



SOUND SPOTLIGHT ON JAPAN

The 2019 Rugby World Cup has given the opportunity to several stadia in Japan to install new sound systems with NEXO loudspeakers.



With a relatively youthful football league and the recent legacy of stadium building from the **2002 FIFA World Cup**, Japan's large sports venues are mainly modern arenas and domes, many of which house more than one professional sport.

The international spotlight of the **Rugby World Cup 2019** presented a new opportunity to optimise technical facilities in host venues, as well as raising the bar in terms of fan expectations.

Two of the host venues for Asia's first Rugby World Cup, the **Sapporo Dome** and the **Toyota Stadium** in Toyota City, were opened in the same year, 2001.

Both of them committed to a major audio upgrade in time for the rugby tournament, approaching **Yamaha**, one

of Japan's most famous technology companies, to implement new sound systems which will take them, in the case of Sapporo Dome, through next year's **Olympic Games** and far beyond.

Yamaha was also contracted to design a stadium sound system for the **Nagoya Dome**, a similarly-sized baseball venue in Japan's fourth largest city.

The three stadia make for an interesting case study. All of them have approximately the same audience capacity (45,000-55,000), and the versatility to host different sports.

All three shared the same objectives when it came to specifying their new audio installations: primarily to improve sound clarity, particularly with regard to speech intelligibility, and to exploit the latest techniques for

time-aligning sound sources to achieve better distribution of sound throughout the venue.

Also critical was the need for more dynamic interaction of the audio system with other elements of the event, such as video, DJs, pitchside interviews and entertainment.

SAPPORO DOME

Since its grand opening in time to host the 2002 World Cup, Sapporo Dome has become well known as one of Japan's five largest geodesic domes, and is also the country's only soccer stadium with an all-natural indoor grass-covered playing field.

Designed to host baseball in a diamond format, the stadium can transform and be reshaped to house a rectangular pitch.



With a maximum capacity of 53,738 people, Sapporo Dome is home to professional soccer and baseball teams.

Preparing for the Rugby World Cup 2019, Sapporo Dome commissioned **Yamaha Professional Audio** to design and install a world-class audio equipment installation, that would significantly enhance the clarity of sound in the venue, as well as increase the volume of output, so as to rise above the levels of cheering fans in the audience.

The system proposed by Yamaha Professional Audio sets a new benchmark for stadium sound in Japan, as Sapporo Dome became the first to include subwoofers in its specification.

Loudspeaker elements from the well-known French manufacturer **NEXO** have

been installed in an unusual central 'bank' in the centre of the Dome.

These include the model GEO S12-ST specialist long-throw line array cabinets, developed by NEXO for stadium and arena use, as well as flagship STM Series modular line array cabinets, frequently seen on large music stages around the world.

As a result of the renovation, superior clarity and improved speech intelligibility has been achieved throughout the entire Dome, along with greatly improved sound pressure level distribution, enabling equal delivery of output to each seat in the house.

"The addition of the NEXO RS18 high-performance 18 subwoofers has brought us a solid low end never heard before in a stadium, which

gives even more impact to our sound performance," said Manabu Takeda, from Yamaha.

TOYOTA STADIUM

Many miles to the south, in the home of several of the Toyota Motor Corporation's manufacturing plants, is the Toyota Stadium in Aichi Prefecture.

With its capacity of approximately 44,400, it was chosen as one of the 12 Rugby World Cup host venues, and also undertook a major upgrade of its sound system in preparation for the event.

Although Toyota Stadium also features a world-class installation of NEXO loudspeakers and amplifiers and Yamaha electronics, the design is a world away from that of Sapporo Dome. The loudspeakers, primarily >>



« NEXO's high-spec GEO S12-ST line array modules, are discreetly installed amongst the steel beams of the stadium structure, ensuring ultra-low visibility.

The system is spread over a large number of locations, starting with an 11-module main array facing the pitch.

For the main stand and the back stand, there are identical arrays of 6 modules, all positioned near the edges of the large roof. Smaller 3-module arrays are directed at the front row of seats, with additional sets of arrays behind the seats, for auxiliary use.

For auxiliary use, another 48 point-source loudspeakers, positioned on the balcony edge around the perimeter, can be activated.

