

THE OLYMPIC SPIRIT



Funktion-One's sound solutions, including what is believed to be the world's largest commercially available bass horn, are performing a resounding job in the Russian Winter Olympic resort of Sochi.

The Olympic spirit; bestowed upon the world by the Greeks and carried through the winding passage of time by those entrusted to protect its enduring legacy. It's a spirit of bravery and belief - an unapologetic commitment to being the best you can be.

As Sochi prepares for the 2014 Winter Olympics, it does so with a huge amount of new infrastructure, including 11 new sports venues. It's a significant level of redevelopment, but most will have expected that from the Russian Federation in the lead up to its first ever Winter Games.

What was, perhaps, a little less predictable is that one of those venues is now the proud home of one of the largest bass horns in the world. It's both a unique and stirring excerpt from British loudspeaker manufacturer Funktion-One's contribution to the new Sochi landscape, which includes state-of-the-art audio solutions for the 2km long Bobsleigh Track and 12,000-capacity Bolshoy Ice Dome.

The Bobsleigh Track can be found amongst the Mountain Cluster - one of two multiple venue sites that will be used during the Games. The other, known as the Coastal Cluster, is less than 48km away, making Sochi the most compact Winter Games in the history of the Olympic Movement.

The project started with a speculative conversation in 2009, between company founder Tony Andrews and Andrei Kremenchugskiy from Funktion-One's Russian distributor, Edelweiss Audio. Andrews was asked about designing high intelligibility sound system solutions for the two venues. The Ice Dome presented typically difficult acoustic challenges and the mountainside Bobsleigh Track had areas where sound coverage was required and areas where it was not.

Having recognised a lack of audio quality in sports arenas and stadiums generally, Andrews had started to consider how Funktion-One could raise the standard. At the time, F1 were in the early stages of developing new technology that would lead to today's MST (Modular Stadium Technology) Loudspeaker Horns.

PHYSICS AND COMMON SENSE

All too often, audio solutions for large public space environments such as stadiums and arenas produce poor, indistinct results, which have become accepted as the norm. In contrast, the MST Horns have been designed specifically for the challenges that these environments present. Due to their size, the large format loudspeaker

The Sochi Bob Sleigh Run course layout.



The Mega Bass Horn with MST Loudspeaker Horns on the Sochi Bob Sleigh Run.

Aerial view of the Funktion-One MST Horns in the Bolshoy Ice Dome.

SHOWCASE
SOUND
SYSTEMS

horns deliver excellent lower frequency dispersion control without recourse to impact compromising corrective processing techniques. In acoustically challenging environments, sound can therefore be focused where it's needed, without unnecessarily exciting the reverberant space. This control, combined with ultra-low distortion and exceptional pattern control, results in clear message transmission and intimate, intelligible and involving sound which feels perceptibility close to the listener. Their weight – only 65kg – makes them very user-friendly.

Andrews explains: *“Sound as humans understand it, is ten octaves wide. It's a large bandwidth with the dimension of the frequencies involved being orders of magnitude different in size. You can easily achieve high frequency directivity – a horn of only three or four inches will control frequencies above 5kHz, the waves are tiny, in the region of an inch. Whereas bass waves can be 30 or 40 feet long - longer, even. So my objective with the large MST waveguides was to control all the speech frequencies, including the chesty ones.*

“If a waveguide is not big enough to control these frequencies then they

will diffract off its edges to the point where some of them will be propagating behind the waveguide reflecting back from the roof, arriving some milliseconds after the original – that is a real destroyer of intelligibility because you're no longer on a nice original singular arrival.

“More sound going directly to the audience area means less excitement of the reverberant field. So, the point of the big waveguide is to have maximum directivity which leads directly to improved intelligibility. It's just the application of common sense and physics.”

OUTDOOR AND INDOOR SOUND

Fourteen MST Horns have been deployed across the 2km downhill Bobsleigh site – in four separate positions. They are grouped in pairs or in fours, and combine individual attributes of 40 degrees horizontal and 20 degrees vertical dispersion to form horizontal coverage parameters of 80 or 160 degrees. The MSTs span a frequency range from 150Hz up to 18kHz.

