better interaction between performers fostered by effects of "virtual shell"
- Breadth of performable repertoire greatly increased
- Additional educational and commercial uses now possible
- Self-powered loudspeakers eliminate the need for loudspeaker cable runs and dedicated amplifier space

Constellation

"The natural acoustics here were perfect for spoken voice, and we didn't want to lose that; Constellation has given us a more flexible venue without affecting the original acoustic."

Rafa Mojas
Technical Director
Teatro de la Laboral

CONSTELLATION OVERVIEW

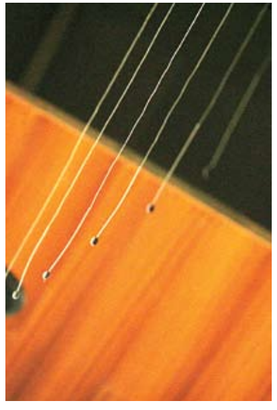
Constellation electroacoustic architecture combines advanced digital processing and transducer technologies with decades of research into the acoustical attributes of exceptional listening spaces to yield flexibility unattainable with traditional mechanical methods of variable acoustics, such as movable walls, drapes, orchestra shells, or secondary chambers, with no time or labor requirements for reconfiguration.

In Teatro de la Laboral, Constellation enables the staff to choose from a broad variety of natural-sounding acoustics to suit the theatre's many kinds of events, instantly modifying the venue's sonic character with a single touch of a button on an LCD computer screen.

System Design Goals

The needs of Teatro de la Laboral were complex. The venue is sizable, containing approximately 11,000 square meters (118,400 square feet), with more than 24 meters (72 feet) of height. The acoustical impact of the new stage house posed a challenge, as well.

"Before the restoration, the theatre had a very small, inflexible stage shell," says John Pellowe, who was project director for Meyer Sound's Constellation team at Laboral. Pellowe is a GRAMMY-award-winning classical recording engineer, as well as having spent 20 years mixing the massive concerts Luciano Pavarotti gave around the world. "The main structural change now is that the shell has been removed and replaced by a big, new stage house. One of our main priorities, when designing the Constellation system for the venue, was to prevent this from becoming an acoustically distinct space capable of coupling, in an undesirable way, to the main hall acoustic."



Moya's original design was for a traditional theatre, which would feature spoken word and dramatic productions. Six decades later, in keeping with the overall objective of modernizing the venue without losing its aesthetic identity, the acoustician sought to retain as much as possible of the original acoustical characteristics, resulting in a mid-frequency reverberation decay time of around 1.3 seconds with the venue empty — very close to the original. This would work well for cinema and spoken word uses, but not as well for many musical performances, which require longer reverberation times.

Consequently, the specification was that the system should provide mid-frequency decay times varying from the shortest time (i.e., that of the room's pure physical acoustics) up to a maximum 2.0 seconds for symphonic or choral programs.

As well, it was desired that musicians be able to experience the same acoustics during rehearsals as during performances. This meant that the system had to enable the hall to sound the same without an audience as with one.

Another challenge was that the theatre employs a primary sound reinforcement system and a separate cinema sound system, both already designed by Álvaro Elena of Meyer Sound España, in addition to the Constellation system. (All sound systems in the theatre use self-powered loudspeakers from Meyer Sound.) While each of these systems serves a different function, the theatre management wanted to maximize the utility of the systems through some degree of integration.

Finally, there was the fact that much of the refurbishment program — though not the construction of the new stage house — was complete by the time Meyer Sound was approached to offer its Constellation solution.

