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STORY

Qatar University Sports & Events Complex Redefines Space Flexibility with AV



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QATAR

**Qatar University Sports & Events Complex Redefines Space Flexibility with AV
A True Convergence of Space and Technology**

By Ram Bhavanashi



Deploying audio-visual technologies at multipurpose facilities, and rendering them flexible for multiple uses is nothing new; but this one perhaps redefines the whole phenomenon with an altogether new exploit and expression. In what can be looked at as one of the most defining convergence user cases, the Qatar University Sports and Events Complex (QUSEC) in Doha, practically sports a very distinct collaboration of spaces and technologies to scale a new dynamic of experiential space flexibility. SIA had the rare privilege to present this project of galactic AV space proportions. Here is Part-I of the two-part coverage.

A New Paradigm Story

Qatar University – one of the most progressive, futuristic and proactive academic institutions in the Middle East – when it ideated to create on a comprehensive entity to meet the sporting and events requirements of the institution, it was perhaps the most ambitious initiative of the kind. For the ensuing body had to be an ensemble of ubiquitous space flexibility even as it symbolised the country’s vision of technology and all-round growth through education.

What came up as a result in the heart of the Education City in Doha is a truly massive collaboration of audio-visual technologies and space functionalities. A new paradigm in flexible space experience contributing to a vibrant community life on the campus.

FACT FILE

Project Name:	Qatar University Sports & Events
Project Location:	Qatar University/Doha, Qatar
Project Segment:	Education / Sports
Project Client:	Qatar University
Project AV SI:	Techno Q , Doha, Qatar
Project Commission Date:	November, 2019

The Sports & Events Complex (QUSEC) – as the new 25,500-square meter entity came to be called – is a very unique project of an unprecedented scale for reasons more than one. Sophistication of solutions, innovation of design, and integration of multiple technologies for multi-purpose facilities- all subtly interplay weaving in a spatial experience.

Consider these:

- A large multi-functional hall that is characterized by the country's largest and retractable ceiling covering a 70m X 40m-large area of varying heights from 3m to 12.8m
- The hall that can host ceremonial events for an audience of 5000; sporting events with a seating capacity of up to 3,200; or a banquet of cluster seating for as many as 900 guests
- An additional Training Hall of 36x67m area, and divisible into four separate halls by retractable ceiling mounted curtains. It can also provide for three full size separate training fields of Volleyball, basketball, and handball or futsal sport. It can seat upto 2200 for sports/events and 900 for banquets
- While both the halls can blend to seamlessly make a huge combo hall for exhibitions or conventions, they can also function as separate facilities with dedicated entry/exit points

In terms of technology, the complex is characterized by

- A very ingenious blend of wireless and BYOD technology architecture
- World's first large-scale integration of complex-wide AFC solution
- Vision software control as complex-wide solution

The immensity of the complex's architectural and audio-visual technology design is such that the 25,500-sqm site build-up complies with as many as

- * Seven ANSI/Infocomm standards
- * Five EN-54 (one EN-60) standards
- * Four BS standards
- * Two each of ISO; DIN; FIB (+FIV) standards

That apart, compliance with Green Guide & Qatar Construction specifications makes the entirety of the project a very massive and unique ensemble of vision, mission, and passion- vision of the State; mission of the University; and passion of the technology designers and integrators.

A yet another measure of the project's immensity is its ICT architecture- characterized by an oceanic stretch of global brands. Almost the entire A-Z spectrum (25 brands) makes the complex truly experiential technology.

As for the spectrum of spaces deployed with AV/ICT, the project comprises

- A multipurpose hall
- An arena/ Training hall
- A Gym
- Exercise studios
- Indoor tennis court
- Squash court

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- Classrooms
- Meeting rooms
- Exhibition area
- Lounges (common & VIP)

The technology deployed thus comprised:

- * AV (including Audio, PAVA, BGM)
- * Broadcast system
- * Scoreboards
- * IPTV and Digital Signage system
- * Stage Lighting
- * Production Communication
- * Translation/Interpretation system
- * Scenic panels lighting system

**The Scripting Stakes**

A project of this scale arguably required a team of high credentials of competence and domain expertise. As has been the case in most AV projects in Government segment in Qatar, the QUSEC too had on its board ASTAD as Project (Management) Consultant, and locally-based AV design and systems integration firm Techno Q as the design-build systems integrator while the Las Vegas-based Coherent Design supervised the prestigious deployment process with its expert value-adds.

