UNIVERSITEIT GENT

Art & Science Lab at the Krook

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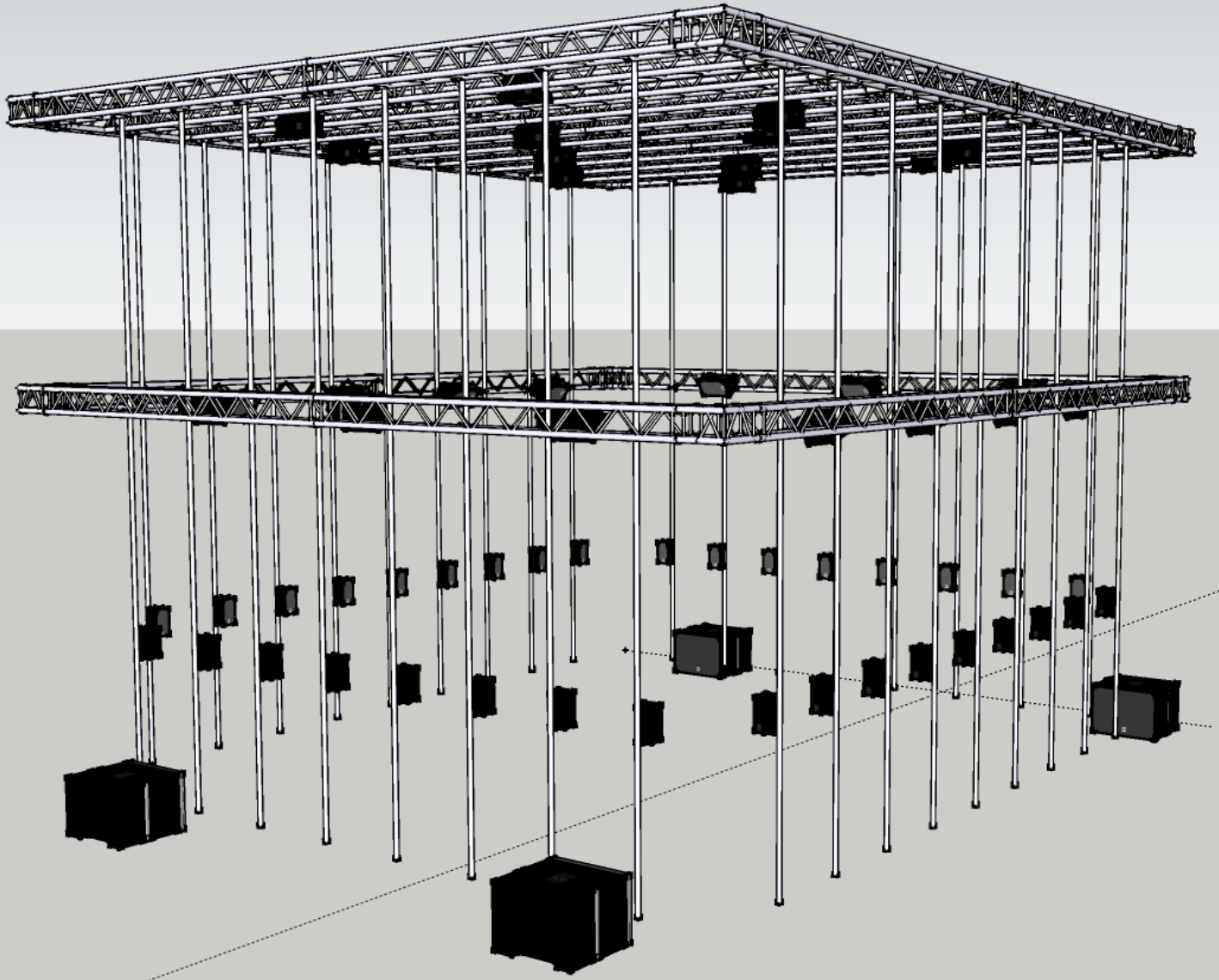


BARCO Visibly yours

IOSONO the future of spatial audio

DE KROOK

Contents

- IPEM
- De Krook
- Art & Science lab
  - 3D sound
  - Mocap
  - Augmented Reality
  - The power of the lab: combining
- Lab Setup
- Questions