Project Partners

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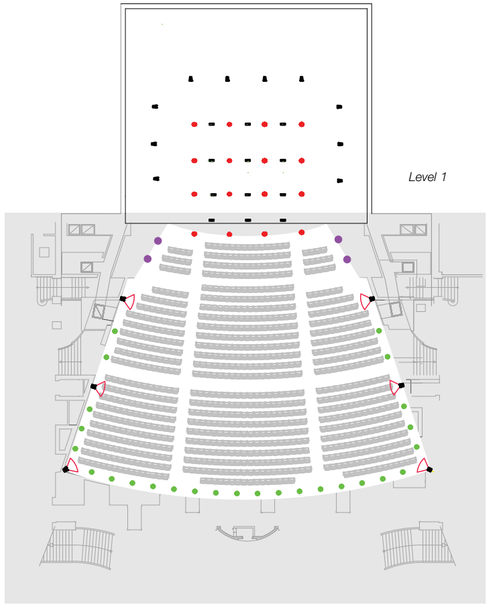
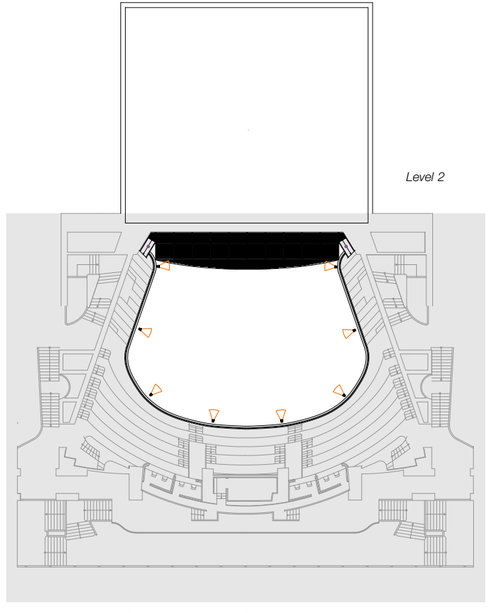
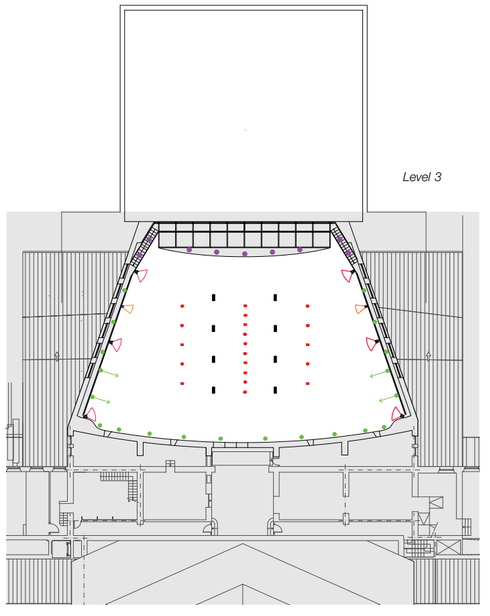






Each Constellation system employs a large number of microphones and loudspeakers, the placement and tuning of which are complex and critical. These figures show the loudspeakers deployed on each of Teatro de la Laboral's three levels. The system is carefully calibrated to ensure optimal energy levels emanating from every direction.

Constellation System

46 Stella-4 loudspeakers
15 Stella-8C loudspeakers
12 UMS-1P-SM subwoofers
34 UPM-1P loudspeakers
10 UPJunior loudspeakers
12 UPJ-1P loudspeakers
20 Cardioid Constellation microphones
20 Omnidirectional Constellation microphones
1 MS-Constellation processor
2 MS-CONST-EXP processors
4 MS-VRAS processors

Constellation System Configuration

Zones and Components

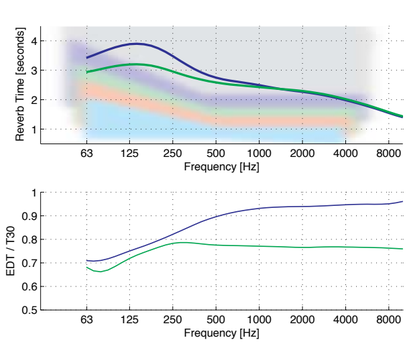
Every installation of Constellation is custom-designed for its intended venue and, because the system is scalable, the design of each system is tailored to the size, shape, age, and finish of the particular room in which it will be installed.