While Techno Q – being the design-build solution provider – stayed at the centre of the whole action, the three agencies, besides working in coordination, have worked closely with a vast band of agencies and vendors to ensure that the design specifications of the high-profile project.

“The design philosophy was to create a multi-functional building that can serve as a sports complex for curriculum activities, and at the same time perform as a multipurpose hall hosting annual graduation ceremony, major sports and other events like functions and exhibitions,” says Maged Amin, Head of Design-AV at Techno Q .



"It had to be cutting-edge in technology; innovative in design; flexible in space experience; multipurpose in usage; and user-friendly in application," he explains. "With that being a sort of brief, we worked closely with the project stakeholders to evolve a design that met all these criteria and also created a WOW feeling."

According to him, the WOW feel was indeed achieved by means of more than one aspects (as listed above)- particularly the large retractable ceiling; blend of wireless and BYOD, and complex-wide AFC architecture.

Says Techno Q 's Project Manager Mohanad Is-Hak for whom the QUSEC was like his very own, as he was involved with the project from day one: "the AV deployment design of the QUSEC was borne out of the University's vision to have one comprehensive and futuristic building that is flexible in terms of both technology application and space usage."



According to him, a Smart and Green Building that it is, the QUSEC sports a very seamless integration of systems and spaces. Audio, video, lighting and networking systems – blending finely with HVAC, backbone protocols, KNX, and fire-safety set-up – are integrated in a very user-friendly fashion, to be controlled completely from one main Control Room.

"All spaces/facilities are operable by individual controls that are in turn controllable via one Master Control Room," he said. "Patchable solutions deployed all over the building are connected to a Patching Headed in the Master Control Room."

The Multipurpose Hall: The Centrestage of all



The Multipurpose Hall seen from a another angle: Observe the seating area, stage, lighting, and the scenic ceiling panels

Multipurpose Hall - the centrestage of all that AV grandeur of the project - is a veritables setting. A critique's case study space, it is a sort of immensity rendered scalable, and flexibility made experiential for an admirer.

The most striking and characteristic feature that plays both audio-visual and architectural function at the hall is the full-colour **retractable ceiling**. As many as 80 5mX5m scenic lighting panels in the ceiling – customized in the labyrinth of

HVAC, fire, lighting and other services - accentuate the setting with diversely captivating colour ambiances and height. End user can position them at 10m from floor during an event and 12.5m during a sport, as per FIBA guideline. They can even be dropped up to the floor level for maintenance.

"Designing the scenic ceiling panels, bringing a touch of magic to each event, is an important technology accomplishment" explains Mohanad, "since we had to comply with the FIBA height guidelines on one hand, and weave in the 'spell of the unseen kind' on the other." According to him, Techno Q , thus custom-developed a 4-layer solution that comprised perforated stretch fabric as the first layer, followed by a vast size of strip lights of 200 LUX with RGBW spec to create a mood-setting light diffusion uniformly across the venue, with the third layer being an acoustical absorbent, and fourth being aluminium sheets intended to strengthen the panels.

When illuminated in four different shades of red, blue, green and (magnesium) white, it imparts the venue with a fascinating ambience flowing from top, uniformly all over the place, and thereby transporting the audiences through a variety of experiences.

While the design exploit has apparently brought a magical impact to the place, it hadn't happened without its set of challenges. The integrator had to do a precision deadload calculation of the complete scenic panel and harmonize the machinery that was custom designed for the project. Techno Q had partnered with Spanish-based M/S Chemtrol for the purpose.

"It was one big major challenge, since there were very precise and detailed selection of the hanging points of machinery shafts which needed to be coordinated and applied within the building structure and allocating the scenic panels portions within the catwalks," elaborates Mohanad. "Techno Q did the complete design study and put the requirement with the general contractor," he details. "Thus came the eight groups of scenic panels with each scenic panel weighing 550 KG."