IPEM - systematic musicology

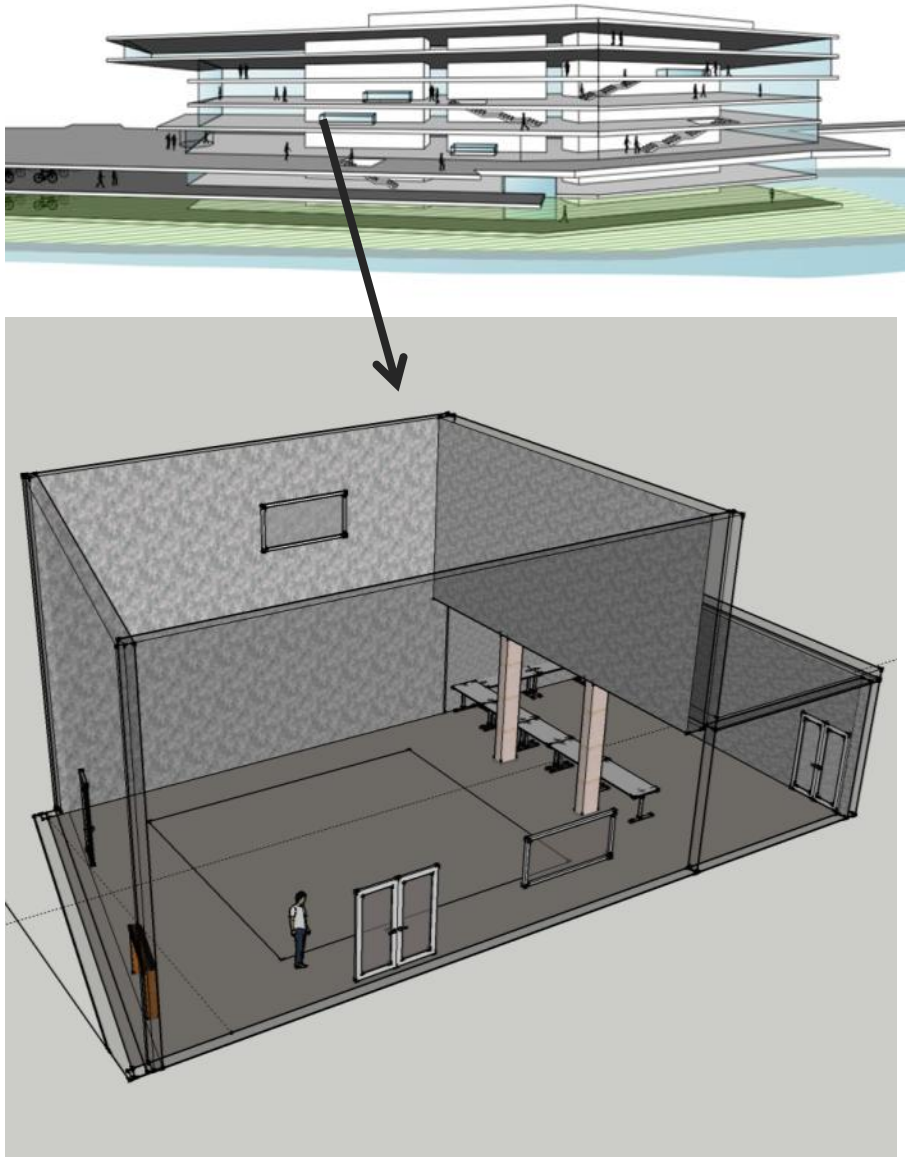
- Interdisciplinary research methods
  - Music theory
  - Performer-inspired analysis
  - Advanced behavioral and neuroscience empirical experimentation
  - Statistics
  - Computer modeling
  - **Focus on embodied aspect: coupling of movement and music**
- Applications in domains such as music education, rehabilitation, sports activities, and artistic research

DE KROOK

- New central multimedia building in Ghent
- Opening march 2017
- Importance of visibility and public involvemnt
- Partners:
  - Library
  - IMEC
  - UGhent
    - IPEM
    - MICT
    - Culture & Education
    - Internet & Data lab
    - Urgent.fm

IPEM Smart Space laboratory

- New multidisciplinary laboratory
  - Focus on scientific-artisitc research
  - High Public Visibility
- Size: 10m x 10m x 7m
  - Adjacent ‘production’ area
  - Adjacent technical rooms

