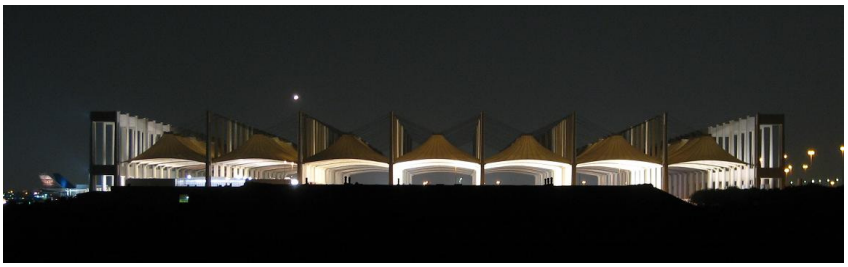
AudioCoustic
Audio & Acoustic Design
ISO 9001 certified

Hajj Terminal 1

King Abdul Aziz International Airport
Jeddah, Saudi Arabia

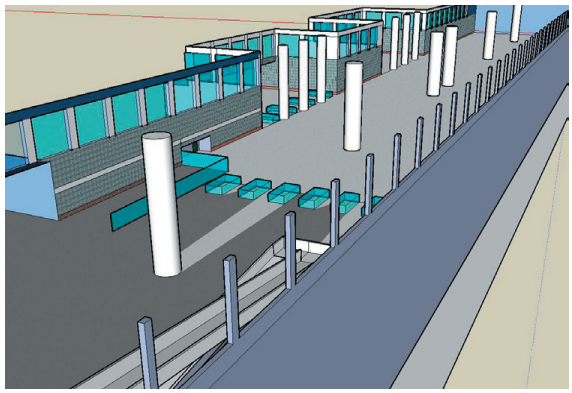


Subject
Airport Terminal building consisting of 16 gates, several office and toilet spaces, arrival/departure hall and outside waiting area.

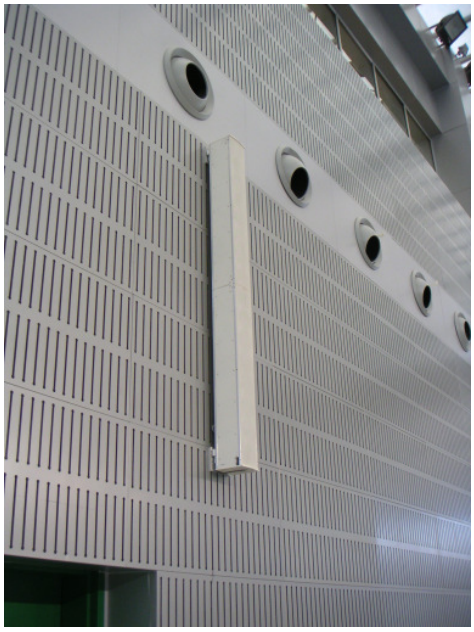
AudioCoustic scope of work:
- Arrival/departure hall acoustic Simulation & speaker design
- PA system design
- Software engineering for PA system
- on site commissioning

Acoustic - Arrival/departure hall
Due to the acoustic study, the wall claddings have been re-constructed using acoustic panels which are covered with a 3mm metal surface with slot absorbers. Due to the modified wall claddings the reverberation time (RT60) could be decreased by approximately 3 seconds, from 6,5 seconds down to 3,8 seconds. These modifications have been the bases to perform electro acoustic simulations in order to choose active speakers which achieve a STI value from at least 0.5 and a total SPL coverage of 85dB [A]. The simulation leads to the result to install seven IC16 and two IC24 active DSP array speakers from Renkus Heinz through out the whole arrival/departure hall.