To meet the Teatro de la Laboral's needs, the system design specified four zones: one to provide early reflections to the stage, one to provide reverberation to the stage (to enable the stage and the house to have the same reverberation times), one for the left side of the house, and the last for the right side of the house. Each zone is driven by its own Constellation MS-VRAS processor.

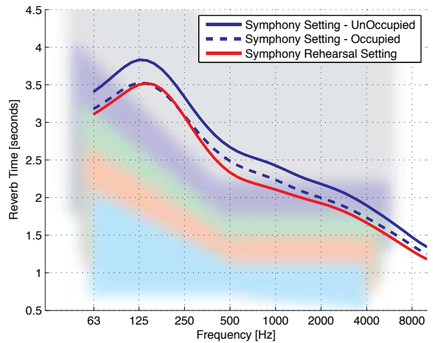
In addition to the MS-VRAS processors, there is an MS-Constellation processor that acts as the system's cornerstone: the touch screen controller connects to its RS-422 port, and its Ethernet port is used for programming the system. There are also two MS-CONST-EXP expansion processors to handle additional signal input and output needs.

A total of 129 loudspeakers are driven from 108 outputs. Forty Constellation microphones, a combination of omnidirectional and cardioid, are used to pick up the direct sound from the stage and the reverberant field.

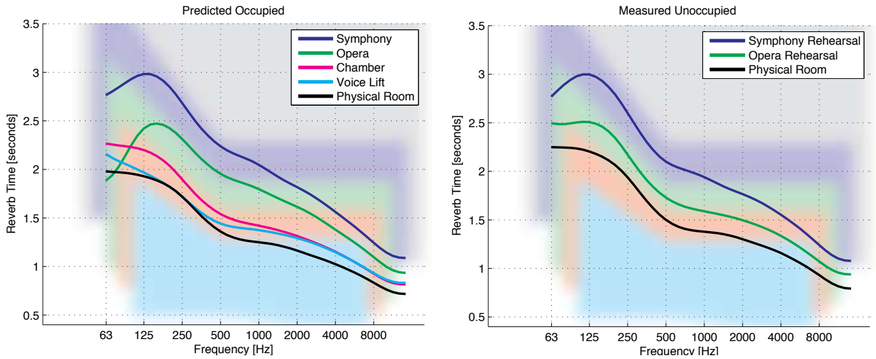
Key to both the artistic and commercial success of the refurbished theatre would be its ability to host a very wide variety of events, from chamber and orchestral music to amplified rock concerts, drama performances, movie presentations, lectures, and corporate events.



Constellation can control acoustical parameters independently, something impossible to do with mechanical variable acoustics methods. Notice the similarity between the reverberation characteristics (upper diagram) of the two settings shown, while the early reflections behaviors (bottom diagram) differ significantly.



When the Symphony preset is used with an audience present (dotted line), its curve is nearly identical to that of the Rehearsal preset in the empty house (solid red line), though the two presets differ quite a bit when both are used with the theatre empty (solid blue line).



The reverberation characteristics produced with Constellation hew closely to theoretical ideals for different sources (indicated by the pastel areas), whether using performance presets in an occupied house or rehearsal presets in an unoccupied house.

Stage Early Reflections and Reverberation Zones

The "virtual orchestra shell" formed by the stage early reflections and reverberation zones provides mid- and high-frequency energy from a combination of UPM-1P ultracompact wide coverage loudspeakers overhead and UPJunior ultracompact VariO loudspeakers deployed around the sides and back of the stage.

For musical events, low-frequency content is supplied to the stage by four UMS-1P-SM (single mount) subwoofers, which are adapted from Meyer Sound's UMS-1P ultracompact subwoofer.

Each self-powered loudspeaker is driven from its own processor output. Sixteen of the system's 40 microphones are used in this part of the system.

Left and Right House Reverberation Zones

The other two zones are used in the audience area of the theatre. Input comes from the remaining 24 microphones in the system, mostly omnidirectional. The majority of the loudspeakers used in these zones are Stella installation loudspeakers: 46 Stella-4 units and 15 Stella-8C units. Most of the Stella loudspeakers are deployed around the walls of the venue.