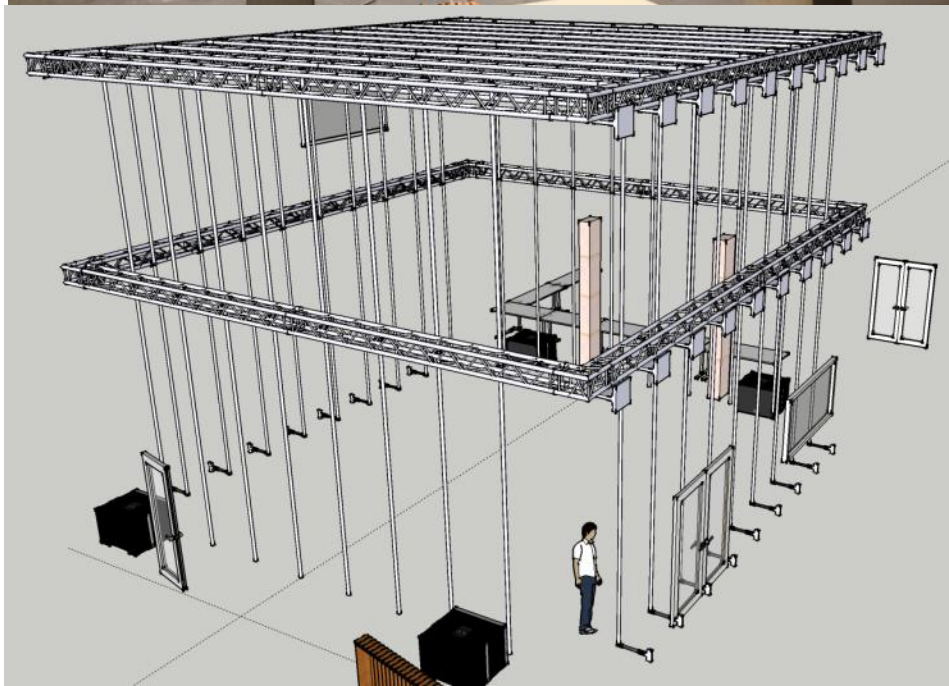


LAB Requirements

- Flexible trussing system

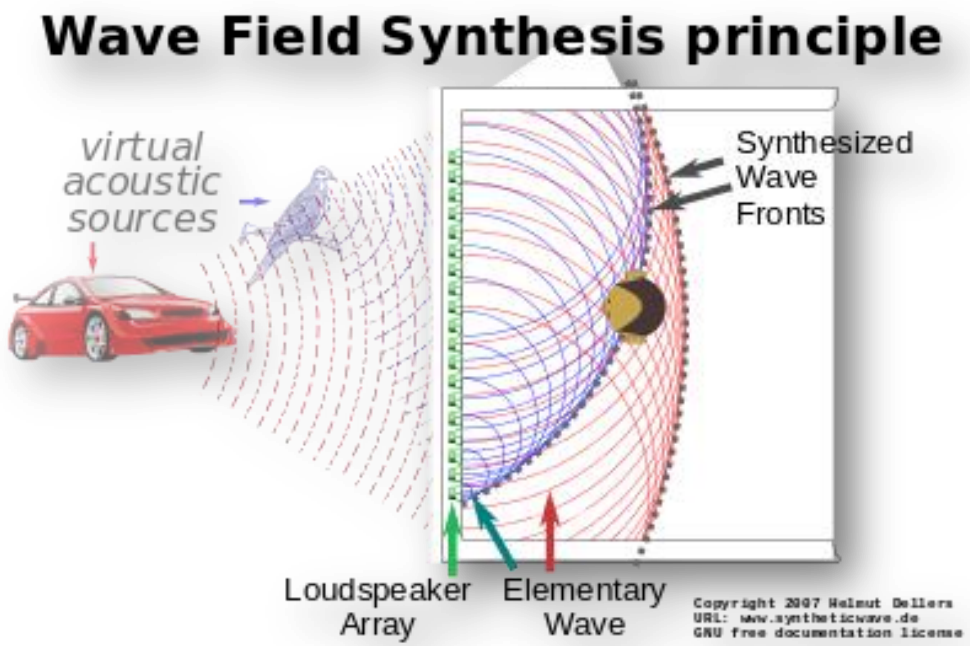
- Immersive 3D sound
- Motion sensing
- Augmented reality

- Projection system
- Acoustic treatment



LAB Requirements: 3D sound

- **Immersive 3D sound**
  - Using wavefield synthesis
  - Play audio or samples at specific coordinates
  - Sound appears to originate from that location
  - Accessible for large audience (inside trussing)



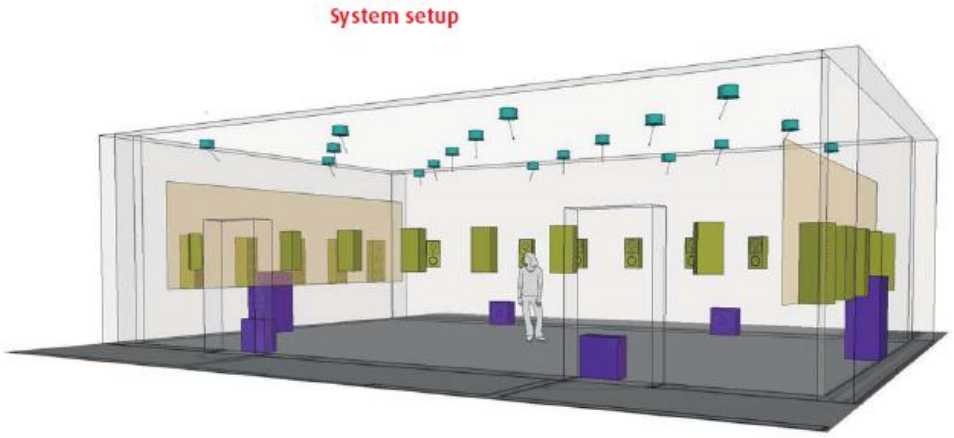
LAB Requirements: 3D sound

- **Simulate different origins of sound sources then speakers**
- Typical setup:
  - Limited effect area
  - Personal ‘sweet spot’
  - Problems with of shadowing

  - Requires almost closed ring of speakers (no distance between)

LAB Requirements: 3D sound

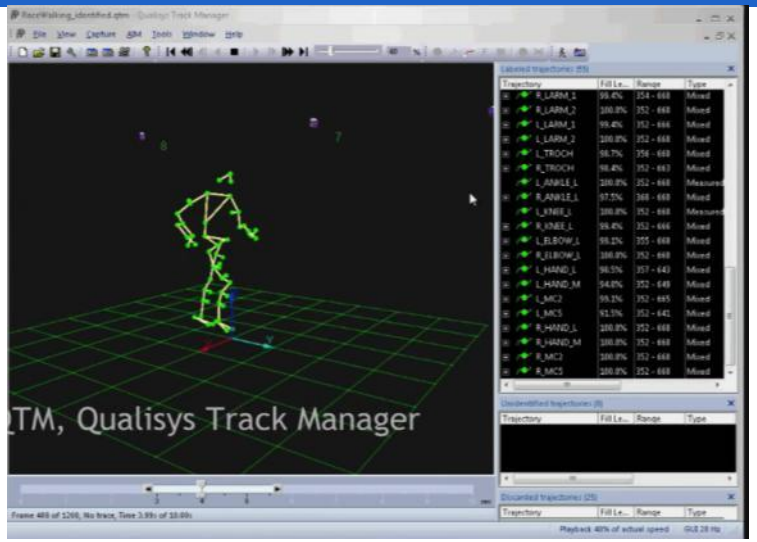
- IOSONO (Barco) is wavefield synthesis based approach for 3D sound
- Main advantages
  - No more sweet spot
  - Works in large areas
  - Requires less speakers
  - Listeners can move around
  - Up to 100 moving sources

