IO : An Immersive Musical and Choreographic Tale

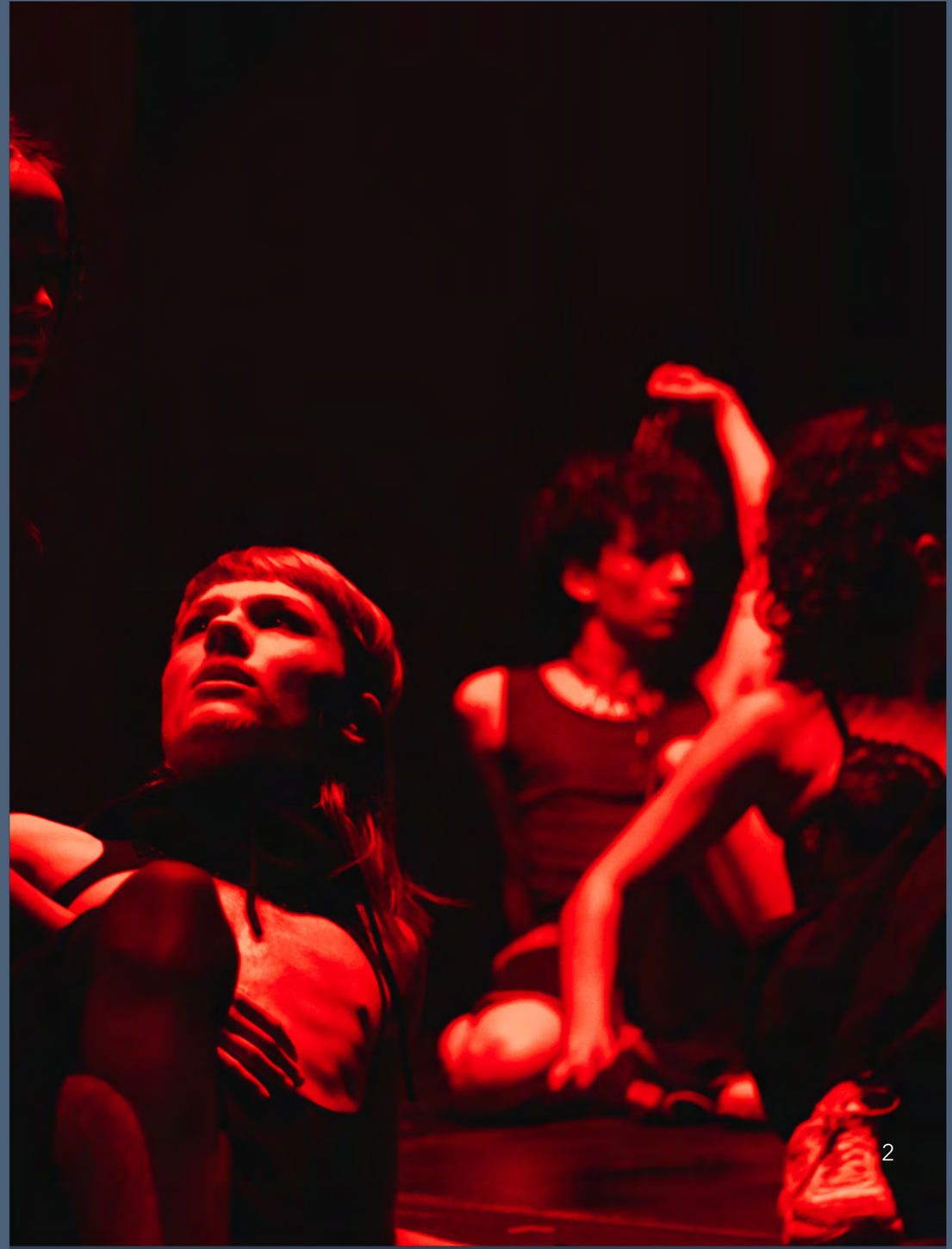
Created by students of the Music-Sound-Image Department,
Paris Conservatory (CNSMDP)

Matis Reynaud

Concept and story

A poetic exploration of memory, emotion and technology

- Dystopian story
- Live music, Dance, Audio dramas, Lights and Video
- IO is a young person who wakes up with no memory in a city where emotions are regulated by an artificial system
- Two main parts :
  - Live sections : musicians and stems
  - Audio dramas (intermedes,, pre-produced)