Twenty-two UPM-1P cabinets placed overhead and on the walls supplement the Stella loudspeakers, and eight Stella subwoofers provide very-low-frequency energy in the house.

Each processor output used for these zones drives either a pair of Stella-4 loudspeakers or a single one of the other loudspeakers used.

In addition, the Constellation system also makes use of the cinema surround loudspeakers, feeding them early reflection and reverberant signals.

These zones are designed to blend with each other, as well as with sound coming off the stage, to create a rich, immersive atmosphere for the audience for musical performances, and increase clarity and intelligibility for spoken word and dramatic performances.

User Interface

The Constellation system is controlled from a Crestron touch screen. Each of the system's seven presets is represented by an onscreen "button." Changing presets requires nothing more than touching the button for the desired preset. No other setup or conversion is required.

Cinema and Primary Sound Reinforcement Systems

The primary sound reinforcement system is based on left and right arrays of nine M'elodie ultracompact high-power curvilinear array loudspeakers each, augmented by a center cluster consisting of a pair of UPA-1P compact wide-coverage loudspeakers. Six UPJunior ultracompact VariO loudspeakers provide frontfill, while six 600-HP compact high-power subwoofers supply low frequency power. A Galileo loudspeaker management system with a single Galileo 616 processor is responsible for system processing and drive.

The cinema system uses a second Galileo 616 processor to drive a CQ-1 wide coverage main loudspeaker, paired with a DS-4P horn-loaded mid-bass loudspeaker, for each of the left, center, and right (LCR) channels. Surround signals from the theatre's Dolby processor are sent to the Constellation frames, which then route the signals to 12 UPJ-1P compact VariO loudspeakers, configured as three vertical pairs on each side of the theatre. Two 600-HP subwoofers provide very low frequencies.

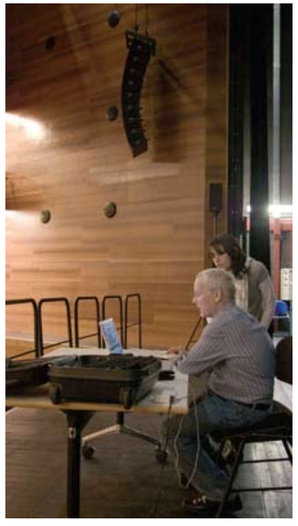
While the cinema system equipment is entirely separate from the primary sound reinforcement system, the surround loudspeaker system is sometimes used with the primary system for reproducing spot effects in theatrical productions. This was easily accomplished by networking the two Galileo 616 processors and creating a preset in the cinema system's processor to accommodate this use.

Main Sound Reinforcement System

- 18 M'elodie loudspeakers
- 6 600-HP subwoofers
- 2 UPA-1P loudspeakers
- 6 UPJunior loudspeakers
- 1 Galileo 616 loudspeaker management system

Cinema System

- 3 CQ-1 loudspeakers
- 3 DS-4P loudspeakers
- 2 600-HP subwoofers
- 12 UPJ-1P loudspeakers
- 1 Galileo 616 loudspeaker management system



Calibrating and tuning the system.

"With the Constellation system, we all feel more comfortable performing on-stage. No one can complain about the acoustics in this room any longer."

Yuri Nasúshkin
Conductor
Asturias Youth Symphony Orchestra

Installation, Calibration, and Tuning

Meyer Sound's Constellation team started with the design requirements given them by the theatre management and acoustical consultants, then took measurements of the room as it existed. From these parameters, the system design was devised.

Since Constellation features both regenerative and in-line components, system design, especially component placement, is complex and critical. However, actual installation of the system requires only best-practice professional installation skills and attention to detail in conforming to the design. No specialized skills or equipment is required.

The self-powered nature of the loudspeakers being used means that no runs of heavy loudspeaker cable are required, and no dedicated amplifier room is needed. The Stella-4 loudspeaker is supplied with DC power and balanced audio over a single cable, and its low-voltage, 12 to 18 V DC supply reduces induced noise and eliminates the need for running a wiring conduit to it.