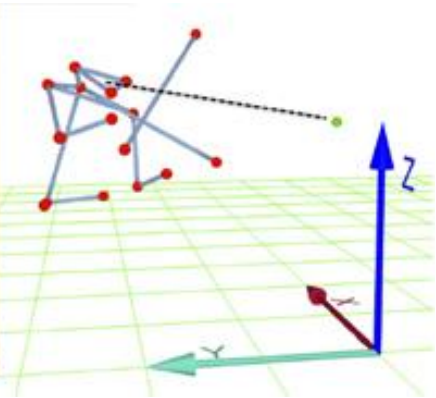


IOSONO)))
the future of spatial audio

LAB Requirements: MOCAP

- **Motion Sensing**
  - Marker-Based IR camera system
  - Obtain position in 3D space of these IR reflectors
  - Attachable to humans (skeleton tracking, face detection, finger movement….)
  - Also attachable to musical instruments (get position of bow, etc)





QUALISYS

LAB Requirements: AR

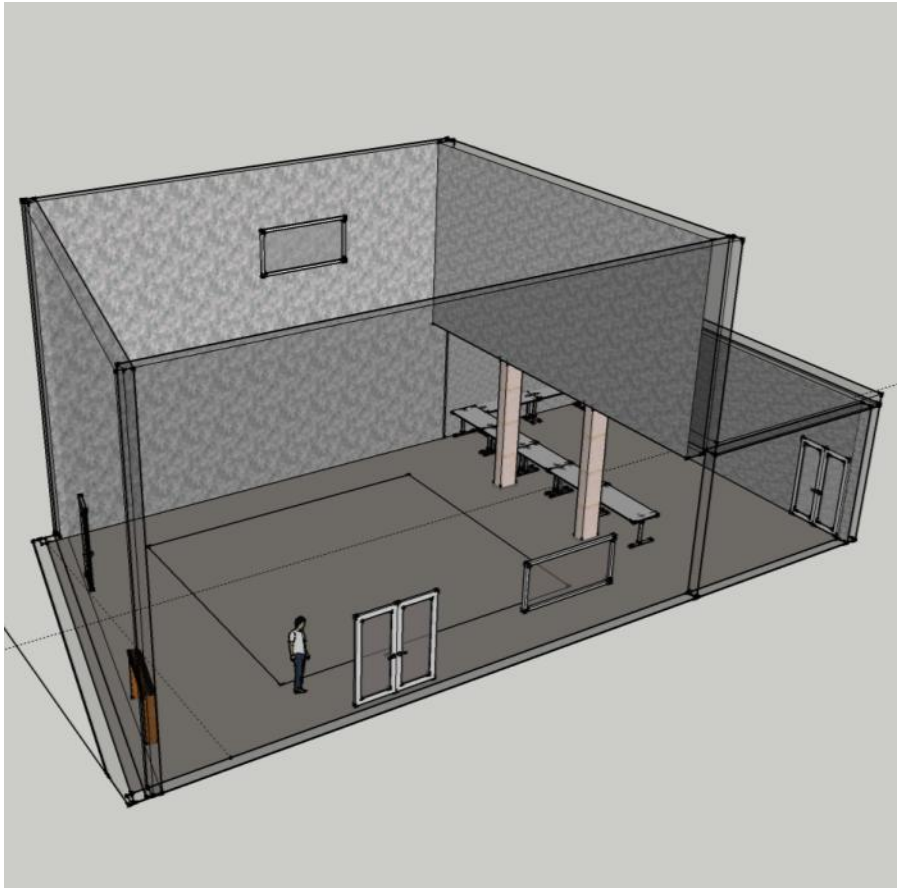
- **Augmented or mixed reality**
  - Show things that are 'not there'; an overlay on current camera capture (eg pokemon)
  - Using glasses or even lenses, you still see the real world (in contrast to VR)
    - Google Glass
    - Magic Leap
    - Apple jumping on the train (skipping VR)