The ability to manoeuvre the field of play court layouts to accommodate multiple court space settings using suspended curtains is yet another design exploit the integrator brought to place. Giving it a further experiential dynamic is the **retractable seating** that can be positioned as per the occasion- sports competition (in four chosen sports), ceremonies, conferences, or banquets.

The design also provides for staged events with 30m X 9m size portable stage with adjustable height and associated AV. Further, with a view to addressing any other events of unique nature, provision is made for temporary event rigging points distributed at the ceiling covering all the hall area, with each point capable to hold up to one ton weight.

That's smart thinking!

'Sound' Reinforcement appears to be as collaborative and flexible as it could get. Eighty different models of high-

performance systems comprising ceiling, wall-mounted speakers, stage monitors and a pair of 9-element line arrays – synced in Dante-enabled network – provide for a vast variety of audio for diverse range of applications. The array speakers can be lowered down as per the need of the event- during the sports event, it is raised up to be hidden between the scenic panels level as per the FIBA Standards, and during non-sport event, it can be lowered as the case may be.

Further, for any stage events, a portable stage front fill and monitor speakers come into play for that extra sound reinforcement.

The audio integration at this Multipurpose Hall – as also at the other facilities within the QUSEC – is of a special reckoning. For, the way it is exploited and deployed towards imparting that sense of collaborative flexibility. This expertise is expressed in:

- A multi-language interpretation system that can serve over 100 users via a WiFi-enabled BYOD system, allowing users to access it on their smartphones, iPods, or any other smart device
- Assistive Listening provided for hard of hearing users. The user can use their iPod devices or smart phones with the neck loop headsets, or their regular hearing aid devices- in the same BYOD fashion
- An Intercom system to help effective communication among the broadcasting, and event management teams. This, in addition to intercom stations distributed in the main areas, backstage, broadcast room, rehearsal room and many other areas. The system is designed to have separate channels, to facilitate communication with different teams for different events at the same time

With a view to minimizing the complexities of routing and provide for increased flexibility – owing to the diversity and large area to be covered – all sound system modules and I/O devices are integrated as a networked audio system to minimize the complexities of routing and give high flexibility. The Control Room is also equipped with a Dante-enabled audio mixer that will enable the user with much more flexibility to locate and operate the mixer in any location in the Multipurpose hall as per each event requirement and connect to the connection tie line located in the broadcast boxes distributed with in the building.

“Every bit of technology area is given this kind of attention,” explains Mohanad. “This attention to the details has rendered the deployment so much more user-friendly.”

Says Maged Amin, the AV Design Head: “The multi-language interpretation a beauty of innovation. It features the Interpretation HotSpot system (from Willam Sound) that transmits multiple channels of audio coming from simultaneous interpretation system over Wi-Fi, adapting to the BYOD architecture.”

According to him, users can use their smart devices through Hotspot Application that enables them to listen to different interpreted channels easily. That, in addition to utilizing centralized interpretation booths for the entire project, by using the two-way communication video and audio signals being sent to different spaces.

That’s apparently, another gem of innovation!

Largest AFC of the kind (in the world)!



The Multipurpose Hall seen from a long view, and without lighting glow. Observe the retractable seating pushed to the walls

Given the diversely multi-purpose combos that the facilities are at QUSEC, a strong need was always there for an extremely powerful and an all-encompassing acoustic solution so that the multitude of spaces has the intended audio ambiances for their chosen occasions. Techno Q, therefore, worked closely with audio giant Yamaha to weave around the Acoustic Field Control (AFC) system that facilitates natural reverberation time at all audience seats – irrespective of form, function and size the space – to ensure suitable environment for an exciting crowd experience.

According to Mohanad, the AFC is very unique system based on getting feedback from the hall via distributed ceiling microphones, send it back to the head-end and then generate the sound through the speakers. Claimed to be the world’s first large-scale install of the kind, the Yamaha AFC deployment at QUSEC is said to have opened a new paradigm altogether in sound intelligibility and audio configuration.

Explains Mohanad: “The challenge was the allocation of microphones to be in line with the spaces within the ceiling- since the ceiling is completely covered with machinery hosting and handling the scenic panels. In addition, the design had to account for the ceiling speakers positioning too, to void any noise/ feedback between the microphones and the speakers.”