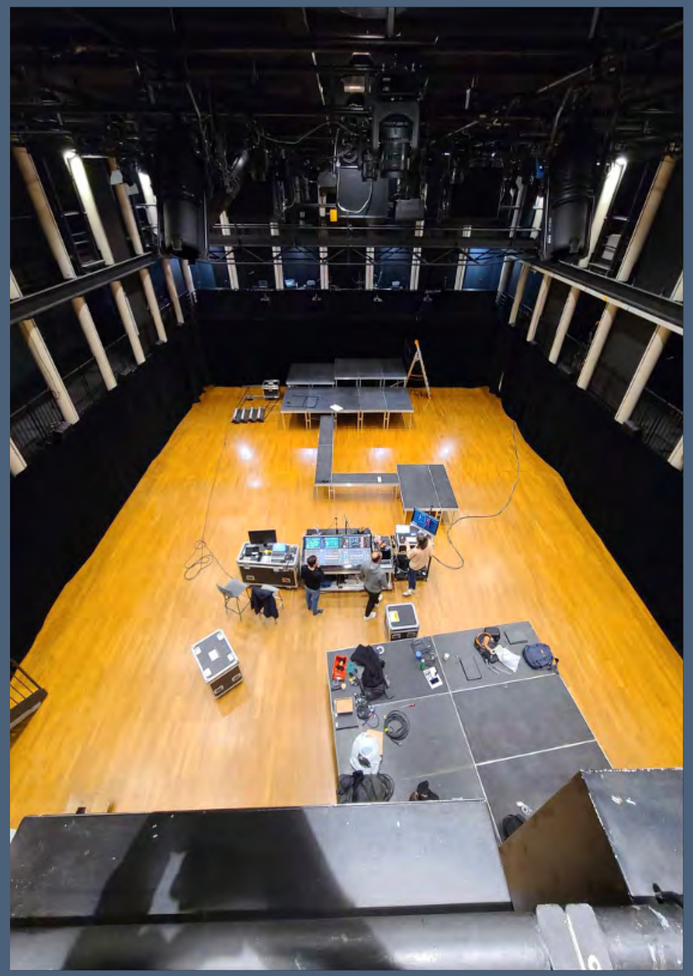
An immersive sound experience

An immersive sound experience

The Venue : Maurice Fleuret Hall, CNSMDP

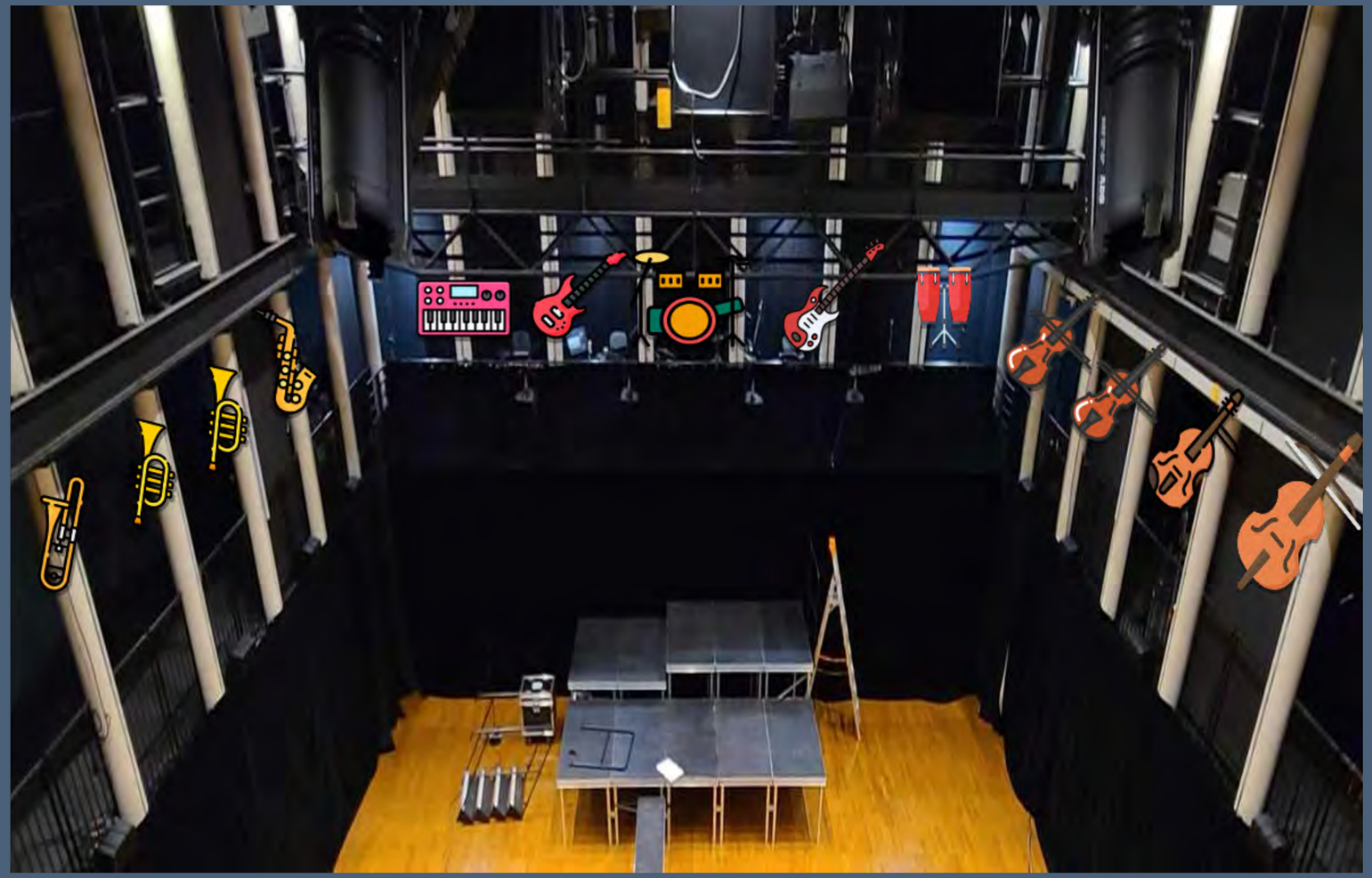
An immersive sound experience

An original scenography



An immersive sound experience

An original scenography

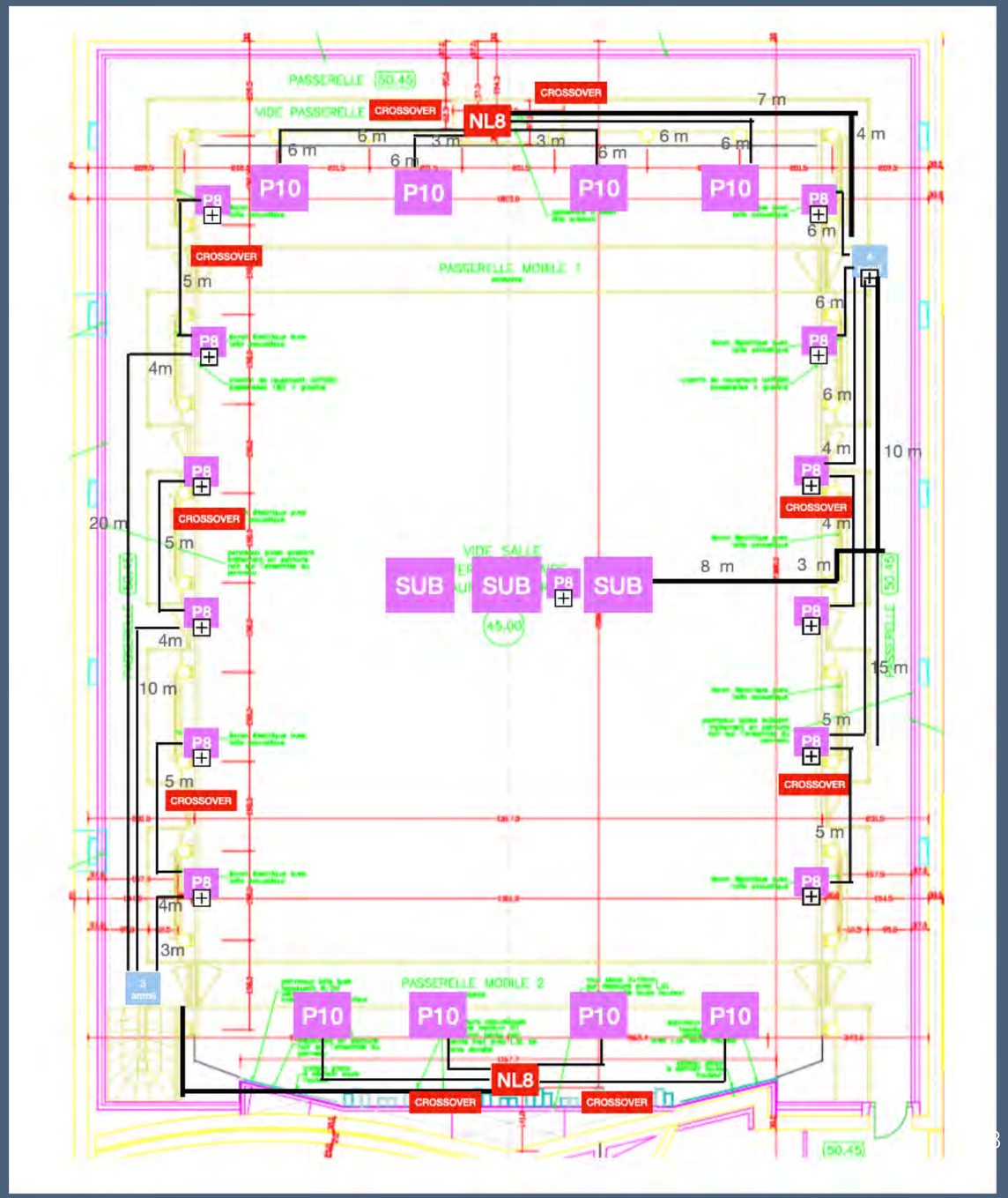


An immersive sound experience

An original scenography

An immersive sound experience

A 360° sound diffusion

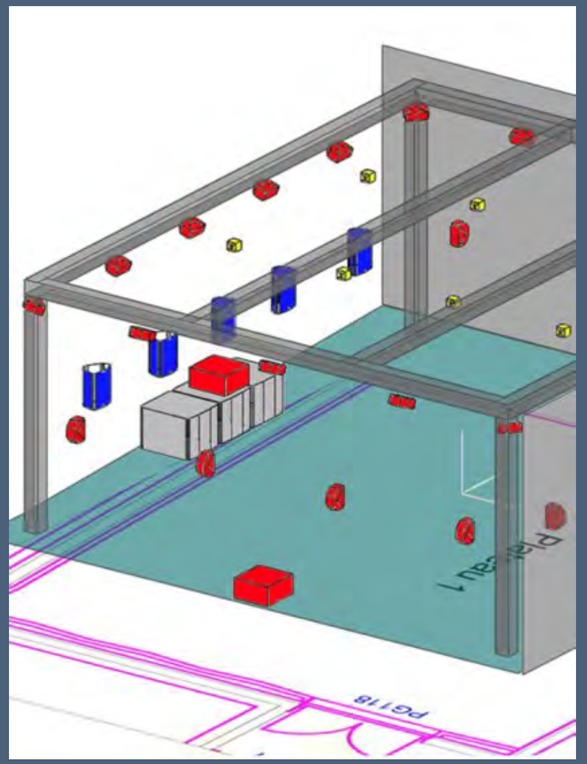


An immersive sound experience

An ambitious project, made possible thanks to

An immersive sound experience

The new immersive studio in « Plateau 1 » at CNSMDP



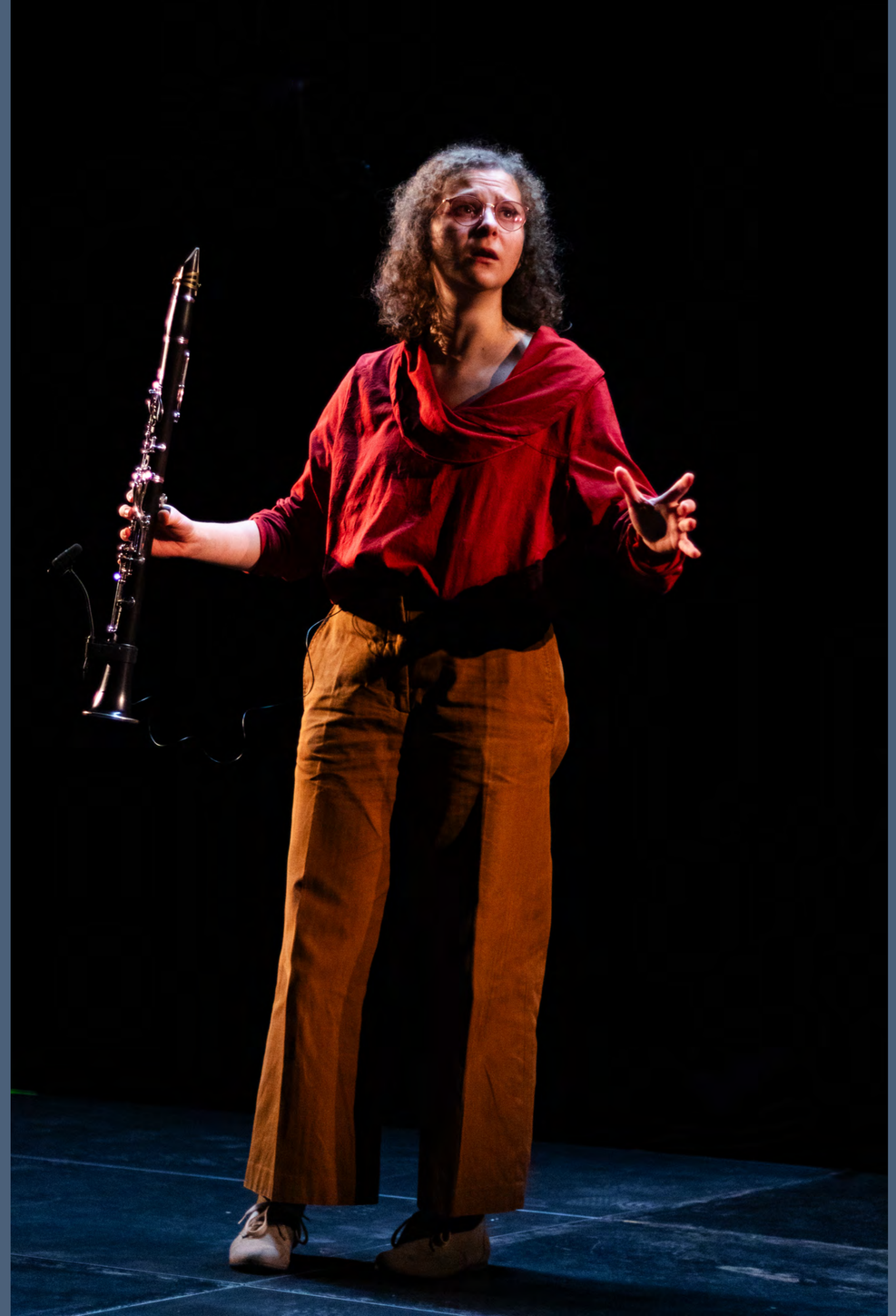
Writing, composing, and pre-producing music for 360° immersive sound

Writing, composing, and pre-producing music for 360° sound

Writing and Scenography

- Two main goals :
  - Writing a story for an immersive context
  - Composing narrative music for 260° diffusion