The Meyer Sound Constellation team returned to calibrate and tune the system, as well as generate the presets, once installation was complete. As with the design of a Constellation system, calibration and tuning are complex procedures requiring highly trained and experienced staff. The Constellation team conducted these processes using proprietary methods and powerful tools, such as the SIM 3 audio analyzer.

At the conclusion of the tuning process, standard measurements, replicable by any acoustical professional, were taken to confirm that the design goals had been achieved.

The Outcome

The Right Acoustic for Every Situation

The Meyer Sound Constellation team created presets with different reverberation and early reflections content to accommodate spoken word, and several kinds of music, either in rehearsal or performance. The one-touch access not only makes it easy to reconfigure for different events, but to compare presets when there is more than one that might suit a particular performance.

- **For cinema screenings and many spoken-word presentations and dramatic productions**, the "Cinema" preset, which disables the Constellation system, is chosen to use the theatre's pure physical mid-frequency reverberation time of 1.3 seconds. At low frequencies, the room develops a maximum of about two seconds of decay.
- **Some spoken-word events benefit from the preset employing Constellation's VoiceLift feature.** The VoiceLift preset provides early reflections for greater clarity and intelligibility.
- **The "Chamber Music Occupied" preset** has similar reverberation decay to the VoiceLift preset at frequencies above about 1 kHz, but at lower frequencies has noticeably longer decay times, reaching a time of about 2.25 seconds around 125 Hz. It also differs from VoiceLift in its early reflections characteristics. This preset is good for delicate music in which the definition of the instruments should not be muddied.
- **The "Chamber Music Rehearsal" preset** is for use when the house is empty. Without the absorption provided by an audience, less energy needs to be put into the room to attain the same characteristic as the "Chamber Music Occupied" preset. Used under their respective intended circumstances, the resulting acoustic signatures are extremely close.
- **The "Opera" preset** is useful for vocal music that involves more individual voices than choral music. Its mid-frequency reverberation time is 1.65 seconds, but it has considerably longer reverberation times at all frequencies than the Chamber presets.
- **The " Symphony Occupied" preset** puts the most reverberant energy into the room of any of the presets, reaching a full three seconds of decay around 125 Hz. The mid-frequency decay time is two seconds.
- **The "Symphony Rehearsal" preset** exhibits very close to the same as the "Symphony Occupied" preset when the latter is used with an audience present.

The Constellation system is not used for screenings or performances involving amplified music (when the primary sound system is in use), but this is only for aesthetic reasons. In theory, if Constellation were to be turned on in such a situation, the system would act exactly as if it were a room with the pure physical acoustical characteristics the preset creates.

Expert Ears Hear the Sound of Success

After attending a demonstration of Teatro de la Laboral's Constellation system with chamber music performed by the Aristos Quartet, acoustic consultant Gerasimos Efthymiatos hailed Constellation for its natural quality. "I've been studying virtual acoustics for a decade as a postgraduate researcher," says Efthymiatos, "and if you have an application where the acoustics are challenging, it's hard to get a good result. But this auditorium sounds nice and natural throughout its length. It doesn't feel at all false, and at no time are you aware that the source of the enhanced reverberation is the Constellation speakers.

"What is also impressive, given that there are so many speakers and microphones, is that there are no obvious feedback effects. This is a really notable achievement, especially as there is no compression or limiting in the Constellation algorithms being used here."

A Comfortable Performing Environment

When performers can't hear onstage, they can't give their best performances. The difference made in this area by Laboral's Constellation system has not been subtle. "I didn't tell the musicians what we were doing," says Pellowe of his first demonstration of the system during rehearsals with the Asturias Youth Symphony Orchestra (AYSO). "(The musicians) sat down and played and then, during the break, I warned them I would be turning Constellation on and off while they were playing. They were shocked by the difference. They were not even aware they were playing in an enhanced environment until I turned it off."

