SWEDEN

The train now arriving

Intelligibility was described as "unacceptable" before Iconyx

Stockholm Central Railway Station gains Europe's largest installation of Renkus-Heinz Iconyx as Sweden's national rail network turns to digital audio, discovers Anthony Lord

A new audio installation designed to transform the PA/VA intelligibility on the concourse of Stockholm's historic, 19th century Central Railway Station is the latest phase in a multi-million-Kroner upgrade of the country's national rail network passenger information systems. On October 1st, national rail operator Banverket unveiled its solution to the station's cavernous acoustics, in the shape of the world's largest Renkus-Heinz Iconyx digitally steerable array system, distributed over CobraNet by a Peavey MediaMatrix Nion system.

The journey from Stockholm's gleaming, modern Arlanda Airport direct to the city centre aboard the high-tech 'Arlanda Express' bullet train is a 20-minute trip through the country's mechanised transport history. Central Station, the hub of the country's rail network and the city's metro system, is an officially protected building with an iconic status in Sweden similar to that of Grand Central Station in New York.

It's great for those who have time to dwell over a latte and savour the marble concourse's elegant arched roof, but bad news for the soaring numbers of rail travellers hoping to hear clear departure details for their train. Banverket has had to contend both with equally old-time acoustics and rapidly growing passenger numbers – adding daily to the ambient noise. As elsewhere across Europe, demand at the station is fast outstripping capacity, but relief will not arrive until 2017 when the new City Line, currently under construction, doubles train capacity through the centre.

The public address system at the station, which handles 500 trains and 80,000 passengers a day, has been delivered for many years by a distributed system of large horns, some mounted in pairs under the roof's apex, others along the concourse's platform-side wall.

Intelligibility, aside from a sweet spot in a central area of the concourse, was increasingly regarded as "unacceptable", according to Mats Liikamaa, project manager for Banverket, whose technical division is responsible for the network's public information systems. "Rail passenger traffic in Sweden is growing so fast now, especially as people are becoming so much more environmentally conscious," he says, "and people need information all the time, everywhere. It's not acceptable for announcements not to be clearly understandable at every point in the station, especially where safety and security are concerned."

For Banverket this new system is the most high profile element of a project that will see the national network's existing analogue telecoms-based audio information system, which already allows stations to be addressed from Stockholm, replaced by a digital system that includes the VA component. The Nion system is configured as the interface between Stockholm's new 'house' PA and the forthcoming nationwide digital network.

Banverket had an experienced designer to call on for a solution when the decision to make a radical change was made last year. Ljud & Säkerhet (Sound & Security), based in Gothenburg and headed by Sten Ranwald, specialises in audio installations for railway stations and churches and Ranwald himself had earlier worked on IT networks for Banverket.

He found himself pushing at an open door when he proposed that an improvement to Gothenburg railway station's PA intelligibility was not only necessary, but achievable. "I had to collect my son from the station and couldn't understand the announcements because of the reverberant field," he says. "I said to the railway company, 'What are you doing about this; I couldn't hear a thing?' They laughed at me and said there had been five [designers] here before and they didn't succeed; how are you planning to succeed? I told them I had the tools, the knowledge and the curiosity, and they gave me a chance. And I guess they were pretty satisfied."

The results in Gothenburg – based on custom built line array loudspeakers – were sufficiently convincing for Banverket to contract Ljud & Säkerhet to provide systems for a further 24 stations, beginning with the country's second city, Malmö. Stockholm took somewhat longer to become number 25. Its historic status and sheer size required a new solution to meet stringent architectural as well as acoustic demands, involving extensive site research to ensure both criteria would be met, finally gaining approval earlier in 2007 from the Ministry for the Protection of Historic Buildings.

With aesthetics ranked a strong second behind intelligibility, the Iconyx system was specified to fulfil both aspects of the brief. A row of 11 IC16 array cabinets, each just under 189cm tall and around 15 x 18cm in profile, is mounted two metres from ground level along the entire length of the concourse wall that faces the street entrances. Midway along this wall and a metre higher is the eight-metre wide electronic destination board, angled slightly down for clarity. One IC16 is bolted flush at either end, painted in matching black. All the other IC16s are mounted flush to the wall using one pair of the built-in hinges, which allow each cabinet to be swung away from the wall for access to the integral electronics. Further cabinets are located in the ticket lobby to one end and a pair of entrance lobbies, in the latter case using the eight-driver IC8 active arrays.

Sources, comprising pre-recorded train announcements, voice alarm messages and live microphones, are routed into and out of the Nion system and, via Renkus-Heinz CobraNet breakout boxes, to the Iconyx cabinets, each of which was individually configured using the company's BeamWare software.

Discreet Iconyx (left of ticket machine)

Renkus-Heinz applications engineer Jim Mobley, who commissioned the system for Ljud & Säkerhet, comments: "There were two main acoustic challenges: the station concourse is a fairly reverberant space, and there's a very high noise level with multiple noise sources – mostly people – down where all of the very hard, reflective floor and wall surface are. And in that very noisy space they're trying to achieve intelligible announcements – it was as tough as you'd expect for analogue audio technology to deal with."

Fourteen out of the 16 IC16s were configured as single lobes while the pair mounted either end of the information board were set up with dual lobes. The units' 120 degree horizontal dispersion allows a natural overlap to create a consistent sound field across the length and breadth of the concourse. Most important, according to Mobley, is the transformation in intelligibility: "We are typically seeing STI [Speech Transmission Index] figures in the .65 to .68 range and in some areas it's above .7, which represents a dramatic improvement." The final Iconyx DSP asset used by the team was to adjust the beam centre of each array to a point close to the top of each column, keeping the power of the lobes above people's heads to assist even coverage across the concourse.

Anders Lindstedt, sales manager of Swedish Renkus-Heinz and MediaMatrix distributor Svensk Musik TTS, comments: "Stockholm Central is well known all over Sweden for how bad it has been for so many years, so it was really vital design an effective solution. Banverket had very high expectations and they say themselves that it should set an example for railway stations in sound quality. By combining these two technologies we think this will be a new standard of controllability. The AES in Sweden have asked for a meeting at Stockholm Central to hear it and get an understanding of how Iconyx works with Nion, and what you can do with it."

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