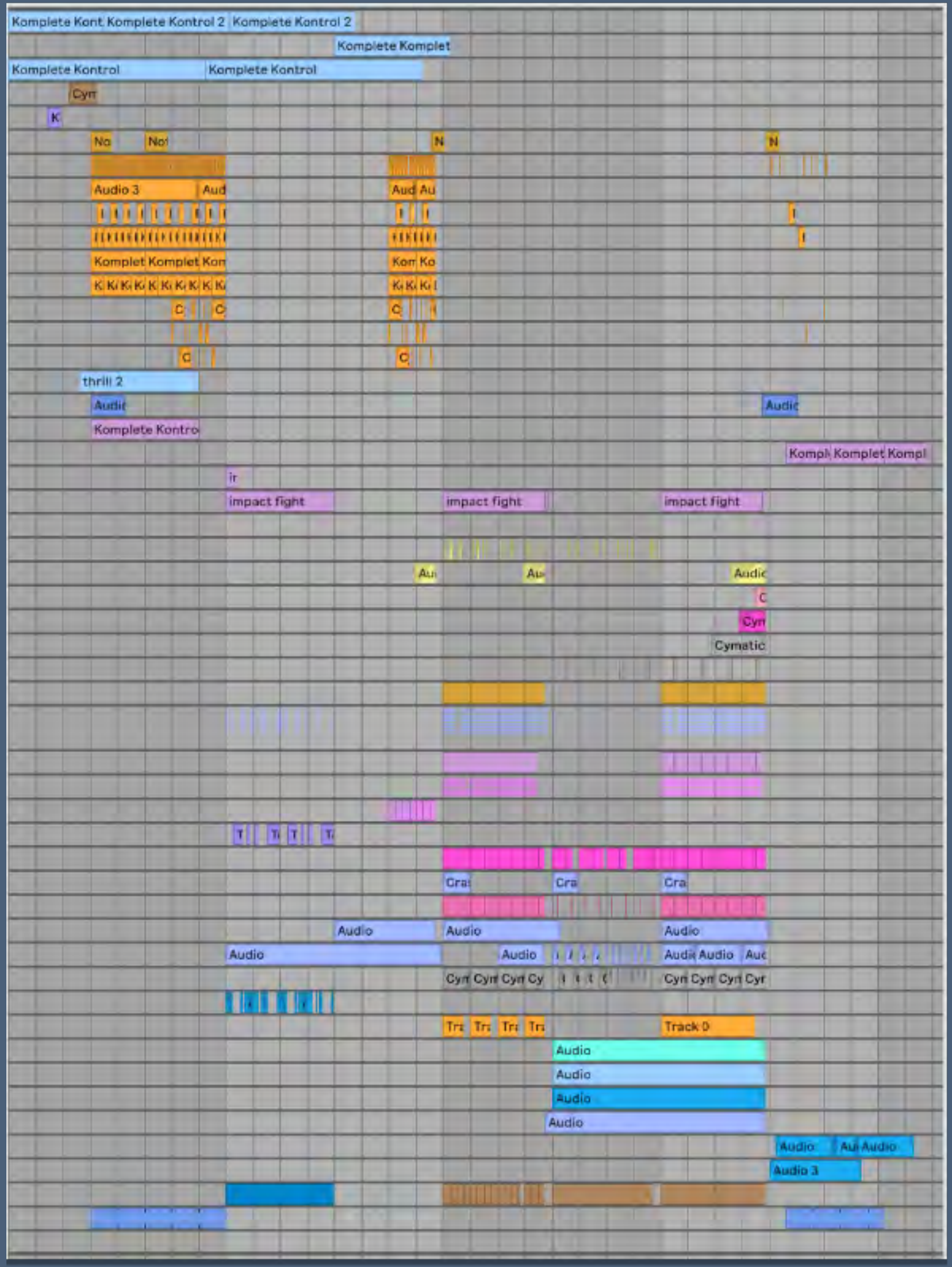
- One main character : the clarinetist



Writing, composing, and pre-producing music for 360° sound

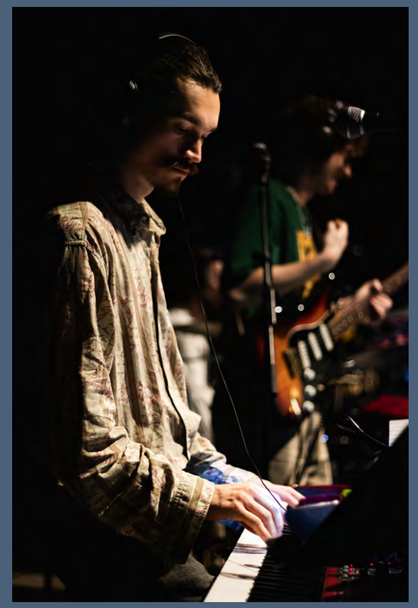
Music composition

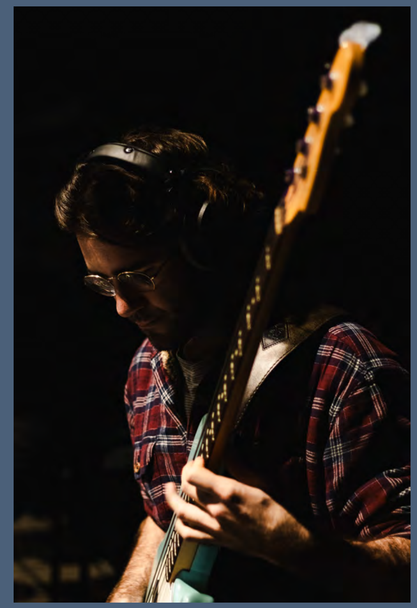
- 5 different composers from our class
- Ableton, Logic Pro or Reaper
- Started in stereo
- Anticipation : multiply the stem layers
- Style coherence : group listening sessions