"With the Constellation system, we all feel more comfortable performing on-stage," says Yuri Nasúshkin, conductor of the AYSO. "No one can complain about the acoustics in this room any longer."

Efthymiatos likens Constellation's benefit to the Aristos Quartet to that of amplified stage monitoring on pop or rock musicians. "Classical performers don't want the false sound of an amplified system, but they do want more clarity," he says. "For these musicians, Constellation is a way of improving clarity in a way that rock or electronic music performers take for granted with stage or in-ear monitoring."

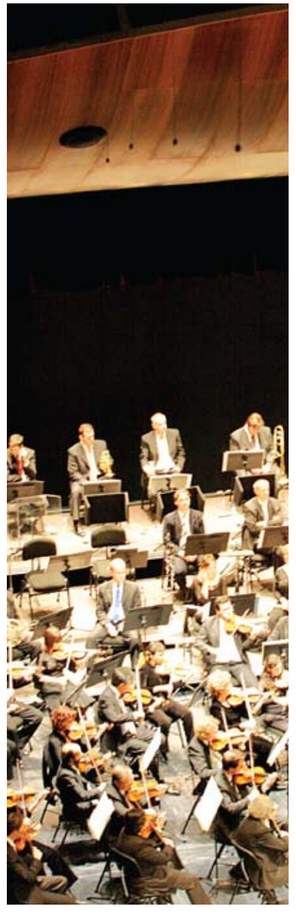
The Venue's Perspective: Reasons to be Cheerful

For Rafa Mojas, technical director of the Teatro de la Laboral, the Constellation system has brought a number of clear advantages. "First of all," he says, "having a virtual shell rather than a physical one has saved us a lot of space, and also saves us a lot of man-hours that would otherwise be spent moving the physical elements.

"Secondly, the natural acoustics here were perfect for spoken voice, and we didn't want to lose that; Constellation has given us a more flexible venue without affecting the original acoustic.

"Thirdly, the fact that Constellation has been integrated with the main and cinema Meyer Sound systems has made it much easier to control the system. All it takes is the simple push of a button on a Crestron panel in the front-of-house cabin, and all three system settings are changed, depending on the preset selected."

Beyond the performance of the system, Mojas also found the technical support the venue received from Meyer Sound to be part of Constellation's value. "When they were designing, calibrating and tuning the system, the Meyer Sound people were practically living here in Gijón!" he laughs. "We will continue to learn from the experience of performers and audiences and, if we require more settings for the system, we know we can rely on Meyer Sound to assist us. For a venue operator that is great to know."



CONSTELLATION SYSTEM COMPONENTS

Constellation is a complete, fully integrated electroacoustic architecture solution that encompasses expert services along with advanced technology. Every system begins with in-depth consultations and analysis by Meyer Sound's Constellation team, and continues through system calibration and tuning.

Constellation Processors

At the heart of every Constellation system are highly sophisticated digital processors which employ Meyer Sound's patented VRAS algorithm.

The MS-Constellation processor contains the communications hardware required in a Constellation system. It receives the user's preset selections and issues the right commands to run them on the MS-VRAS processors.

The MS-VRAS processor is the unique technological core of Constellation, providing powerful digital signal processing for the VRAS algorithm.

MS-CONST-EXP expansion processors provide additional inputs and outputs for the MS-VRAS processors.

Microphones

The Constellation system utilizes precision-calibrated omnidirectional and cardioid Constellation condenser microphones, carefully placed over the stage and spaced throughout the room, to pick up both direct and reverberant sound.

Loudspeakers

Effectively reproducing the characteristics of a natural acoustical environment requires loudspeakers of extraordinary linearity and consistency. Every loudspeaker in Meyer Sound's extensive self-powered line fulfills this requirement, though normally only more compact models — several developed with Constellation in mind — are specified for this application. The following models were used in Teatro de la Laboral:

Stella-4 Installation Loudspeaker

Incorporating a single 4-inch cone transducer, the self-powered Stella-4 offers exceptional performance in a small package. Maximum peak SPL of 108 dB combined with an operating frequency range of 100 Hz to 20 kHz and ultra-low distortion provide the accuracy required for creating a natural-sounding room characteristic.