Where extra reinforcement is needed, the MSTs have been supplemented

by 163 Funktion-One F55 compact speakers, 14 AX88 2-way passive mid-high loudspeakers, 18 AX8 speakers and six F118 single 18-inch bass enclosures.

Less than 50km from the Bobsleigh Track, in a south-westerly direction towards the Black Sea, a collection of venues reside in neat formation. The Coastal Cluster caters for winter sports less reliant on mountainous terrain and altitudinous weather conditions. Here, the Bolshoy Ice Dome sits proudly as one of the largest arenas in Sochi. Shaped like a frozen drop of water, its roof is decorated with light-emitting diodes that light up in different colours. Inside, the arena is divided into two areas - the central rink and training rinks.

The sound system features 40 Funktion-One MST Horns. This installation actually played a part in the MST's development, when Edelweiss Audio's Andrei Kremenchugskiy visited Funktion-One HQ in the UK to hear a prototype of the speaker. Kremenchugskiy was extremely impressed but had some suggestions, which were absorbed into the development process. The finished product offers directivity, intelligibility and performance that set a new precedent for sports venues.

The MST Horns work in pairs – 16 groups of two MST Horns with one F221 double 21-inch bass enclosure and two in >>

Bolshoy Ice Dome is the main ice arena for the 2014 Sochi Winter Olympics. Photo credit: Getty.



Bolshoy Ice Dome's roof structure.

◀ each of the four corners of the arena. A total of 44 Funktion-One Resolution 25H skeletal speakers are used to cover the rear of the upper seating as well as the VIP section.

Kremenchugskiy adds: *“We want as little sound as possible on the ice itself – it’s a requirement of the International Ice Hockey Federation and broadcast companies – and we’ve achieved that; there’s real separation between the seating and the playing area.”*

MEGA BASS

It seemed that both installations were reaching their final stages, when the client asked about extending the audio infrastructure at the Bobsleigh Track to make it into a full music bandwidth system. Andrews had suggested during that initial conversation that the best solution would probably be a huge bass horn and much to Funktion-One’s surprise, the Russian authorities placed an order for a Mega Bass Horn. This, however, was still merely a concept.

While many people would be defeated by the six-week timeframe, Andrews, driven by obligations to both the client and audio quality, accepted the challenge. And from a standing start, work began on what is believed to be the world’s largest commercially available bass horn.

Using an extremely rigid and weight saving construction, Andrews and the team at Funktion-One designed and built the huge horn as a flat pack, to be assembled on site. Andrews then travelled to Sochi to meet the delivery and worked with Edelweiss Audio on its installation, at one point working a 17-hour day, in freezing temperatures, 40-feet above the ground on an open platform. Though it was brazenly ambitious, the design, build, delivery and installation of the Mega Bass Horn were tethered to an ideology that runs through Funktion-One’s DNA. The objective, regardless of the environment in question, is to deliver the best audio quality possible – even if it means doing something that has never been done before. More accurately, particularly if it means doing something that has never been done before.

The Mega Bass Horn is positioned at the bottom of the course and shoots back up the mountain.

“It’s very accurate and very smooth bass,” says Kremenchugskiy. *“It’s all around you – you can feel it and hear it. It’s soft but it still pushes you.”*

Locally, the response to the installations has been extremely positive. Russian news crews have flocked to see the new state-of-the-art sound systems. Internationally, the installations have captured the imagination of the professional audio industry, with the Bobsleigh Track system winning the Pro Sound Award for Permanent Installation of the Year in September. Funktion-One, buoyed by the MST’s success in Sochi, is extending the range to include a wider dispersion model and looks forward to applying its pioneering stadium technology to sporting environments all over the world. ■



Geometrically arranged MST Horns in the Bolshoy Ice Dome.

Visit Funktion-One at these forthcoming Trade Shows in 2014:

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Pro Light & Sound Frankfurt, 12-15 March, Stand 8.0-G94

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