Writing, composing, and pre-producing music for 360° sound

The choice of live instruments

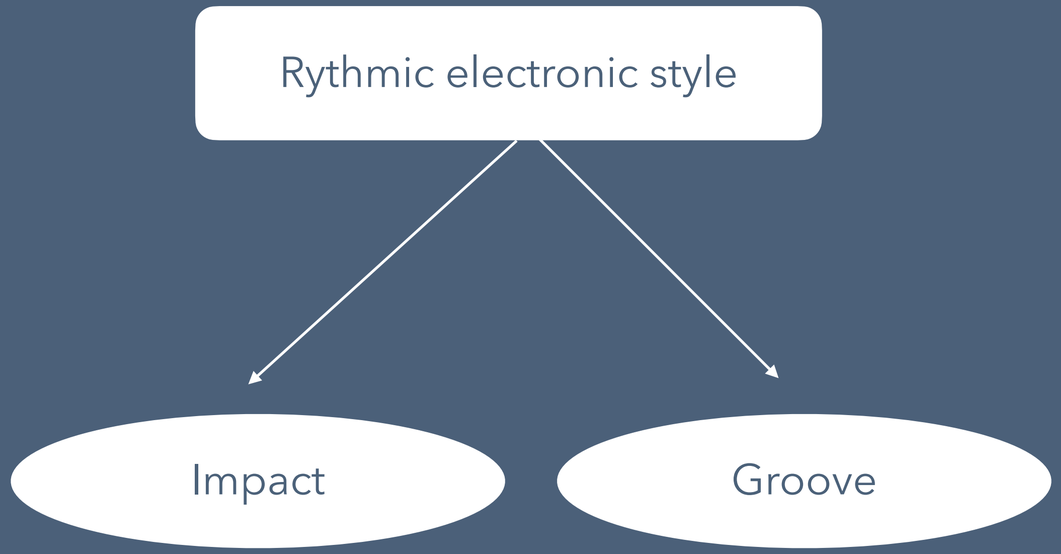



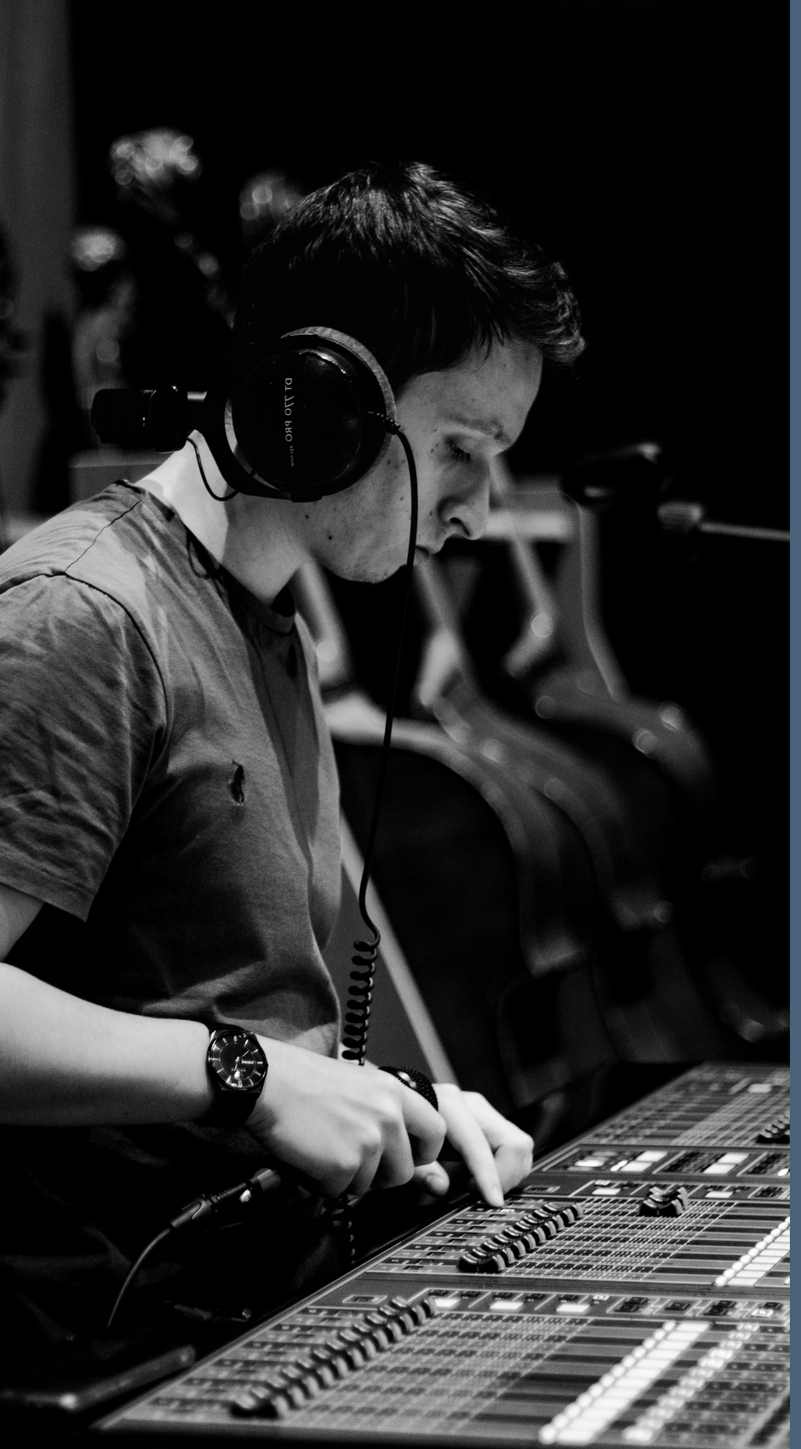




Writing, composing, and pre-producing music for 360° sound

Directional sound scenes

- Guide the audience attention

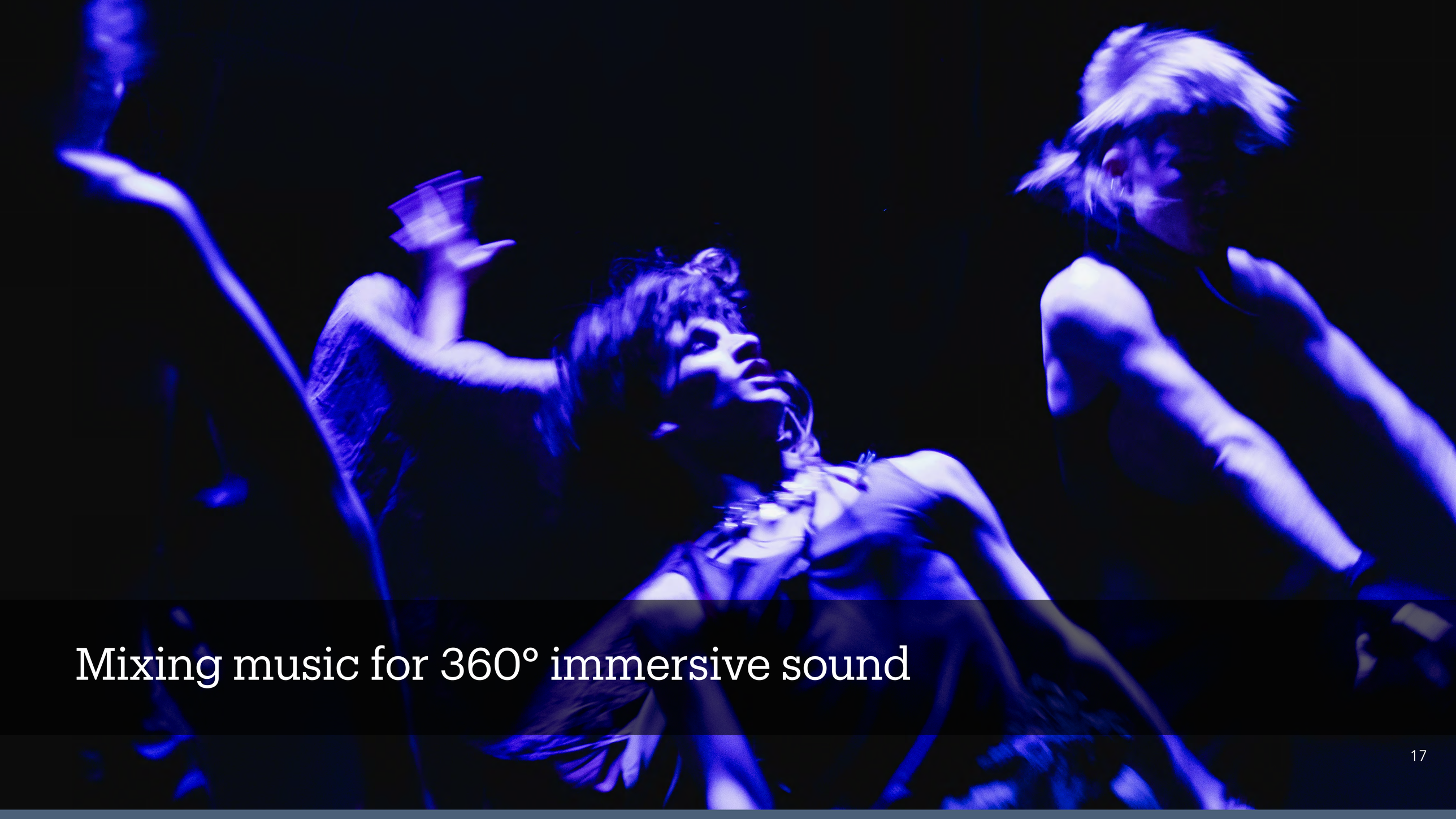




Writing, composing, and pre-producing music for 360° sound

Creative residency : Anticipating the final sound diffusion

- Three stages of mixing :
  - Premix sessions
  - First object based mixes
  - Final adjustments



Mixing music for 360° immersive sound

Mixing music for 360° immersive sound

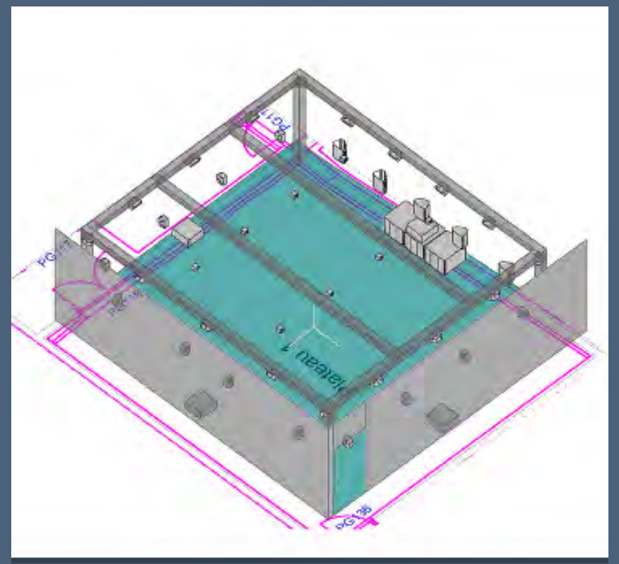
First listening sessions in « Plateau 1 » and issues identified

- Getting familiar with the AFC
- Listening tests
  - Comparisons for percussive elements
  - The AFC multichannel reverb
  - Developping, testing and refining custom M4L tools

Mixing music for 360° immersive sound

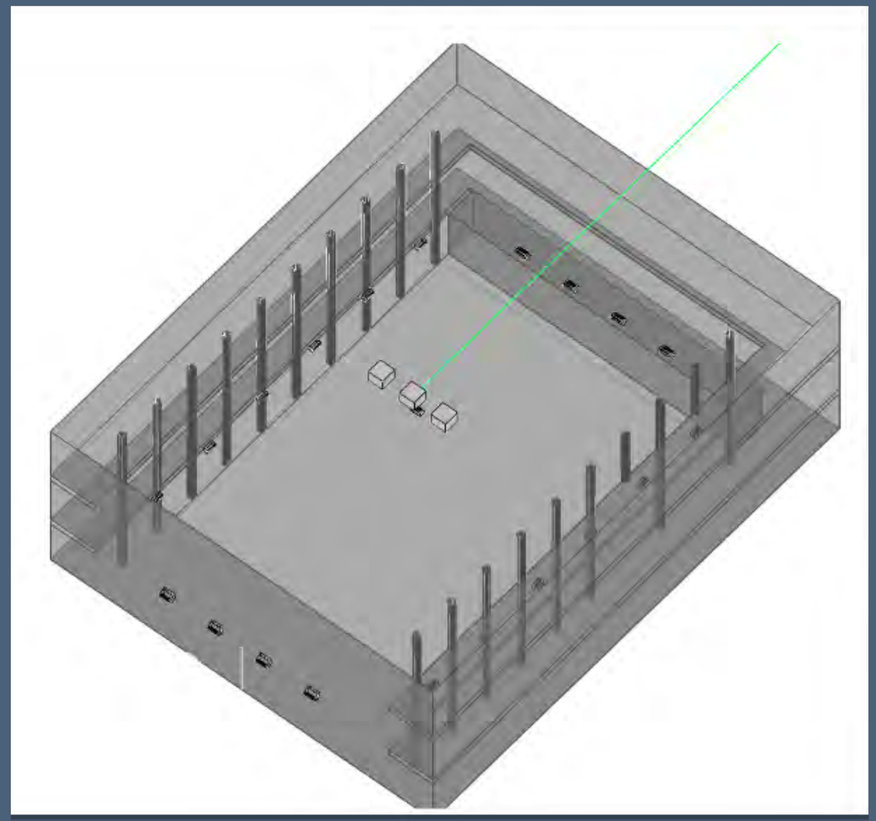
From the rehearsal space to the performance hall

Plateau 1



9m x 7m x 3m

Fleuret Concert Hall

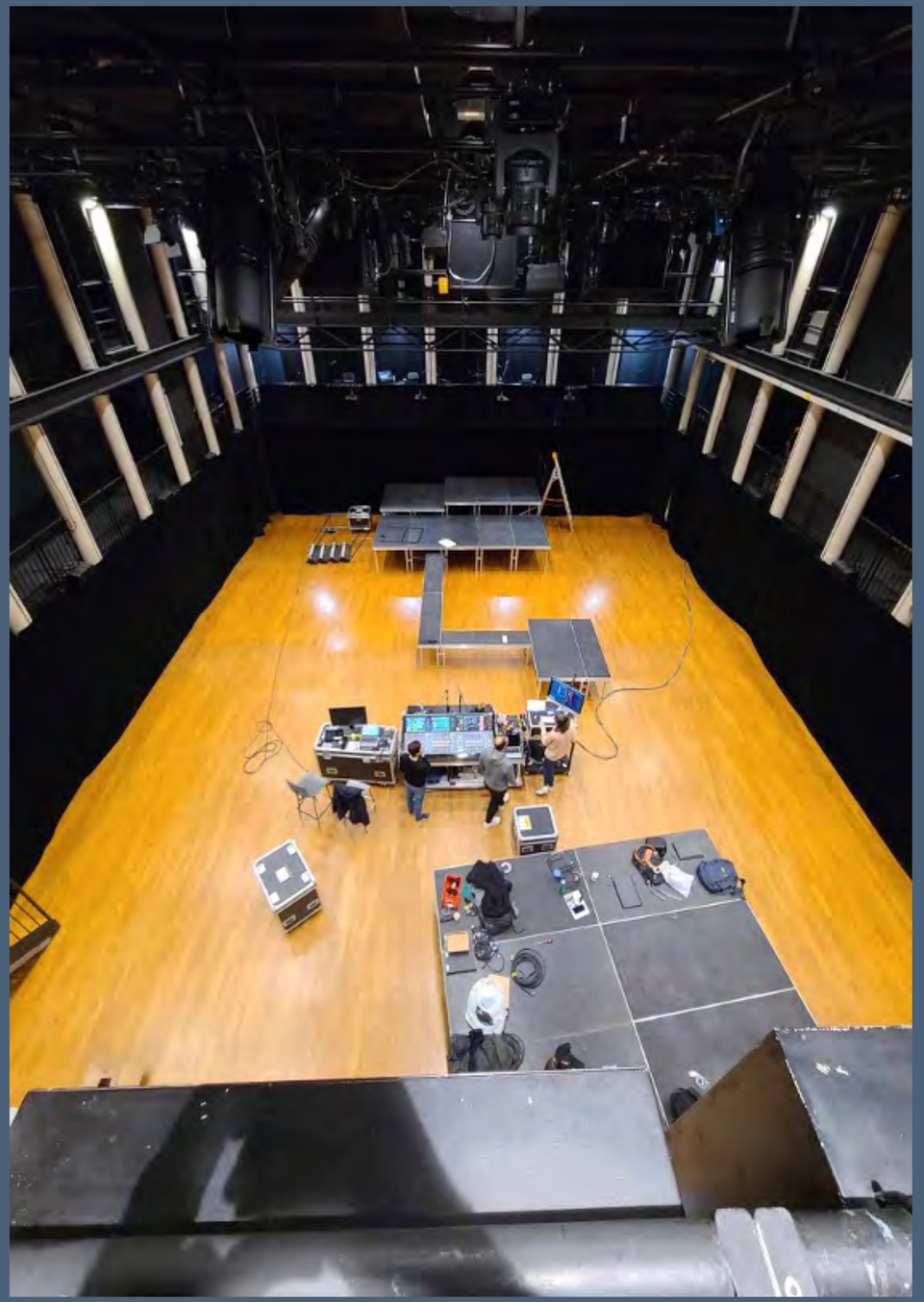


20m x 13m x 8m

Mixing music for 360° immersive sound

First listening sessions in the Fleuret Hall

- Best results than in « Plateau 1 » :
  - Less echo issues
  - Best Low Frequencies management
  - Best Multichannel Reverb Management