Stella-4 receives balanced audio and DC power through a single 5-pin Phoenix connector. Low-voltage (12 – 18V) DC powering provides the benefits of self-powering with no requirement for conduits. The Stella-188 external power supply provides eight outputs carrying power and audio, and accepts eight discrete audio inputs on a single 25-pin D-sub connector.

Stella-4 comes in a compact, standalone package that blends into wall and ceiling architecture, and can be ceiling or wall mounted through the use of an included bracket or via third-party accessories such as OmniMount.

Stella-8C Installation Loudspeaker

The Stella-8C delivers acoustical performance similar to that of the Stella-4 and Stella-4C loudspeakers, but with expanded output capability and wider coverage. The unit's 8-inch coaxial cone and 0.75-inch tweeter transducers can produce a maximum peak SPL of 117 dB at one meter over a wide frequency range of 100 Hz to 22 kHz.

Housed in an aluminum diecast enclosure with a heatsink on the back, the Stella-8C can be flush-mounted in ceilings and walls with standard backcans for 8-inch drivers (with a minimum depth of 6.5 inches).

The Stella-8C exhibits the same low distortion, high intelligibility, and flat frequency and phase response for which Meyer Sound products are known. As a self-powered loudspeaker, the Stella-8C offers simplified installation for the multichannel output of Constellation systems or other installation applications.

The required method for delivering balanced audio and DC power to the Stella-8C is with the Stella-188 external power supply, which can accommodate up to eight Stella-8Cs (one per channel output).

UPM-1P Ultracompact Wide Coverage Loudspeaker

The award-winning UPM-1P is a self-powered, bi-amplified, three-way system capable of high sound pressure levels with low distortion and uniform directional control. High-frequency reproduction is provided by a one-inch metal dome driver, while low-mid reproduction is handled by two five-inch cone transducers. Both low/mid drivers work in parallel for low frequency power, with one driver rolling off above 320 Hz to maintain a uniform directional pattern through the crossover region.

In addition to a two-channel power amplifier (350 W total), the internal electronics module also includes frequency- and phase-correction circuits, driver protection, and a laser-trimmed, differential input stage for superior common-mode rejection.

UPJunior Ultracompact VariO Loudspeaker

UPJunior brings the sonic signature, versatile rigging, and extraordinary power-to-size ratio of the award-winning UPJ-1P to a smaller package convenient for use in Constellation systems. UPJunior's VariO horn allows quick rotation to provide an 80-degree by 50-degree coverage pattern in either the horizontal or vertical plane.

UPJunior's low/mid-frequency section employs an 8-inch neodymium magnet cone driver, while the high-frequency section utilizes an efficient 0.75-inch exit, 2-inch diaphragm compression driver. Its small size belies UPJunior's power: it can produce a maximum peak output of 126 dB SPL at one meter over its wide operating frequency range of 70 Hz to 20 kHz.

A host of mounting and arraying options make UPJunior a versatile performer capable of satisfying a broad range of applications.

UMS-1P-SM Subwoofer

The UMS-1P-SM, an adaptation of Meyer Sound's popular UMS-1P subwoofer, is a small but remarkably potent self-powered loudspeaker system. Housing dual 10-inch drivers in a bass reflex cabinet, the Stella subwoofer produces a peak SPL of 127 dB (@ 1m) over an operating range of 25 Hz to 160 Hz. An internal two-channel power amplifier provides 450 W of total burst power. Compact dimensions allow discreet ground placement or mounting on trusses over suspended ceilings. The UMS-1P-SM subwoofer extends Constellation system bandwidth to the lowest bass octaves to create a natural acoustical response for all kinds of music, including orchestral and organ.

For more information on the Meyer Sound self-powered loudspeakers used in Teatro de la Laboral's primary and cinema sound systems, go to: **www.meyersound.com.**

"This auditorium sounds nice and natural throughout its length. It doesn't feel at all false, and at no time are you aware that the source of the enhanced reverberation is the Constellation speakers."