LAB Requirements: Combination

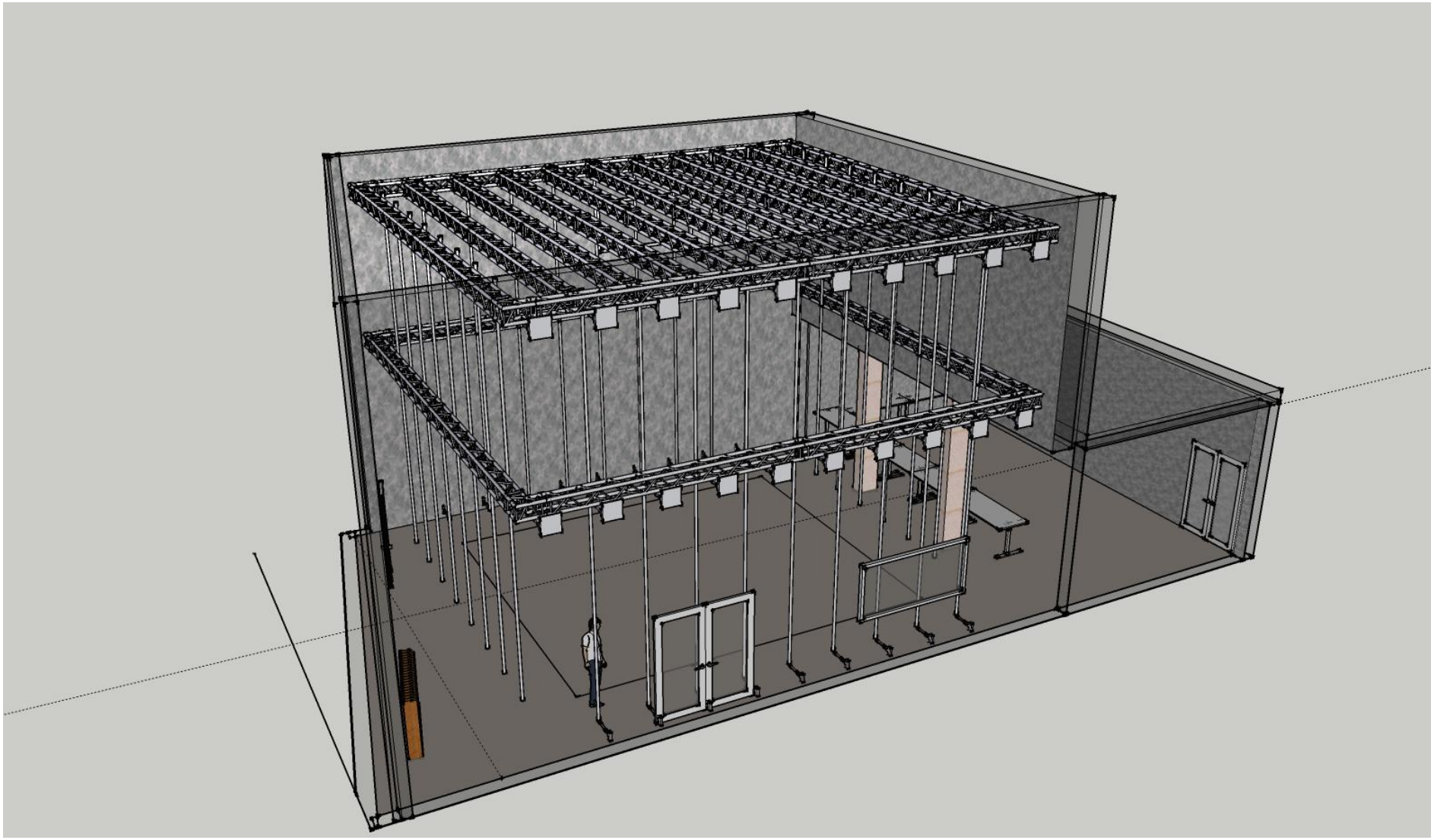
- The Art & Science lab will focus on combining these three technologies into scientific and artistic projects
  - 3D sound
  - Motion capture
  - Augmented reality
- Possibilities are nearly endless: talking holograms in conference room (without sensory motor conflics), music compositons and visualisations, movement research, …

Lab setup

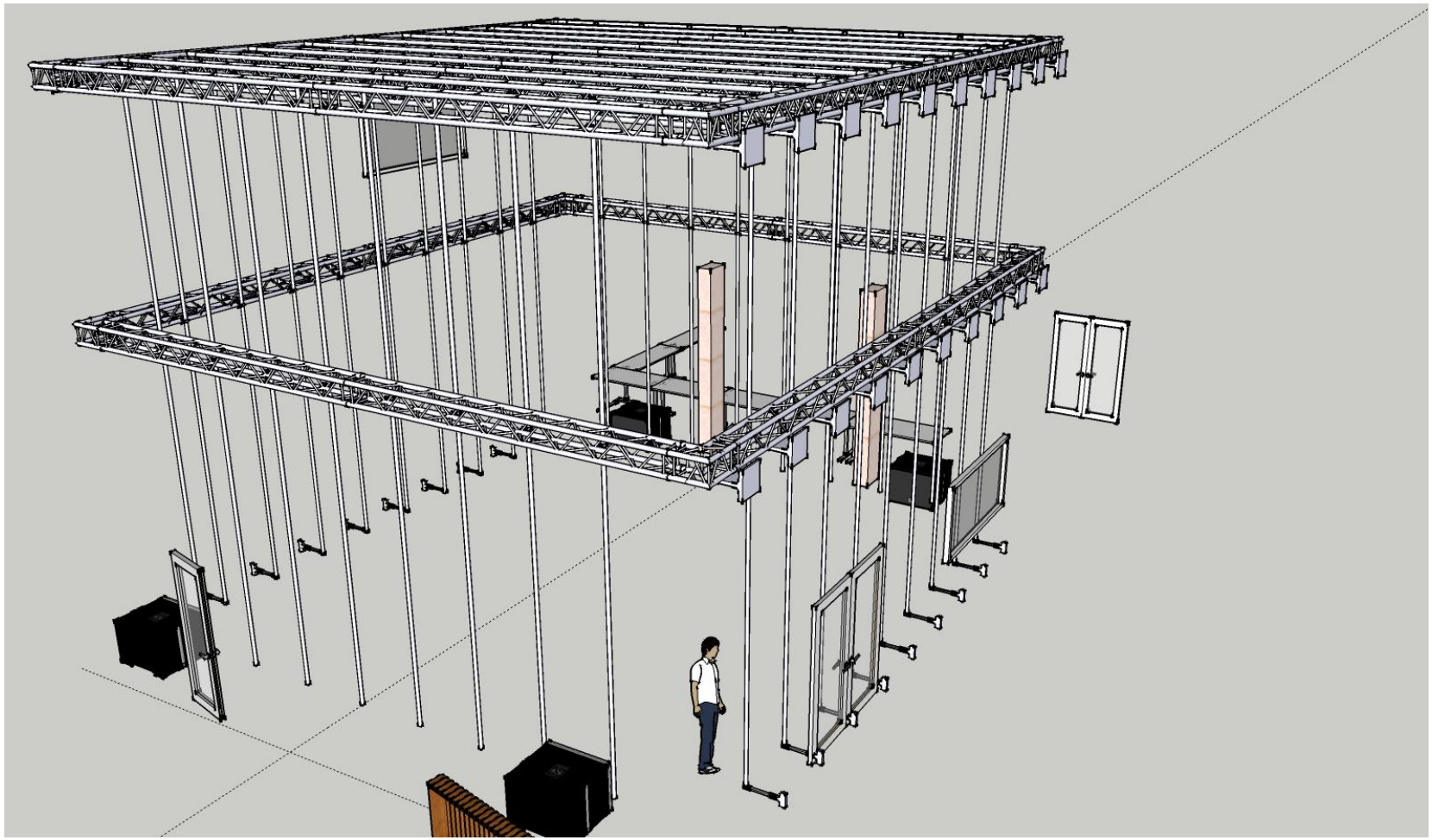
- Where to start?
  - 1st: trussing
  - 2nd: audio equipment
  - 3rd: mocap
  - 4th: AR