Production of the audio dramas

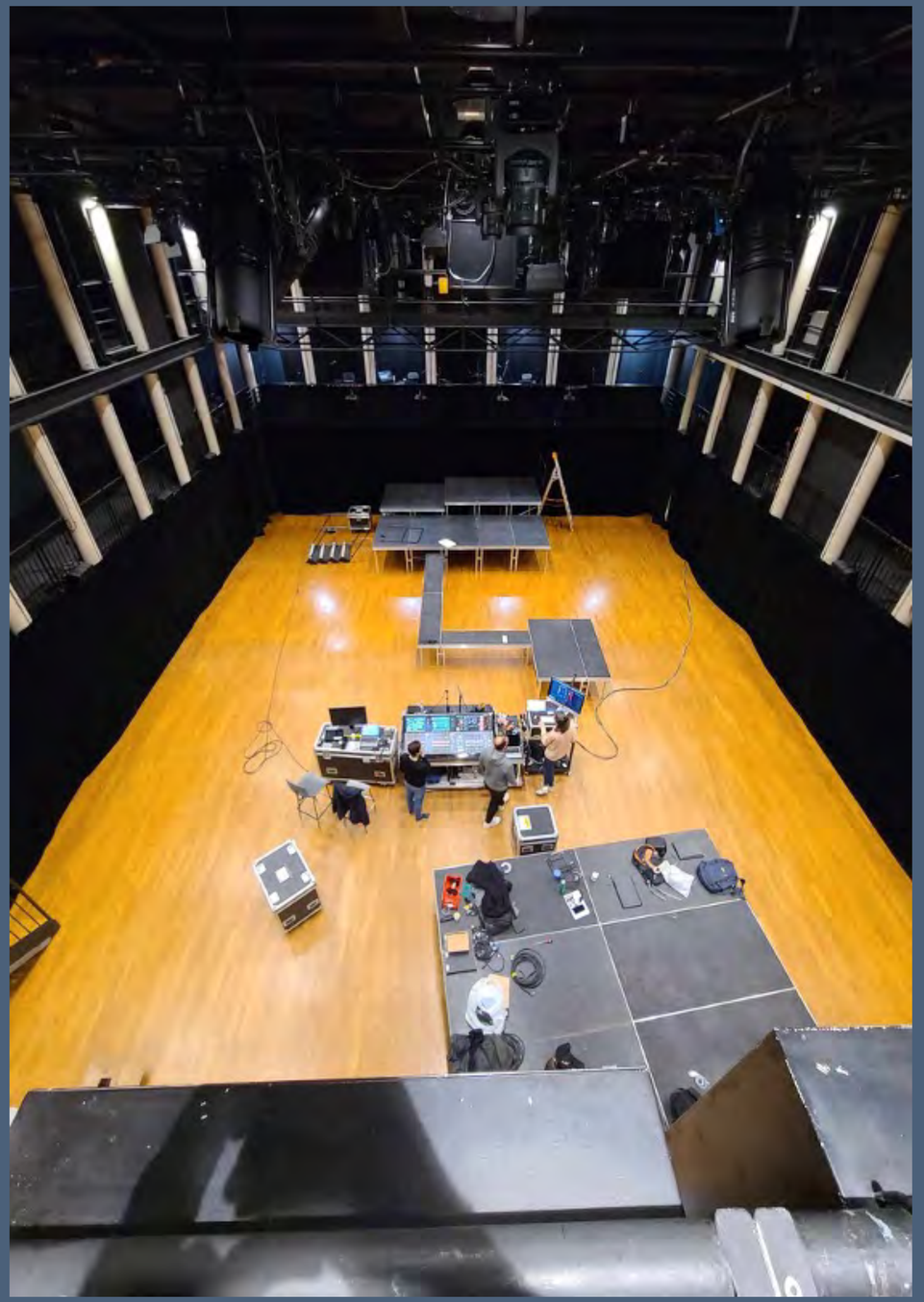
Production of the audio dramas

Intermedes fully pre-produced

- Stereo pre-production
- Ambisonic recordings
- Fully 360° placement : non-oriented scene

- Stems in Ableton
- Spat Tools suite : automations via OSC from Ableton
- Spat Revolution : VBAP 3D and ambisonic decoding

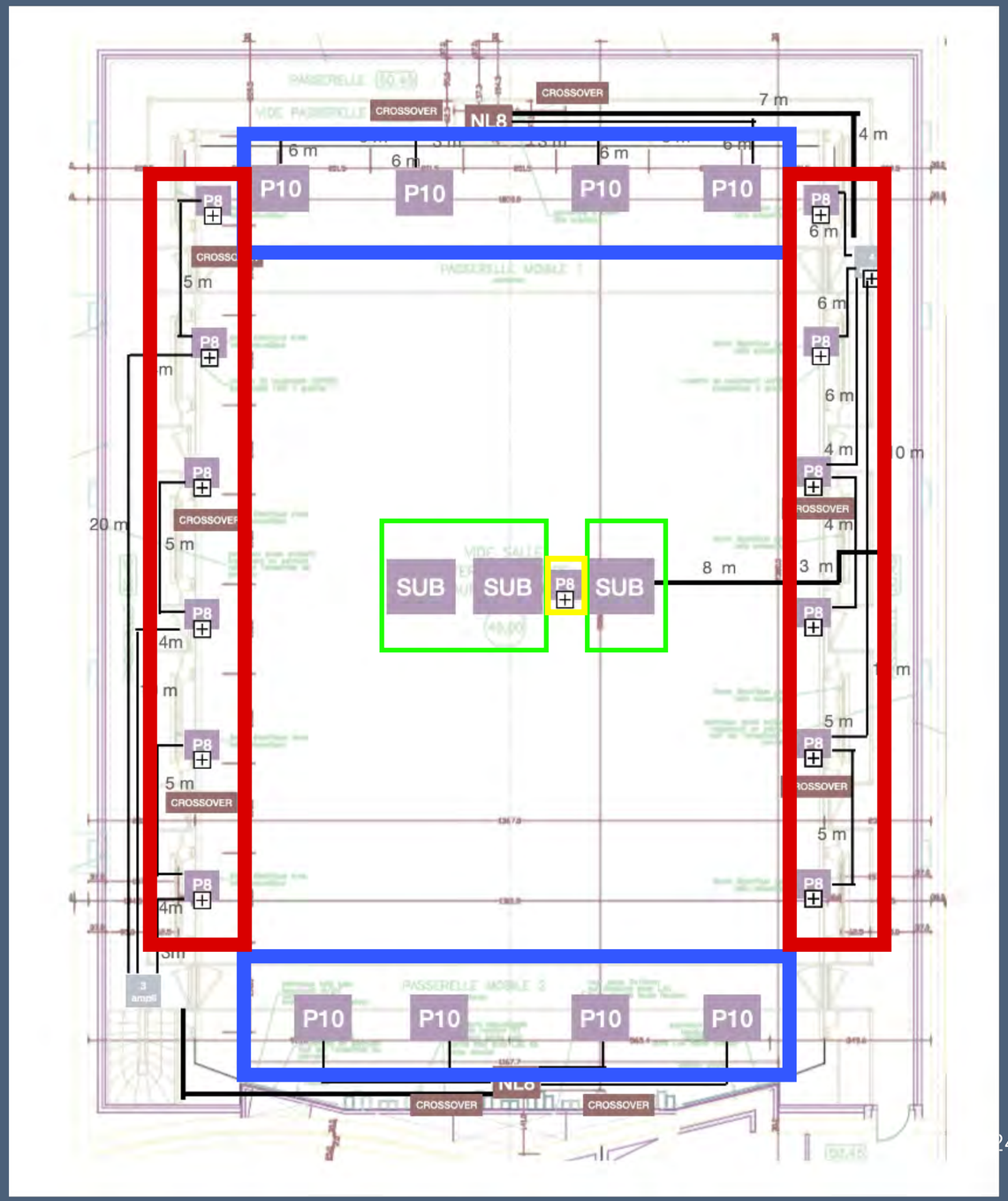
- Simultaneous use of Spat Revolution and AFC System



Final sound diffusion of the show

Final sound diffusion of the show
System design

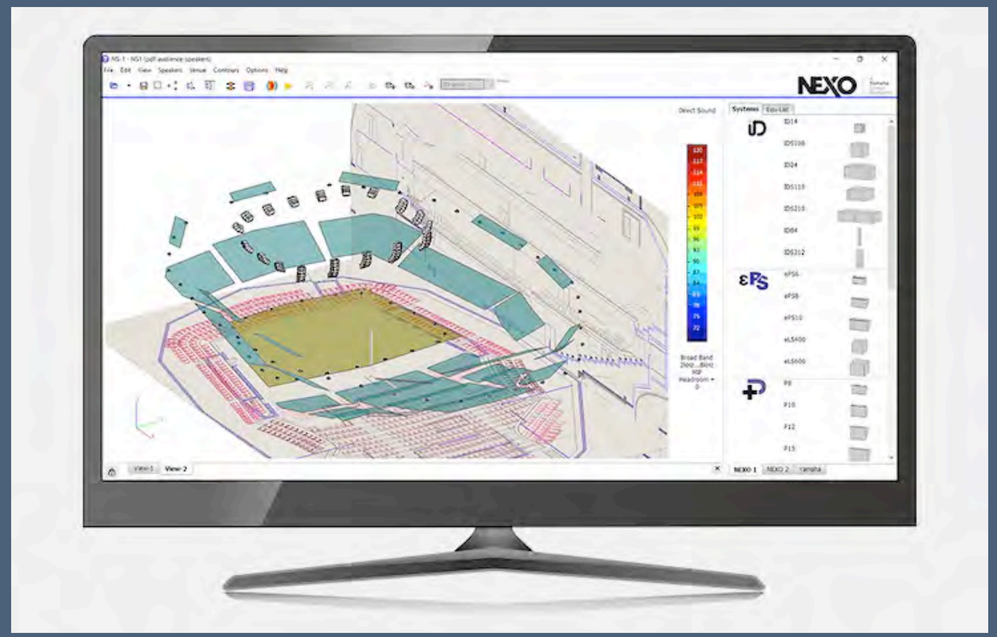
- A 360° Nexo system :
  - 4x P10 per width (main faces)
  - 6x P8 per length
  - 3x subwoofers
  - 1x P8 overhead for a « voice of god »
- All speakers at 100°x100°



