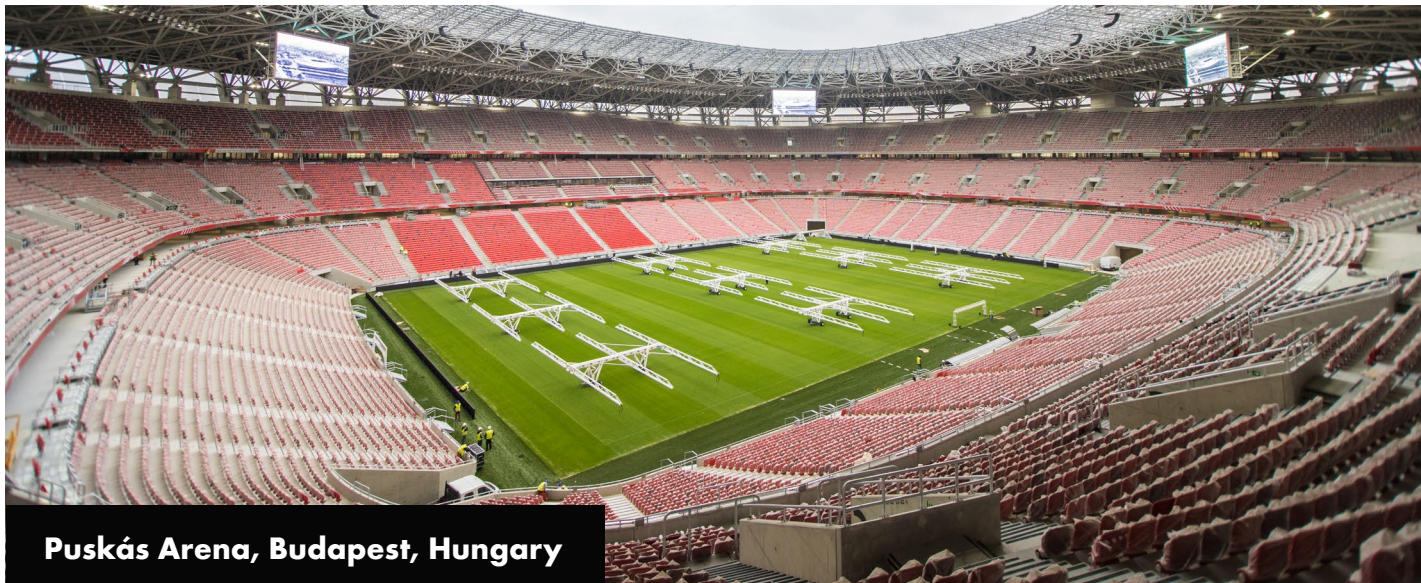


Puskás Arena pitched for victory with d&b.



Puskás Arena, Budapest, Hungary

“In order to meet the requirements imposed by UEFA, the audio system had to deliver high STI (Speech Transmission Index) values, wide frequency response, high SPL and exceptional sound quality parameters.”

István Bogár
Marketing Manager, INTERTON Group

Setting the scene

Completed in 2019, the new Puskás Arena in Budapest is a triumph of modern architecture, engineering and technology. With a capacity of nearly 68,000, the new venue replaces Hungary's former national stadium of the same name (after the country's most famous football player Ferenc Puskás). Ranking as Europe's 19th-largest stadium and the most modern in Central Europe, one of the elements that sets Puskás Arena apart is its state-of-the-art, weatherised d&b sound system fully optimised with d&b's unique ArrayProcessing technology.