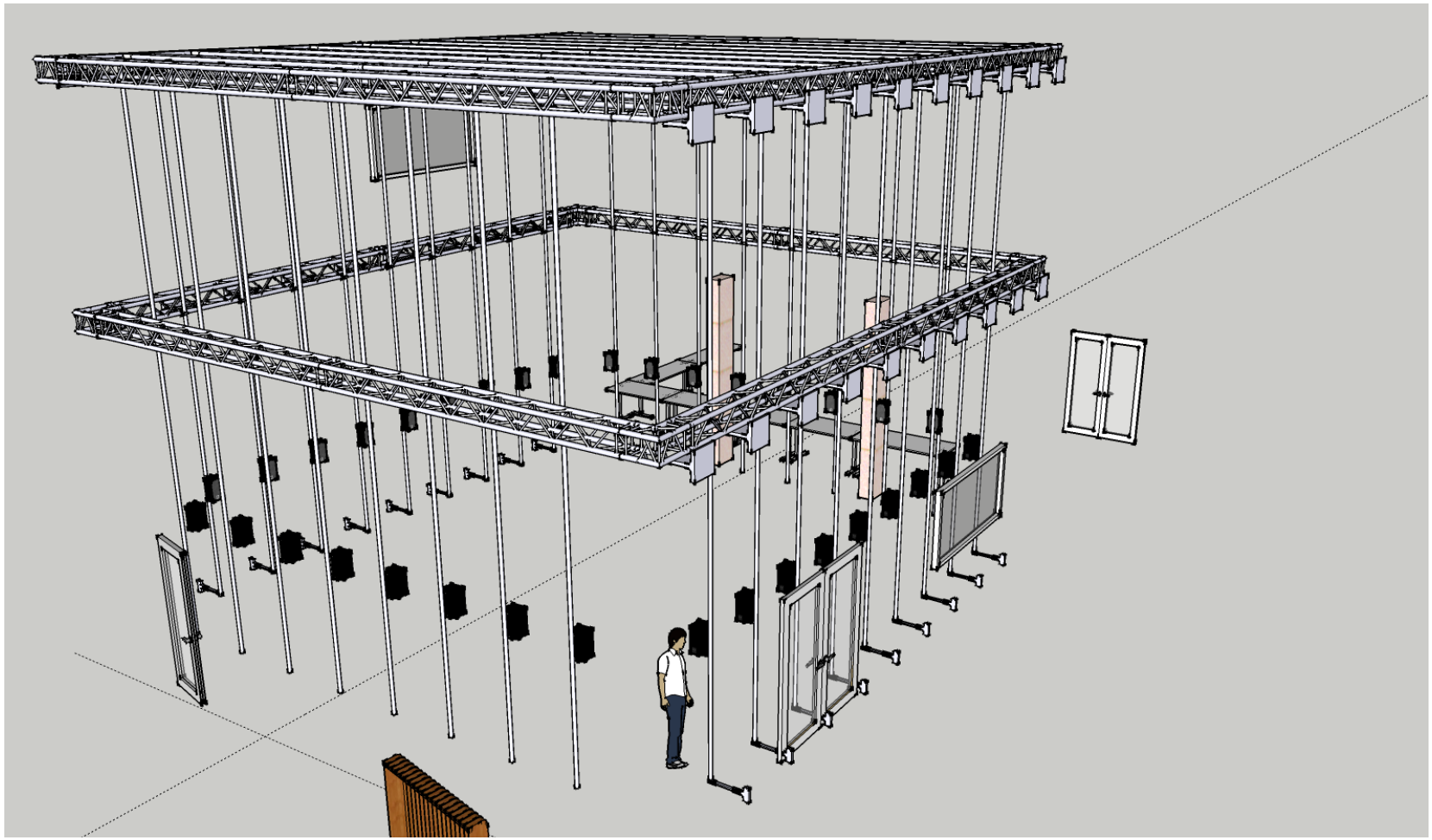
Trussing



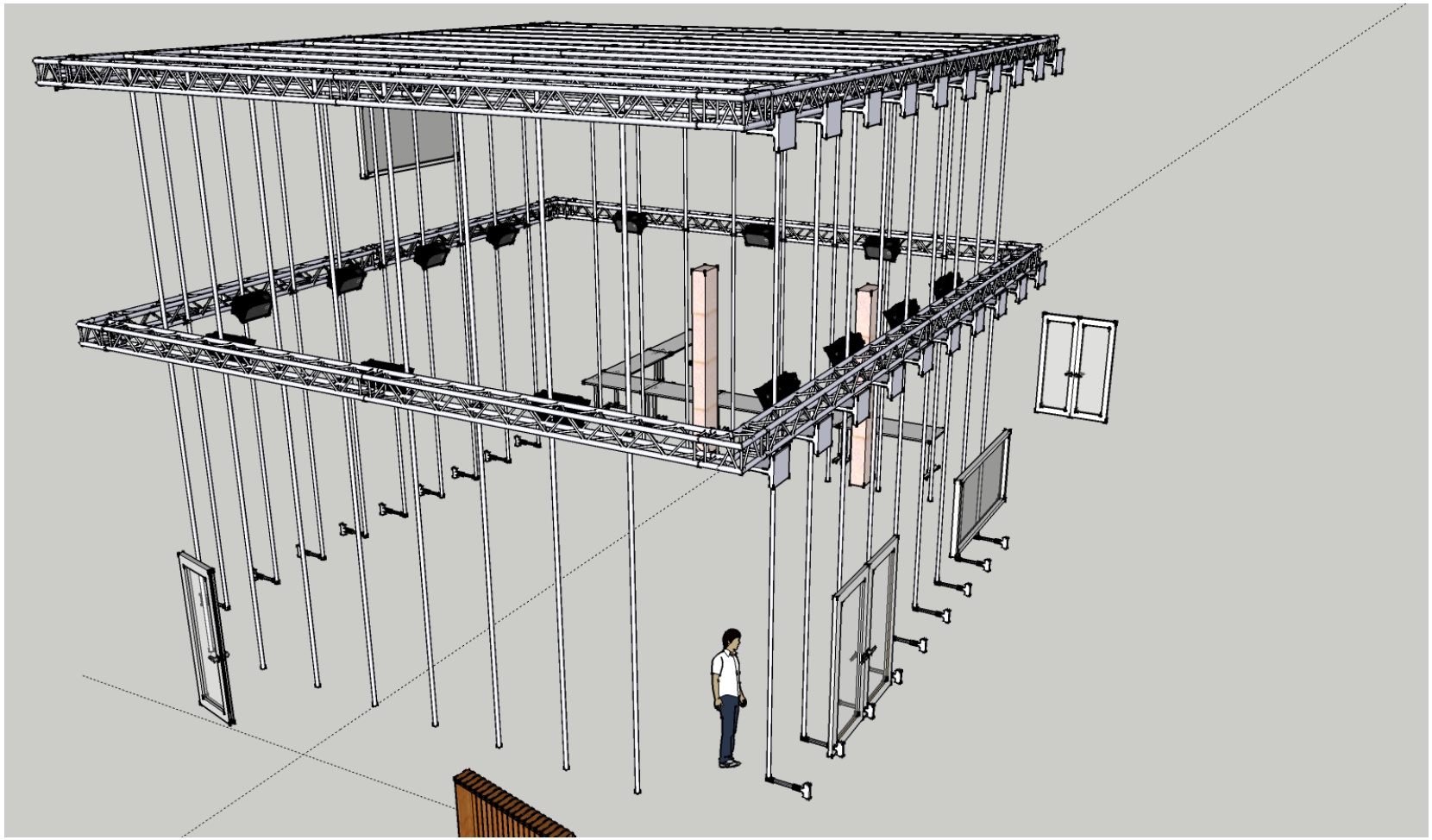
Floor: subwoofers



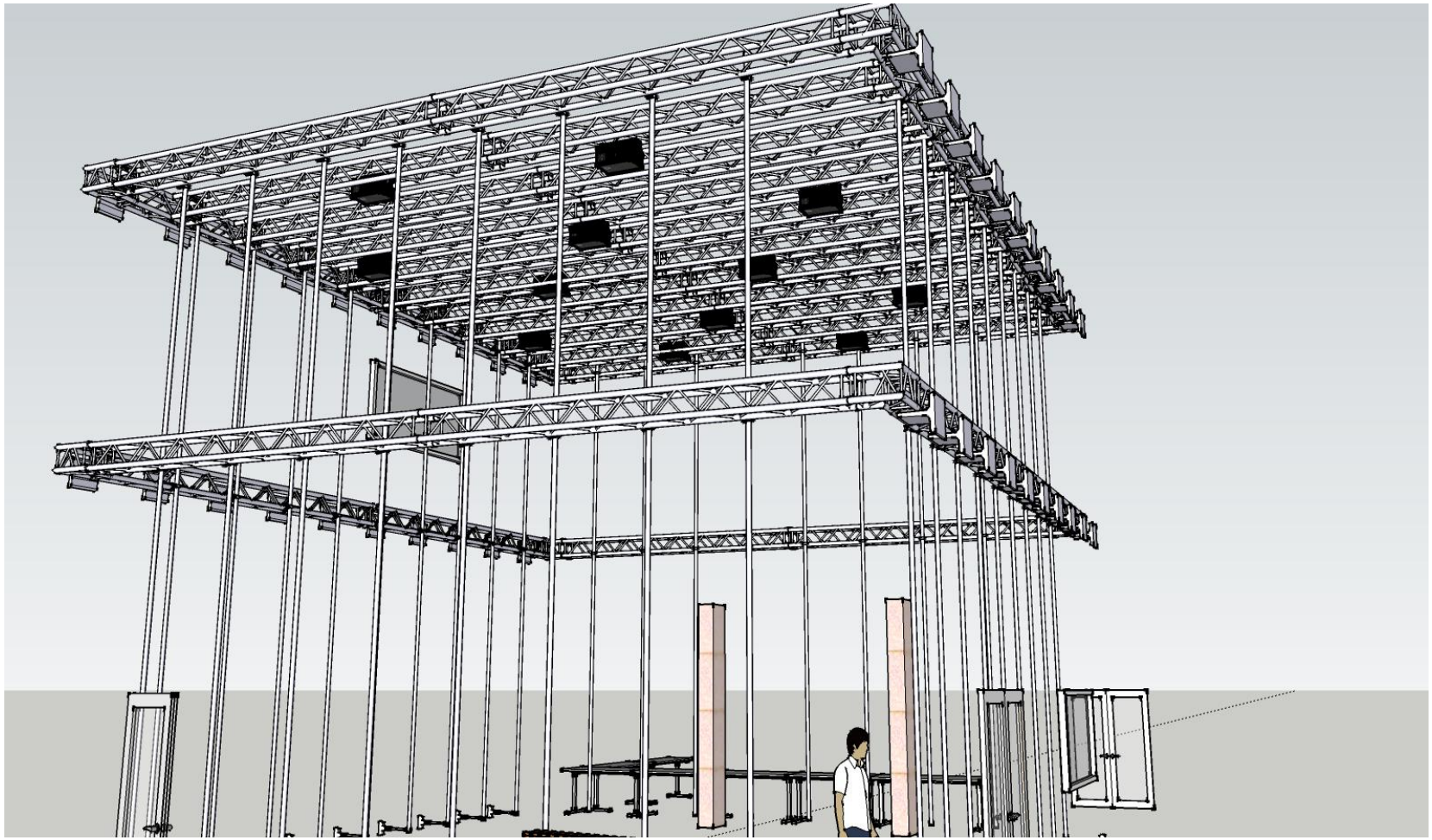