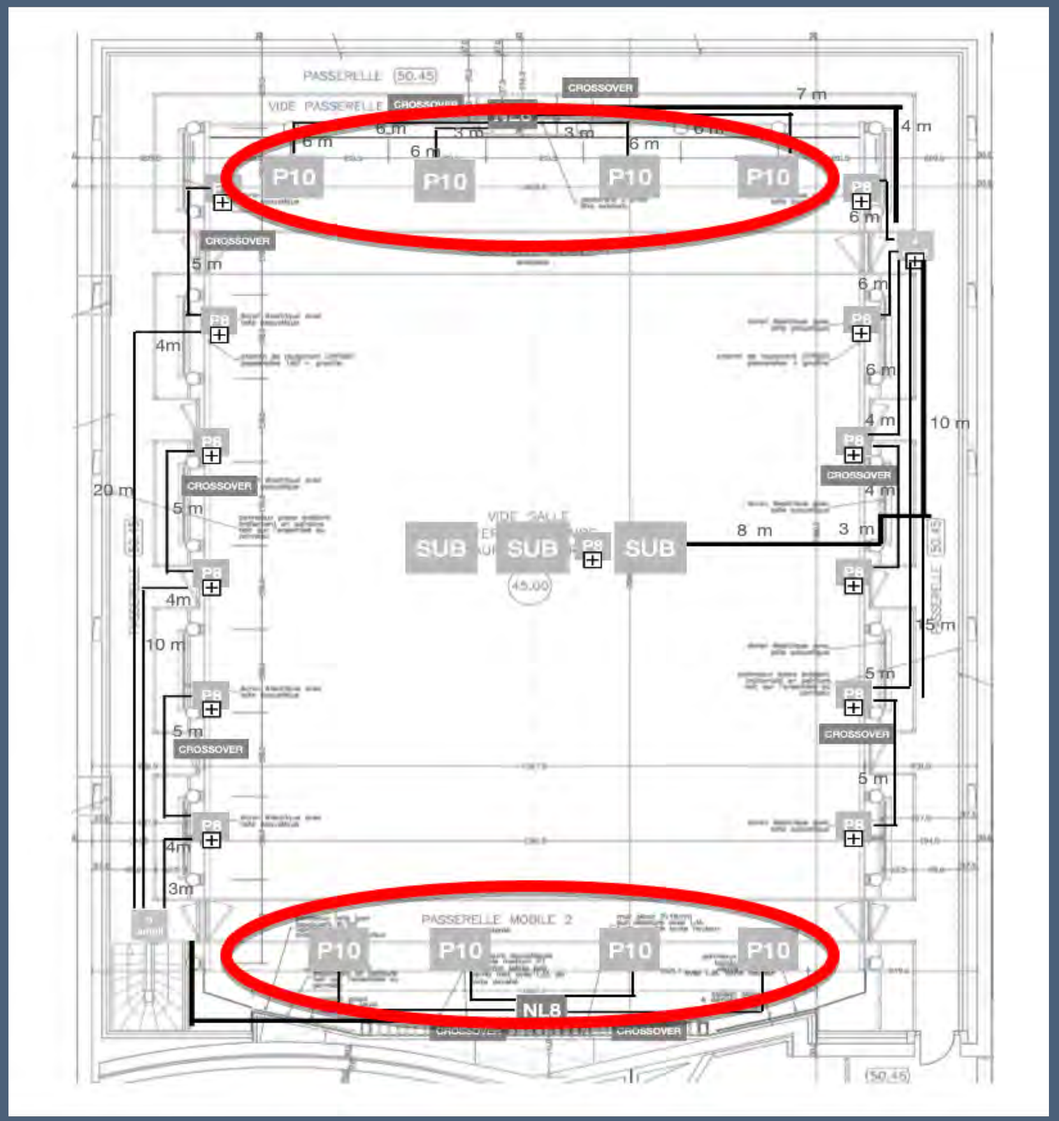
Final sound diffusion of the show

System design

- Simulation : NS-1 and AFC Assistant tool

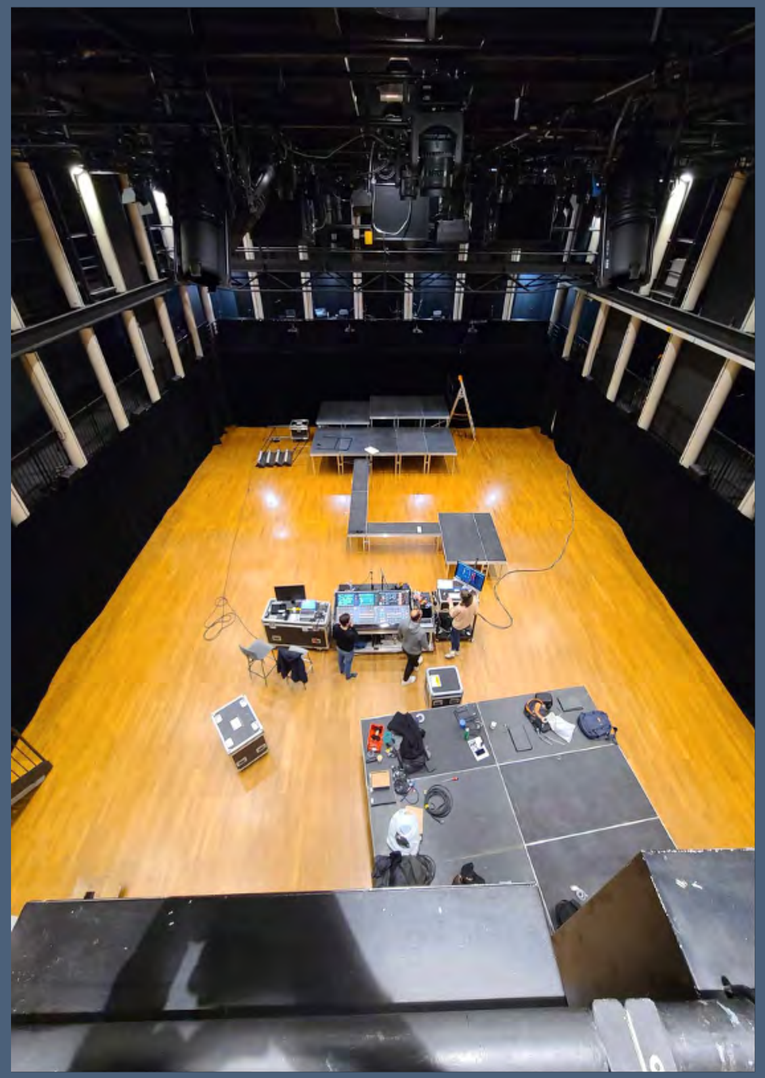


- Two alternating faces



Final sound diffusion of the show

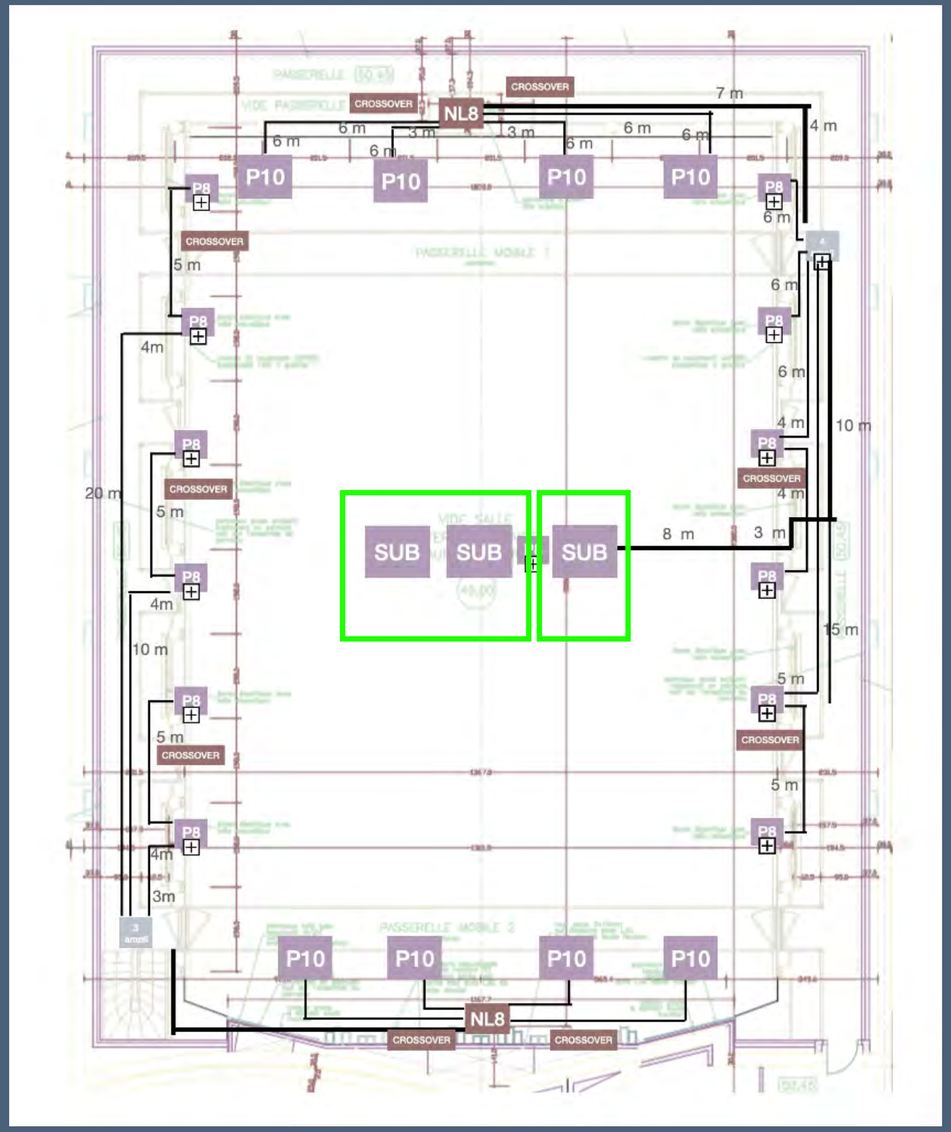
Acoustic : draperies on the walls and behind the musicians



Final sound diffusion of the show

Subwoofer placement

- 3 subs suspended from the ceiling
- This configuration limited the area where subs were perfectly aligned with the main.