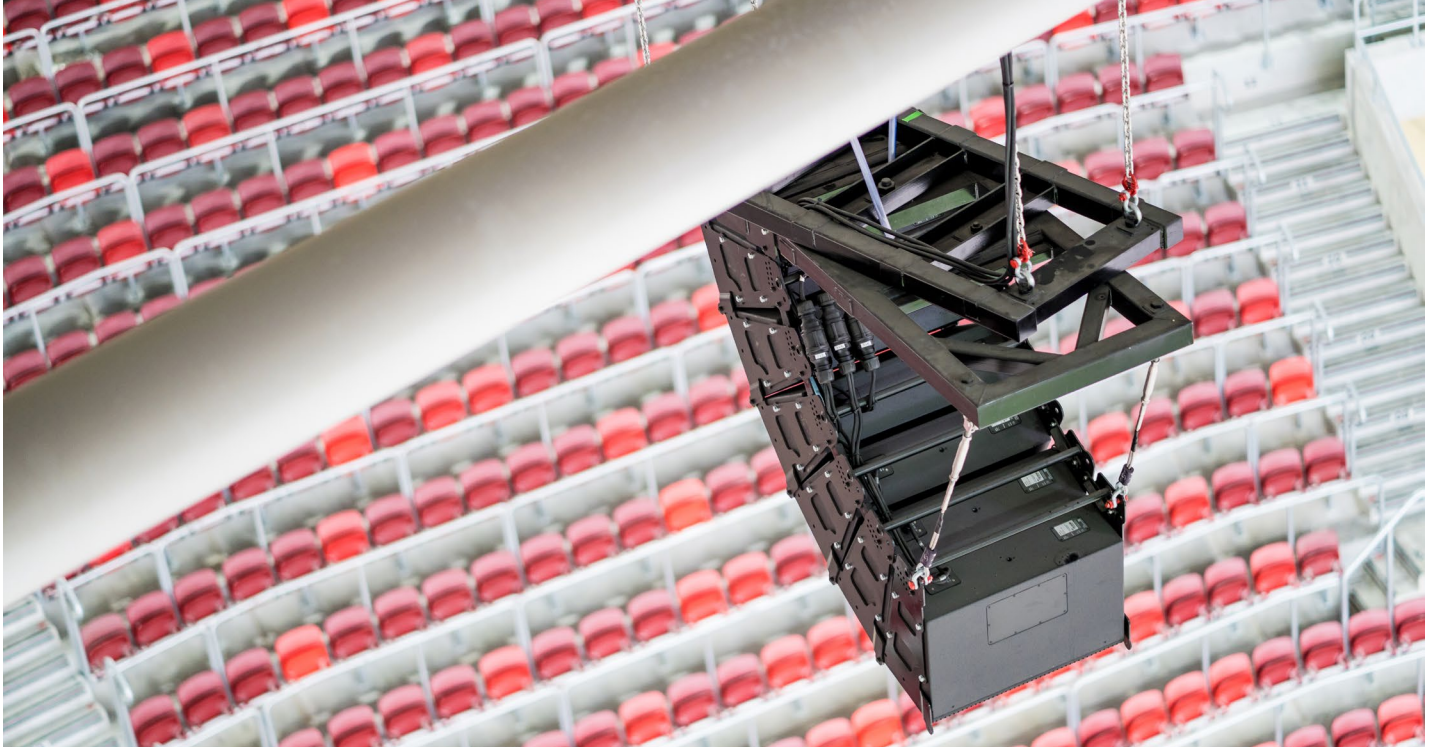
Discussions for refurbishing the original, now aging, stadium began as far back as 2011, but it wasn't until 2014 when Budapest was selected as one of the host cities for the UEFA EURO 2020 European Football Championship (now UEFA EURO 2021) that the process began in earnest. Budapest was nominated on the premise not of a renovation, but a completely new stadium. Following a long tender process which saw close cooperation from all parties involved - including d&b - for

the design of the AV and IT solutions, the contract was awarded to d&b's distributor and renowned Hungarian integrator, INTERTON Group based in Budapest.

Setting objectives

The brief for the new, state-owned national arena was for an ultra-modern, high-tech, UEFA Category 4 stadium. According to INTERTON Group's Marketing Manager, István Bogár, the most important guide for the design team was the UEFA EURO 2020 Technical Requirements handbook which laid out the highly demanding specifications in detail. Indeed, d&b's ArrayProcessing technology has successfully delivered the required level reduction zones, as specified in the handbook, for UEFA Champions League matches since the 2014 Champions League final at the Estádio do Sport Lisboa e Benfica in Lisbon, Portugal.