According to him, reflection of the sound caused by the wooden sport floor was big challenge affecting the reverberation time. Given the regular time constraint of just about 10 months’ time for the project commissioning, Techno Q had to come out with an effective solution for the situation. They had, therefore, ran several rounds of simulations in their design



The Multipurpose Hall during a Banquet occasion. Observe the mood setting lighting

lab, worked with their vendor (Yamaha), and came out with deployment design of AFC

“one of the most innovative solutions in this project is the Yamaha AFC, given the characteristic setting of the facilities to be treated,” says Maged Amin. “This is the first time globally that this system is deployed on such a large scale and in such a unique fashion – addressing diverse situations from one facility to the other,” he elaborated. “That’s quite a technology exploit.”

Dynamic Lighting

The lighting configuration at QUSEC is rendered in dynamic fashion with a mix of wash and profile stage lights from. Lighting trusses suspended from the catwalk with motors and chains to be lowered down as per the event needs and during the sports mode to be raised to the parking position. The lighting console located in the Control Room provides with full functionality and options to operate the lighting systems. The beauty of the console here is that it can be used from any location in the field via the connection tie line located in the broadcast boxes distributed with in the building.

The beauty of lighting system, on the other hand, is that it comprises such variety as to look special and unique for each of the sporting event hosted at the Hall, in accordance with the sports training lay-out, as also meeting the high-frame rate and super slow motion spec required for broadcast quality.

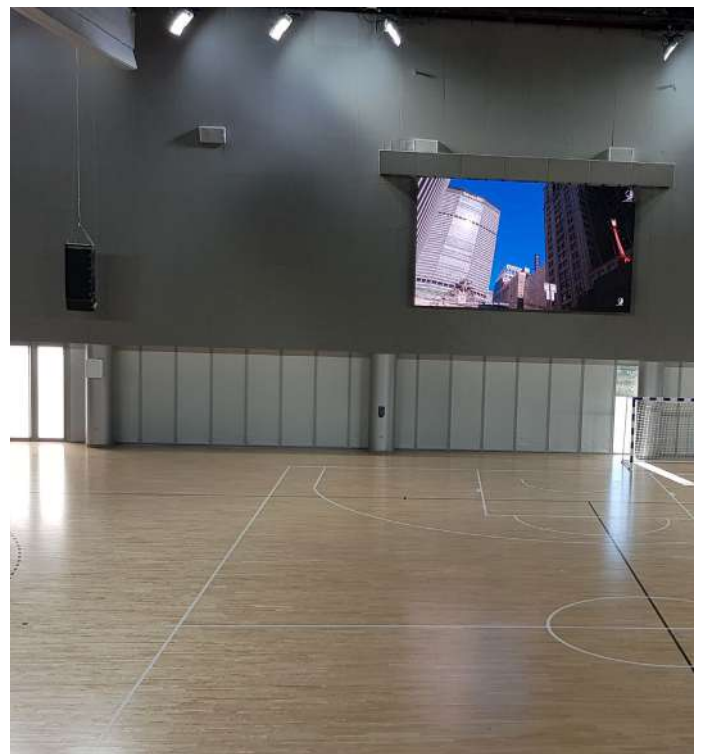
Pretty much in match with the grandeur of the Hall’s audio and lighting is the video. The comprehensive, integrated video system distributes and displays videos and replays of the action across the premises, as also the large LED displays deployed in the Hall. Furthermore, the LED displays are synchronized to Broadcast and in-house cameras.

The **Control Room** created at the centre of Mezzanine floor with bi-fold windows is part of the same acoustic space as the

Main Multipurpose Hall. While it is equipped with full audio, video and lighting controls for the hall, the bi-fold window provides unrestricted view of the hall outside.

“A high degree of innovation exploit and design expertise have gone into making not just the Multipurpose Hall, but all those many facilities within the QUSEC,” explains Maged who led the design team, perhaps, to one of its most ambitious projects.

(Conclusive Part-II to be presented in next issue)



The additional training hall is divisible into four separate halls. It can also provide for three full-size separate training space for volleyball, basketball, handball or futsal