Final sound diffusion of the show
L-width and speaker height

- Aisle = minimum distance from a speaker to be considered within the immersive zone
- We chose : Aisle width of 2 meters
- Compromise between number of speaker and maximize the audience within the immersive zone
- We chose : 2.5m speaker height

Final sound diffusion of the show

Impact of the System on Object-Based Mixing Choices

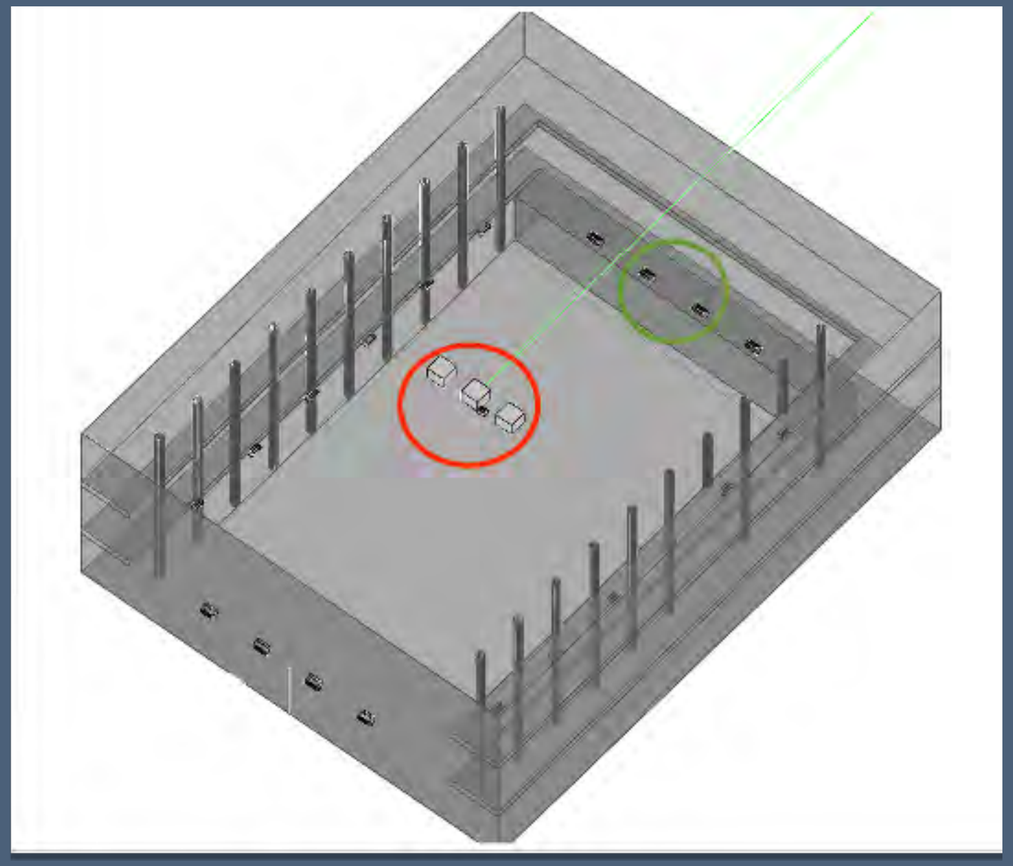
- 96 sound objects in total
- Not processing all sources through the AFC

- Kick, snare and toms directly in the speakers

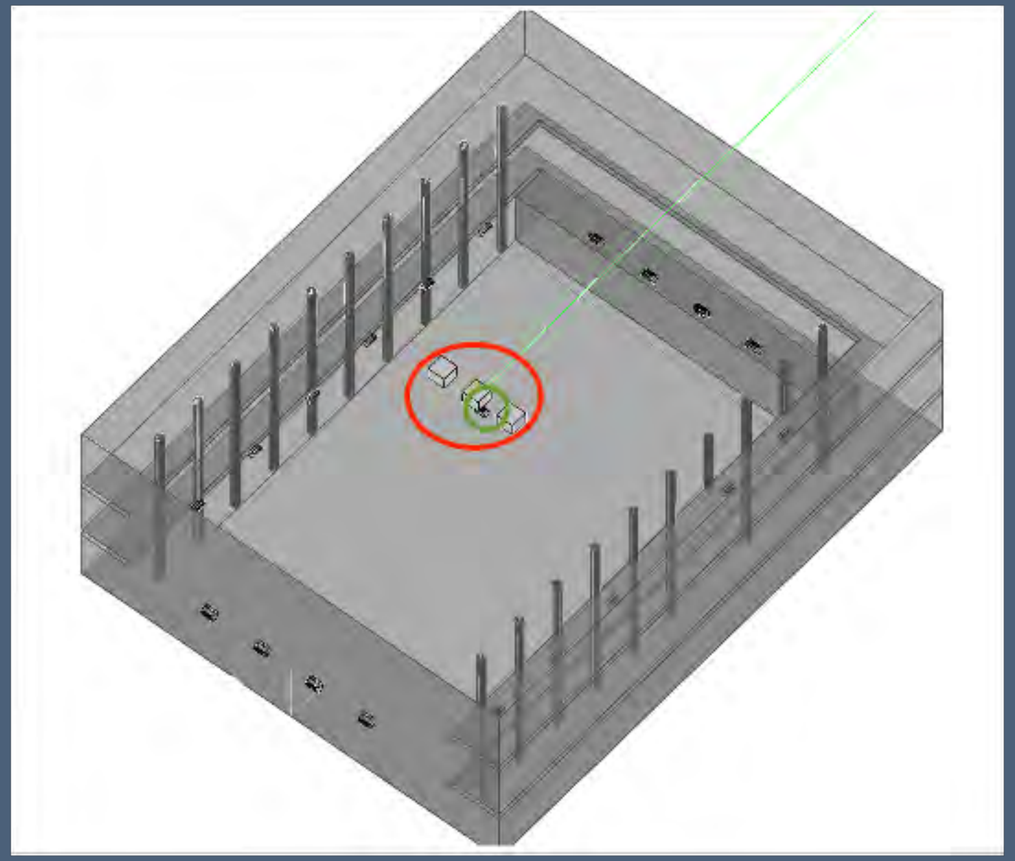
Drums
Percussions
Basse
Synths
Horns
Pads
FX
Sound design

Final sound diffusion of the show

Kick placement and Frequency considerations



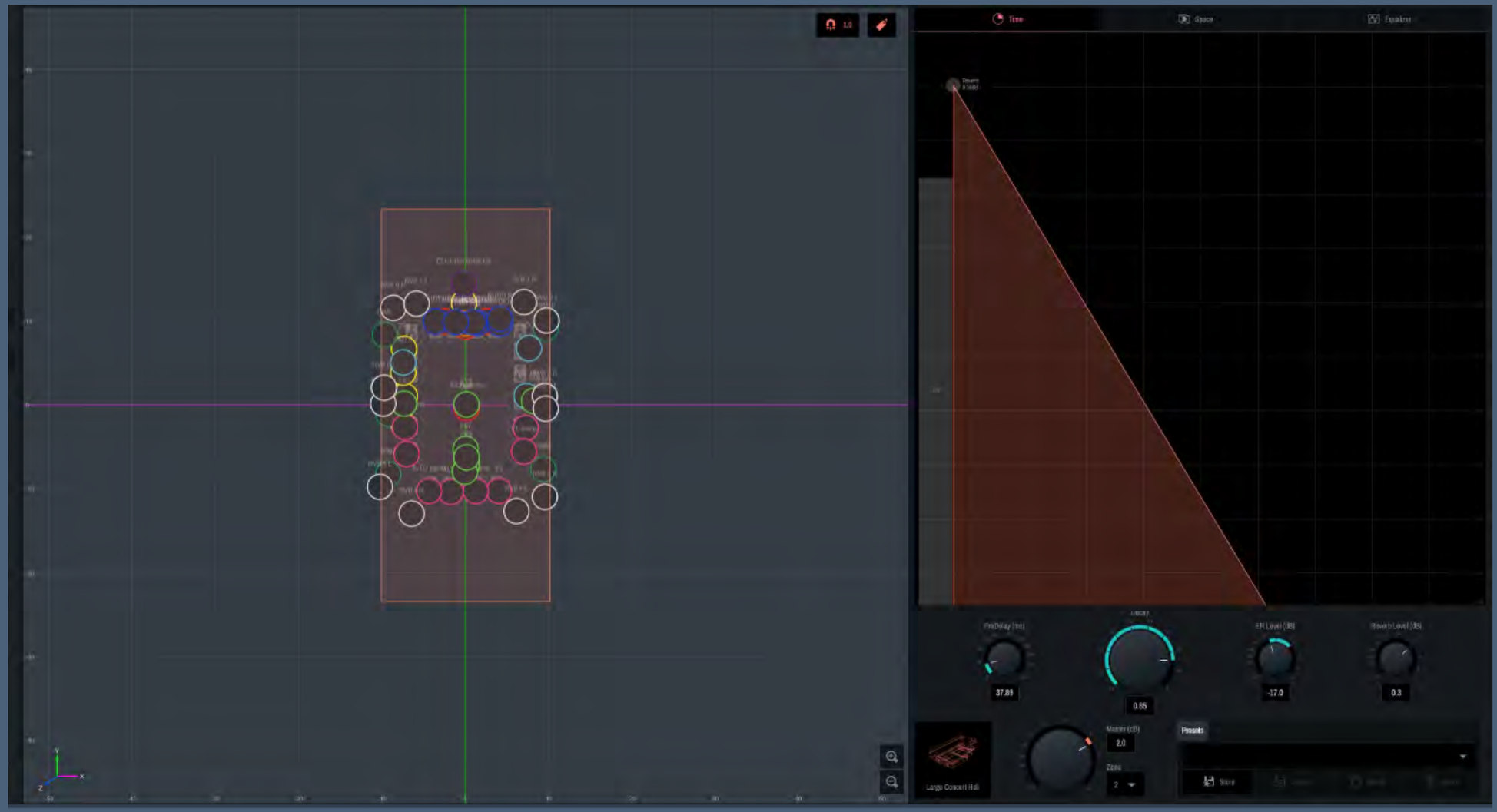
Kick placed on the FOH of the « song »