“In order to meet the requirements imposed by UEFA, the audio system had to deliver high STI (Speech Transmission Index) values, wide



frequency response, high SPL and exceptional sound quality parameters,” recalls Bogár. “It also had to provide sound diffusion zones for the press area and seamless integration with the building’s Q-SYS audio management system.”

d&b’s Education & Application Support team run by Stefan Goertz supported INTERTON’s experts from the beginning, working up a number of different scenarios including full ArrayCalc and EASE acoustic simulations in order to optimise each design approach both technically and economically. The final design was based around d&b’s powerful, lightweight installation version of the V-Series line array systems – supplied in fully weatherised SVS (Special Version Stadium) versions which are supplied with threaded inserts in the side panels to accommodate application-specific custom rigging. The arrays are powered by 30D amplifiers with DS10 network bridges

providing the link to the Dante network. Control is via QSC’s Q-SYS software which integrates seamlessly with the audio systems via OCA.

Zsolt Kiss, Audio Project Manager for Puskás Arena explains briefly how the system is configured: “The venue is divided into a total of 175 zones which includes everything from VIP boxes to corridors, rest rooms, etc. The 32 line array hangs of the main PA occupy two of those zones. 18 high priority zones can serve as an independent local audio system and the whole thing is managed by the redundant pair of QSC Enterprise CORE processors on a redundant IT network.”

INTERTON designed a system deploying a total of 336 fully weatherised Vi8 SVS line array elements. Eight arrays of six cabinets cover the areas shadowed by the four large

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video screens in the corners of the stadium (two arrays per screen). A further 24 arrays of 12 Vi8s each cover the rest of the stadium as a distributed system. Each Vi8 is driven by a single channel of a 4-channel 30D amplifier for a total of 84 30Ds across the system. The arrays are suspended from the roof structure, so it was a considerable advantage that the V-Series offers a lightweight as well as high power solution.

"The results are amazing," confirms Kiss. "Microphone responses are always clear, dynamic and razor sharp. In terms of tone, perfect voice can be achieved with minimal correction and an almost flat EQ setting. Despite the large distances from loudspeakers to the seats and the huge volume of space to be covered, audio decay is minimal; individual voices can be heard clearly and distinctly from anywhere in the stands."

d&b's unique ArrayProcessing technology also came into its own for this project in order to meet the exacting requirements demanded by UEFA: "UEFA stipulates the ability to control level distribution between different zones within vertical sections of audience areas in the bowl," clarifies Kiss. "Of particular concern was the press zone where we needed to be able to reduce overall SPL, especially where announcements are concerned. d&b's ArrayProcessing technology allows us to even out the tonality in parallel with level control over the whole vertical span of a stadium bowl in a way which would be impossible with any conventional or pure geometric splaying of line sources. In this way we are able to easily isolate and control individual zones – such as the press zone – as well as optimise the sound throughout the rest of stadium."

"The sound is physics-defying when you consider that the arrays are 54m in the air... The moment of proof was when 67,000 fans erupted in celebration of a home goal and the d&b system still managed to clearly convey the voice of the commentator."

Zsolt Kiss
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"Puskás Arena is only the second stadium in Europe that fully complies with the strict audio requirements as laid out in the UEFA 2020 Technical Requirements documentation."

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The system made a grand entrance in front of a capacity crowd during the Arena's first official match, a friendly between old rivals, Uruguay and Hungary in November 2019. Whilst it was fully expected that the system would perform well, Kiss was blown away by the results. "The sound is physics-defying when you consider that the arrays are 54m in the air... The moment of proof was when 67,000 fans erupted in celebration of a home goal and the d&b system still managed to clearly convey the voice of the commentator against a backdrop of immense volume. We could hear every word!"

"We were delighted to number d&b amongst our premium partners for this project," concludes INTERTON's István Bogár. "Their experience in the design and implementation of large, complex stadium systems was invaluable, as was their knowledge of UEFA

and FIFA level specifications. We knew we couldn't – and wouldn't – compromise sound quality for the brand new Hungarian national stadium, and d&b was the ideal partner for us. Despite the tight timeframe, they helped us deliver what is nothing short of an excellent system on time and to budget. According to tests carried out by UEFA experts on the fully commissioned system, Puskás Arena is only the second stadium in Europe that fully complies with the strict audio requirements as laid out in the UEFA 2020 Technical Requirements documentation. We are extremely proud to have participated in this prestigious project and delivered a system that the nation can be proud of."

> System: Vi8, 30D, DS10