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PRESS RELEASE

**Hyparschale Magdeburg restored to fulfill its potential as a multipurpose cultural hub**

*ADA Acoustics & Media Consultants, a WSDG company, has optimised the acoustics of this historic shell building by Ulrich Müther, transforming it into a versatile event venue*

**Magdeburg, Germany, December 3, 2024 – Hyparschale Magdeburg is one of the largest concrete shell constructions of its kind and one of only 50 remaining shell buildings created and designed by structural engineer Ulrich Müther (1934-2007). The project began in 1969 and opened in 1974 as a cultural institution for the German Democratic Republic, but after reunification the building fell into disuse, and by 1997, since the structural integrity of the roof was a cause for concern, it was closed. In 2017, the decision was taken to restore the building and a team from gmp Architects (Gerkan, Marg & Partners), headed by project leads Christian Hellmund, Sophie von Mansberg and Ursula Köper, were engaged to oversee the restoration, transforming the Hyparschale Magdeburg into a functional, multipurpose resource for the whole community. ADA Acoustics & Media Consultants (ADA-AMC), a WSDG company, was entrusted with the acoustics design of the space.**

Tobias Behrens from ADA-AMC began talks and site visits in 2017. A year later, the contract was awarded, and work could begin on computer modelling, as well as a report into the conceptual design for room and building acoustics. The scope of the project covered controlling the sound field, not only for the main volume of 17,000 m³, but also newly built cubes, overseen by Behrens and his colleague Jörn Hoffmeier. The electroacoustic design was also involved, as well as acoustic dampening of machine noise in the space, such as ventilation systems.

The term Hyparschale (Hypar-Shell) was coined by Müther to describe the hyperbolic paraboloid curves that characterise the design of many of his buildings. The limitations of contemporary building techniques and materials at the time of building meant that the Hyparschale Magdeburg did not live up to Müther’s original vision. The impressive ribbon of light provided by linear skylights was blocked when leaks meant that the windows had to be covered with roofing materials. Unfortunately, water ingress still damaged the internal structures of the concrete roof and within 20 years, the Hyparschale had become unsafe for public use.

The building is a remarkable sight on the bank of the river Elbe and much loved by the local community. So much so that when the plan to demolish was announced, the community, including a group of architects, fought to save it. The authorities of Magdeburg, state capital of Saxony-Anhalt, listened and when private investors could not be found, they decided to fund the project themselves. The restoration process would not be a simple task, the size and shape of the building’s roof and the vast open design of the building meant that making it vibrant, multipurpose and acoustically fit for purpose would be challenging, as Behrens explains.

“The fabric of the building was amazingly structurally sound, even after not being used since the 1990s,” he says. “The entire space is 20,000 cubic metres in volume, so a lot of material is required to bring down the reverb times. The ceiling would traditionally be a very useful place to start adding absorptive materials, but for this space, that could not happen.”

Consisting of four hyperbolic paraboloid roof surfaces, the Hyparschale covers a total area of 48 by 48 metres with glass façades on all four sides, with the highest point of the curves at 16 metres. Internally there are no supports, and the result is an uninterrupted, singular, open space. Reinstated skylights, uncovered after years of being hidden under roof felt, split the ceiling into quarters and emphasise the curve of the roof internally. More light floods in from the façade of transparent glass that replaces the original industrial translucent glass, opening up views to surrounding Rotehornpark.

To allow the space to have multiple uses, gmp Architects added cubes to each corner of the space, in a grid layout following Müther’ grid design. The cubes have a floor plan of 15 by 15 metres, two of them (designed as seminar rooms) can accommodate each up to 127 seated people. All four cubes are connected by walkways that span the space across the first floors. Individually, the ground floors have distinct purposes. One houses facilities such as bathrooms and cloakrooms, a second is home to a café, and the rear two accommodate multipurpose lecture and education rooms, as well as housing the large partitioning walls. The first floors contain exhibition galleries; the first exhibition to take place, *Banksy: A Vandal Turned Idol*, an unauthorised exhibition of privately owned artworks, opened in July 2024.

The remaining central area retains a large, spacious feel and can be used as an auditorium, capable of accommodating 500 seated people. The positioning allows the impressive volume beneath the curved roof to be fully appreciated. Reverberation times for this space would have been much too long even for concert or orchestral performances, disabling any acceptable speech intelligibility without absorbent treatments.

Due to the structure of the roof, traditional methods, such as applying a layer of absorption to ceilings, were unavailable. The ceiling could not be altered or have any weight added to it due to the complex mathematical balancing act that keeps the vast unsupported curve upright. The visual lines could also not be disturbed, so curtains or acoustic baffles were inappropriate for the space. This created a challenge for the acousticians involved in the project.

The expansive glass windows are also highly reflective and because the space is almost square, the walls are parallel, giving flatter echoes, negatively impacting intelligibility. Controlling the room reverberation times helps with these echoes and sun-blinds, added to windows to offer shade, delivered limited sound absorption, aiding the control of flat echoes in the auditorium.

The main solution for controlling the room acoustics came from the four cubes and the interconnecting bridges. These spaces are acoustically treated, not only internally with absorption materials on the walls, but with special five layered curtains that enable 20 dB of sound difference either side. They are also highly treated externally, with every possible surface covered with dampening materials, including the soffits of the bridges and wall faces. The materials used included a stretched metal panel with absorptive material behind it. Lateral reflections were allowed to remain to assist audiences and to ensure that the acoustics matched to the expected sound of such an open space.

“The Hyparschale requires a unique approach to provide the correct room response. As an audience member, if you don't have reflections from the side, you don't feel well because there is no auditive interaction to what you see,” explains Behrens. “Because of this, we left some reflective faces. The walls look the same, but there's no absorptive material behind the metal sheet, so the original acoustics is not as dampened by these surfaces.”

The central performance area and auditorium is fully equipped, containing a Kling & Freitag Vida-L system, specified by ADA-AMC (WSDG), and a lighting system designed by Lichtvision Design. The Kling & Freitag loudspeaker system is a scalable, controllable and full-range line array system. This system ensures that sound energy is directed exactly where it is needed, which has the double benefit of avoiding sending energy into the large reverberant hall and enabling the highly absorptive audience to soak up the majority of the sound, further reducing the opportunity to excite the room acoustics. The system is full range and capable of providing perfect sound for spoken word or musical events.

The result of the expert consideration offered by the ADA-AMC (WSDG) team is a beautiful, usable space that fulfils its brief of being both multi-purpose and an asset to the community, as Architect Christian Hellmund, Partner of gmp Architects, concludes.

“It was a particular challenge to achieve room acoustics that were suitable for multifunctional uses, even with the acoustic reflections of the shell roof,” he says. “In close coordination with the specialist acoustic planner and others, we succeeded in preserving the characteristics of the building's surfaces while at the same time meeting the new requirements for reverberation time and speech intelligibility.”

For more information about WSDG, visit [www.wsdg.com](http://www.wsdg.com)

Hi res images are available for download from <https://bit.ly/WSDG_HyparschaleMagdeburg>

Editors’ contact:

Sarah James at Gasoline Media  
Tel: +44 1483 223333  
Email: [sarahj@gasolinemedia.com](mailto:sarahj@gasolinemedia.com)