Kick placed at the center of the room

Final sound diffusion of the show

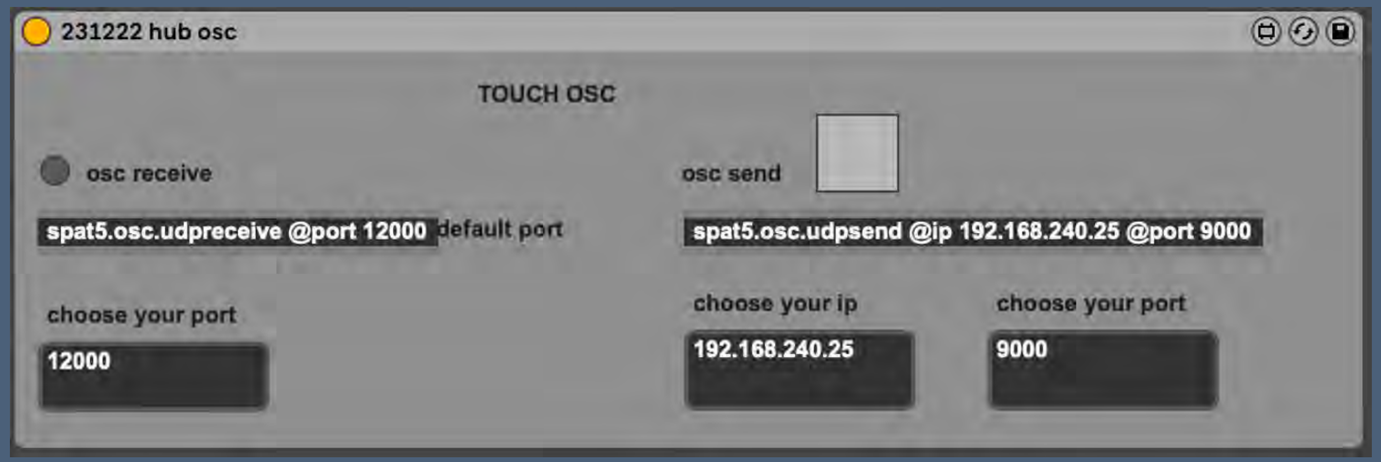
Multichannel reverb management



Final sound diffusion of the show

Automating the sound objects

- Ableton Live : Max for Live, communication of MIDI data, automation’s ergonomy
- Max for Live : control AFC
- Touch OSC interfaces
- Snapshots : Spat 5 (IRCAM)



Final sound diffusion of the show

The FOH setup : four hands mixing

Final sound diffusion of the show

Unmasking sources and Perceived loudness

Drums
Percussions
Basse
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Pads
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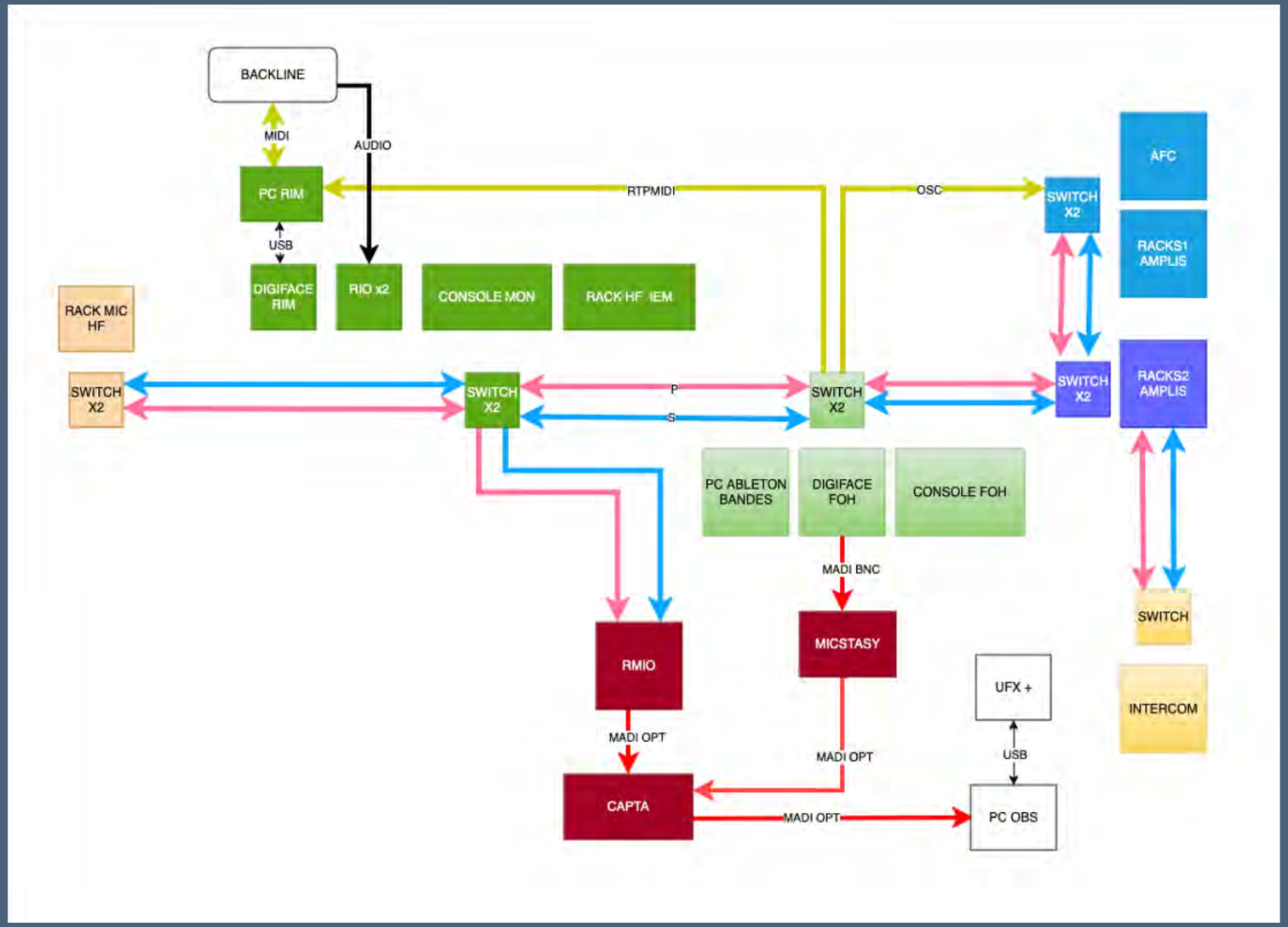
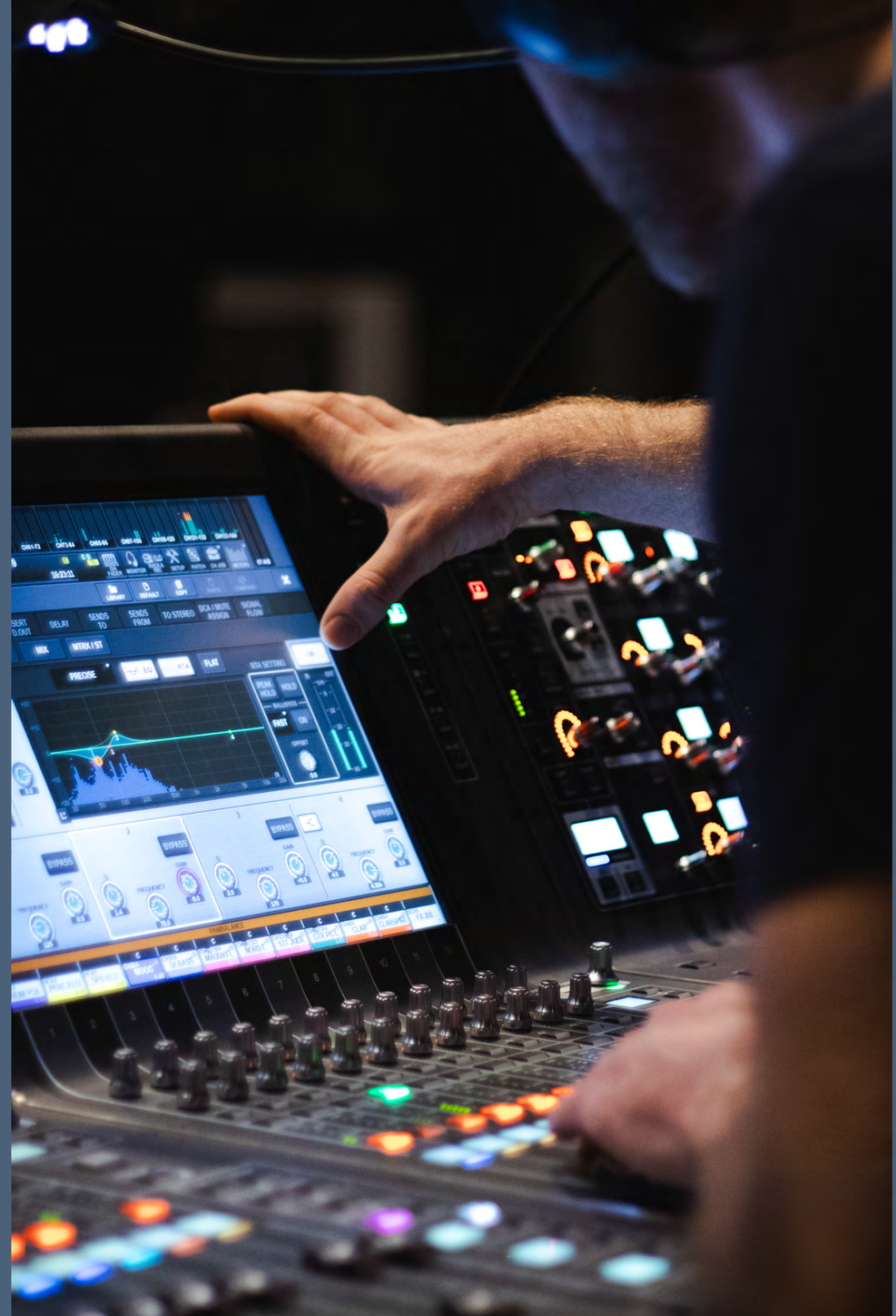
Sound design

Network Management



Stage monitors

- Yamaha PM7 : we needed a lot of inputs (a time saver)
- Stereo monitor mix (binaural only for intercedes) : functional tool
- Click track and cues
- No wedges, only headphones (DT77O and IEM)
- Wireless pocket management



IO : an educational experience

- A full pedagogical process : more than 50 students
- We worked like a professional production team
- Llink theory, practice and collective creation

- Artistic and educational outcomes :
  - Immersive audio : tell the story emotionally, increase the audience engagement
  - Required a large amount of sonic material
  - The show required development of new tools
  - Importance of understanding spatialization algorithms
  - 3D does not conflict with established musical references

IO : the spirit of the Music-Sound-Image Department

- Learning by creating
- Linking art and technology
- Imagining the future of performance together

Thank you for your attention !