The system is used for music at half-time, for the stadium DJ, for venue announcements and to play sound to accompany the big video screens. It is also used to amplify the pitchside interviews, so speech clarity was an absolute priority for the designers, as well as high SPL to provide the volume needed to handle loud cheering and applause.

Japanese specialists M&H Laboratory Co, Ltd. undertook the design and sound consulting for the project, working closely with Yamaha Sound Systems (YSS) and the NEXO Engineering Support team.

The President of M&H Laboratory Co. Ltd, Yoshiteru Mimura, explained: *"This is an environment with a large amount of reverberation and echo. That makes it difficult to ensure clarity with even volume and sound quality. Before the upgrade, we took measurements in*

listening tests, and there were several areas in the stands where it was difficult to hear the sound. To solve this, we not only replaced the existing speakers, but also increased the actual number of speakers, thoroughly adjusted the sound quality and corrected the distance. The main goal was to improve sound clarity."

HOR Masahiro Hori, sound operator for the Toyota Stadium, said: *"I can clearly feel the difference between the previous speakers and the NEXO speakers. It feels like the NEXO speakers are never strained for sound. We also thoroughly corrected the level and time alignment, but the sound has much greater clarity than before. I also think a big improvement point is how we reduced the echo through appropriate adjustments."*

President Mimura added: *"The NEXO speakers have higher efficiency than the previous ones, so we can output louder sound than before. Something that is important in this kind of facility is durability. Speakers in this kind of facility often break due to exposure to wind and rain. With the new NEXO system, we are able to achieve theatre-class high sound quality even in severe conditions."*

NAGOYA DOME

Home of the **Chunichi Dragons** professional baseball team, the Nagoya Dome stadium in Nagoya, Japan, is also a major concert and event venue.



This 50,000-capacity stadium has finally completed an extended programme of upgrading its sound systems, and is now enjoying the benefits of its new NEXO GEO S12-ST line array PA installation.

Yoshihiro Hattori from the Facilities Department of Nagoya Dome Co. Ltd said: "The speaker systems had been

in place since the Dome opened in 1997 and there was an increasing incidence of failures as it became more difficult to get repair parts for discontinued loudspeaker models.

"In the fifth floor stands, there were some locations where we had difficulty with coverage. Making improvements to these seats was one of the goals of our upgrade."

Hattori and his team, working closely with Yamaha Sound Systems, started the loudspeaker upgrade by replacing the centre cluster, and then the stand-facing satellite clusters, which are in 18 locations facing the upper stands in each direction.

They chose NEXO's GEO S12-ST extended throw line array modules: these cabinets have been developed from the standard GEO S12 concert sound design to deliver higher SPL (volume) and the enhanced speech intelligibility required for stadium and arena applications.

"The sensation and feeling of the sound has improved very considerably," said Hattori. *"Previously, there was the sense that sound echoed through the whole dome, but when I sat in the stands during a professional baseball game, I felt the sound had more impact than before, as if the sound was coming directly towards me. It felt close and exciting. I felt that way particularly when listening to the sound effects from the screen."*

Nagoya Dome has a remarkable 106 metre-wide screen, the longest and biggest size for a home stadium in the Central League.

"We expanded the screen, tripling the visual impact for fans, but the sound had remained the same, so we couldn't help but feel there was something lacking. With the NEXO system, the feeling of the sound has dramatically improved, so the images and sound feel more united, and fans are experiencing images and sound with even more impact." ■

For the last 10 years, NEXO has been a strategic business unit of the globally dominant Yamaha Corporation of Japan, and has consolidated its place as one of the world's leading elite manufacturers of sound reinforcement equipment of the highest specification.

Each and every one of NEXO's loudspeaker cabinets is designed and manufactured in France.

The NEXO range of sound reinforcement solutions includes point-source cabinets for small and intimate spaces, to complete line array ranges for larger performance areas, ranging from 1,000 to 100,000 audience size. NEXO systems, recognised for their exceptional clarity and musicality, are carefully versioned for touring use, and for fixed installations in the built environment. NEXO's long list of stadium references include the **Stade de France** in Paris, the **Etihad Stadium** in Manchester, **Croke Park** in Dublin, **Wimbledon** and **Roland Garros** tennis clubs.