Real view – arrival/departure hall

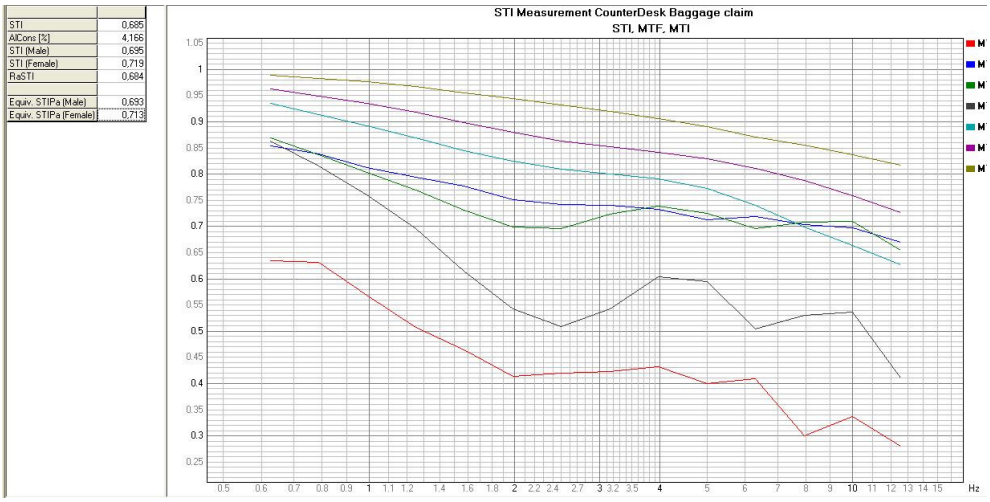


3D model architectural view – arrival/departure hall



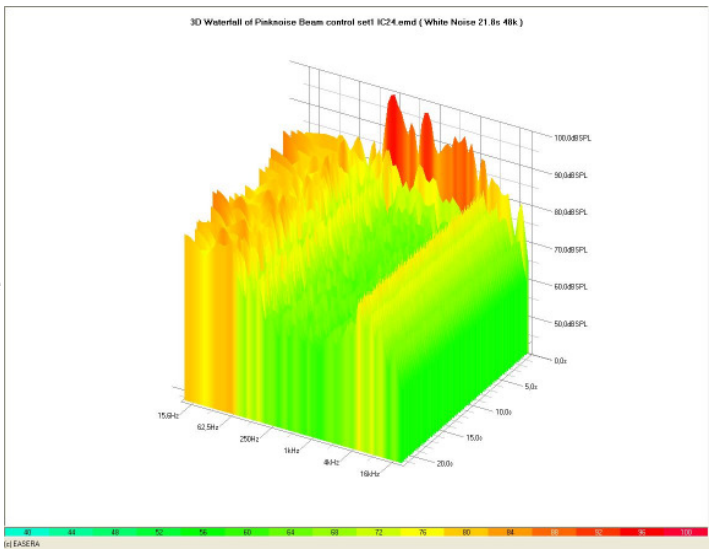
IC16 (Iconyx array): thin, small and hardly to be recognized

During the on site commissioning performed electro acoustic measurements in STI and Total SPL operational level result in the following.



The real application has exceeded the simulation results. With using the simulated and designed DSP arrays the hall achieves STI values from 0.62 to 0.68

and a homogeny Total SPL coverage 87dB[A] +/- 3dB in the operational mode.



PA system design

The PA system at the Hajj terminal 1 consists of two main components interacting via TCP/IP.

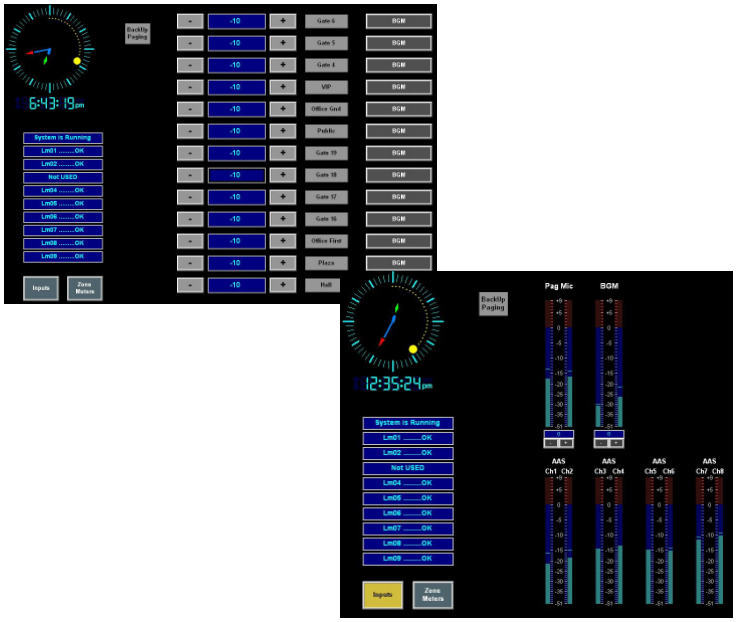
1. The automatic announcement system (AAS)
2. The audio routing & distribution network (PA)

AAS has stored pre-recorded text phrases in 6 different languages and is announcing zone depended flight schedules (generated through the FIDS), security advices and manual paging calls through 13 IP based paging stations installed throughout the whole airport building. The connected PA system itself is distributing the audio signals to the AAS allocated zones through 256x256 audio matrixes installed in one main technical room, monitoring each connected speaker independently, self healing in case of amplifier crashes by activating automatically standby amplifiers and offering high quality DSP power for equalization, limitation and levelling for each established paging zone and speaker.

The PA unit is feeding the 9 Iconyx arrays in the arrival/departure hall through line level distribution including monitoring through dry contacts. Terminal zones using ceiling speakers get their feed and monitored through CAT5 cables connected to decoding and pre-amplifying units.

The airport announcement and PA system is offering 3 access terminals for operation, maintenance and evacuation and the number of access points can be extended.

The AAS operating terminal consists of two flat touch screens offering automatic and manual announcement masks based on web technology.



The PA system screen is offering an easy-to-use main screen for changing zone setups, input volumes e.g. (AAS announcement channels), on screen maintenance tools and helps, zone level indications, logging any announcement request and performed call within the airport and many other features relevant for a high end PA system installed at an airport which is ready for future applications.