Ring 0: Equidistant ear-height



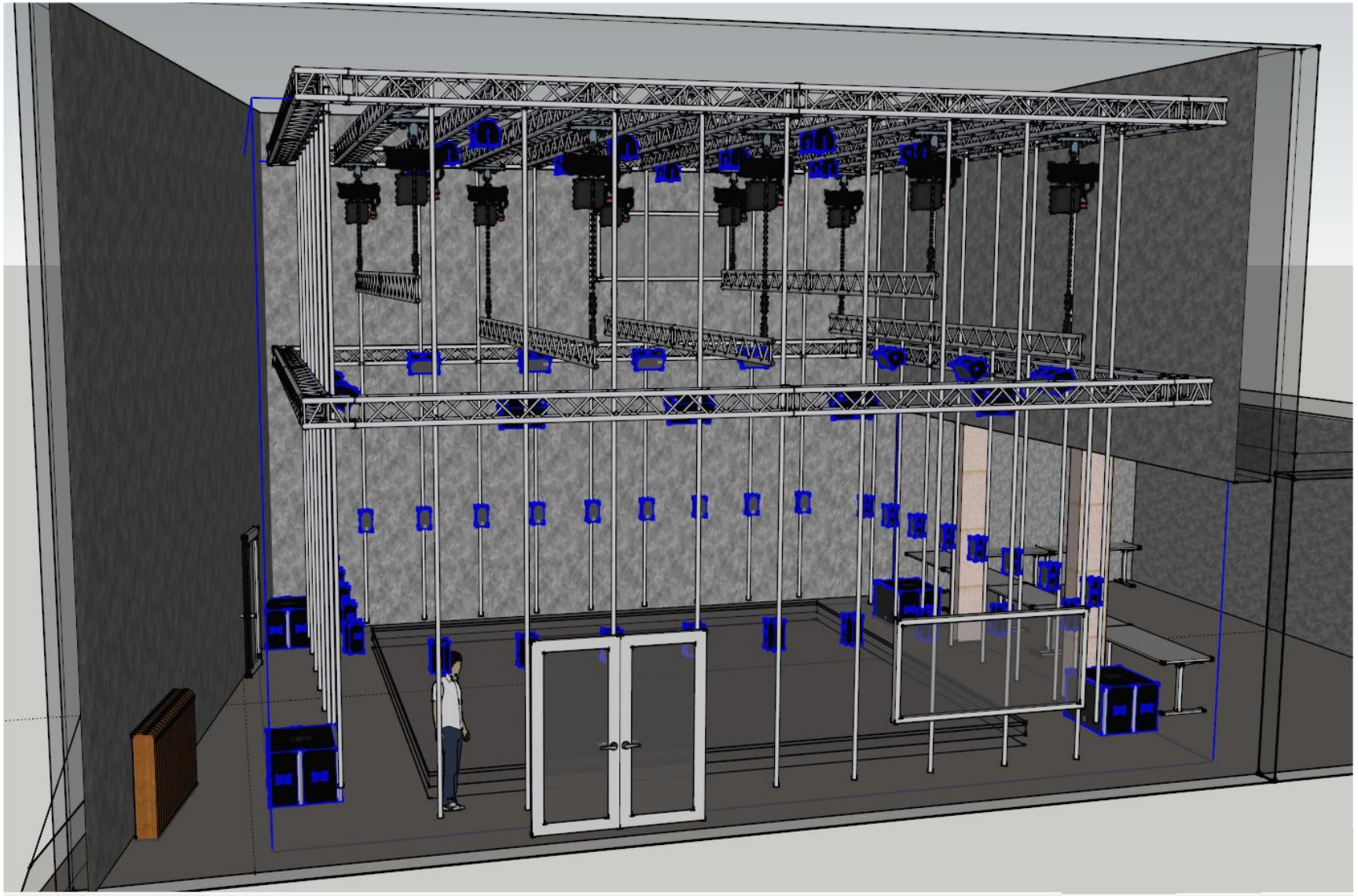
Ring 1: In-between



Ceiling: triangle-structure



Speaker Setup overview



Questions?

- Thank you for your attention!

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  - 28/11/2016