Gerasimos Efthymiatos
Acoustical Consultant

ABOUT CONSTELLATION ELECTROACOUSTIC ARCHITECTURE

A 21st Century Approach to Venue Acoustics

Constellation electroacoustic architecture is a major breakthrough in acoustical science that solves a challenge faced by many contemporary performance venues. In the past, performance spaces were acoustically designed for a specific purpose: theatres were optimized for plays, concert halls for music, lecture halls for speech, and cinemas for surround sound. But today's venues must cater to a wide variety of performance types and community events, and an acoustical signature ideal for one type of performance can impair the enjoyment of another.

This dilemma usually resulted in compromises, with acoustics designed to be minimally acceptable for all performances, but ideal for none. Some venues attempted mechanical systems to vary the acoustics, including orchestra shells, retractable draperies, and secondary chambers. But such solutions are inherently costly and often produce mixed results.

In contrast, Constellation offers a complete solution that allows venues to immediately alter the room's acoustical signature while remaining invisible to the eye. The result is optimum acoustical characteristics for both the audience and the performers on stage. At a musical concert, the listening experience has the enveloping warmth and resonance of a concert hall, while a play in the same space exhibits excellent intelligibility. Musicians on stage hear themselves better, fostering superior ensemble performances.

With Constellation, a venue can fill its schedule with a diverse mix of events and performances of all kinds. Constellation is scalable as well as flexible, making it suitable for venues of any size and type.

A Certified Solution

Constellation is provided as an integrated, turnkey solution that encompasses the patented VRAS digital technology, Meyer Sound's long-established excellence in loudspeaker design and manufacture, and the support of the company's highly trained staff of professionals. This approach ensures that every Constellation system is correctly designed, properly installed, and rigorously calibrated to meet all of the agreed project goals.

Experience is a crucial element in the proper design of electroacoustic architecture, and Meyer Sound's team of specialists offers an extraordinary range of talents and skills. The Constellation team includes not only qualified technicians, but also a staff scientist with a Ph.D. in acoustics and a GRAMMY-winning classical music recording engineer.

Once the system is installed, calibrated, and tuned, the user takes control with an easy-to-use interface. Adapting room acoustics to have the ideal response for any performance is as simple as the press of a button or click of a mouse.

Constellation

Adaptable Features

Constellation technology allows implementation of a variety of acoustical effects, both in the audience seating area and on stage. Some features require additional loudspeakers, microphones or processors, while others are implemented in the software presets. Of course, not all features are necessary or appropriate for every venue.

Ensemble

Constellation Ensemble provides an electronic version of the traditional orchestra shell, improving the listening experience — and often the performances — of musicians on stage. Because it is not a fixed shape and does not require any setup, Ensemble provides increased flexibility and reduced labor costs. For events involving large or widely spaced groups of performers, such as dancers or large choirs, Ensemble ensures that everybody on the stage is enveloped in a uniform field of natural sound.

VoiceLift

The VoiceLift feature significantly boosts intelligibility for events where the audience needs to understand presenters clearly. By adding early reflections that bring presence and immediacy to the spoken word, VoiceLift ensures that every word is heard clearly without the use of a sound reinforcement system. VoiceLift enhances the clarity and impact of a speaker in corporate meetings as easily as it allows the dialogue of a high school play to be heard in the back rows of an auditorium. In more complex productions, VoiceLift can even eliminate the need for an experienced audio operator.

Crowd Enhancement

Constellation allows everybody at an event — whether a church congregation or fans at a sporting event — to feel fully engaged in their surroundings. In church services, the reverberant field created by Constellation reinforces congregational singing, moving worshippers to a greater feeling of participation. (Unlike pure physical acoustics, though, Constellation can be turned off when it's time for amplified contemporary praise music.) Similarly, Constellation can enhance the sensation of crowd involvement at sporting events in venues having relatively dry physical acoustics.

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