

ircam Centre
Pompidou



World Expo Osaka Immersive Sound design for France pavillon





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Clément Cerles
Sound Engineer

Yann Brecy
Computer Music Designer

Speakers



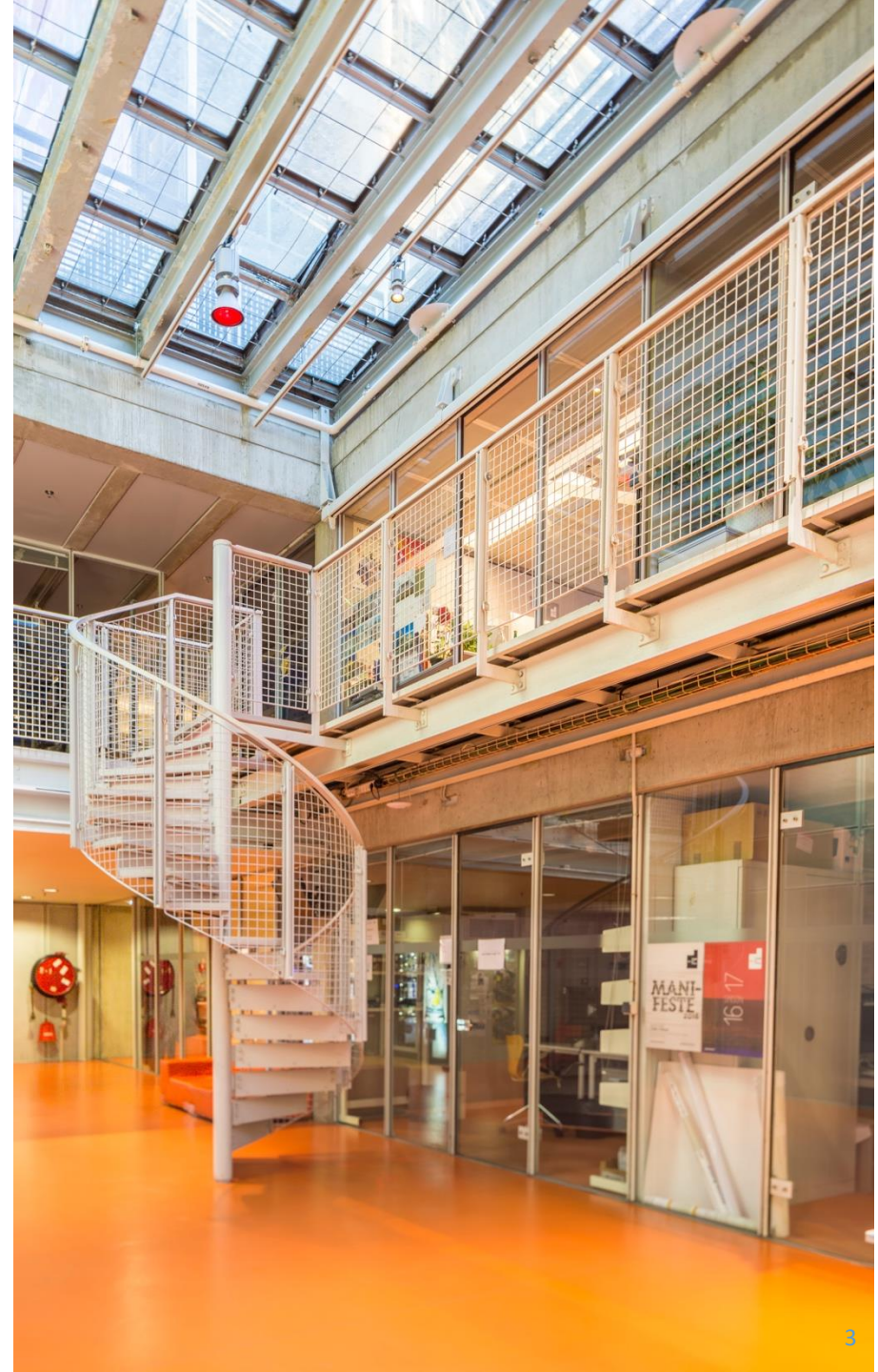
Rappel du titre de partie

Introduction

What is IRCAM ?

French institute founded in 1974 by Pierre Boulez linked to Centre Pompidou. It is dedicated to the research of music, sound and acoustics, especially in contemporary music.

Research & cultural center, concert venue, music production company, ...





SUMMARY

1. French Pavillon « Pulsation » : an immersive scenography
2. Off site : Sound system & content & spatialization design
3. On site : Mixing & mastering & playback design
4. Virtual tour



01

**Pulsation : an
immersive
scenography**

鼓動

PULSATIONS

PULSATIONS

« Pulsations »

Justine Emard : art director of the permanent exhibition

Concept, creation & réalisation : Justine Emard & GSM Project

Sound creation & design : IRCAM

Production : Cofrex

Audio Equipment : Nexo

Transversal Experience

The visit to the French Pavilion is a harmonious and unified experience. Here are the elements that work in concert to create a guiding thread, an experiential DNA that weaves through the entire visitor journey.

1.



THE PULSATION

The visitor experience is drawn throughout the exhibition by the very essence of human vitality: a pulse.

Within the Pavilion, this pulse sends forth waves of light, sound, and emotion, weaving them through the air like threads of life. It becomes the unifying force, a common thread that connects every corner of the space, inviting all who enter to feel the rhythm at the heart of the exhibit.

2.



THE SOUND

The Pavilion experience unfolds as a contemporary ode to love.

The rhythm of the music becomes a material to shape the space itself. In collaboration with IRCAM, a unified soundtrack will lead visitors through a musical journey during their exploration of the pavilion. This sonic backdrop weaves together the thematic threads, creating a harmonious interplay between architecture and emotion.

3.



THE HAND

Symbol of craftsmanship, creativity, communication, and emotion, it's the central motif of the French Pavilion's exhibition. This powerful icon represents the intertwining of human skill and artistic expression, illustrating how hands not only build and create but also communicate and evoke feelings. This element will thread through the exhibit, with emblematic sculptures of Rodin standing in front of each zone as an emblematic welcoming element.

4.



THE INTERACTIVITY

The hand leads to an interactive gesture, symbolically allowing visitors to engage with the environments of the exhibition.

This gesture emerges as a recurring element across all spaces, establishing a coherent and unified logic throughout the experience.

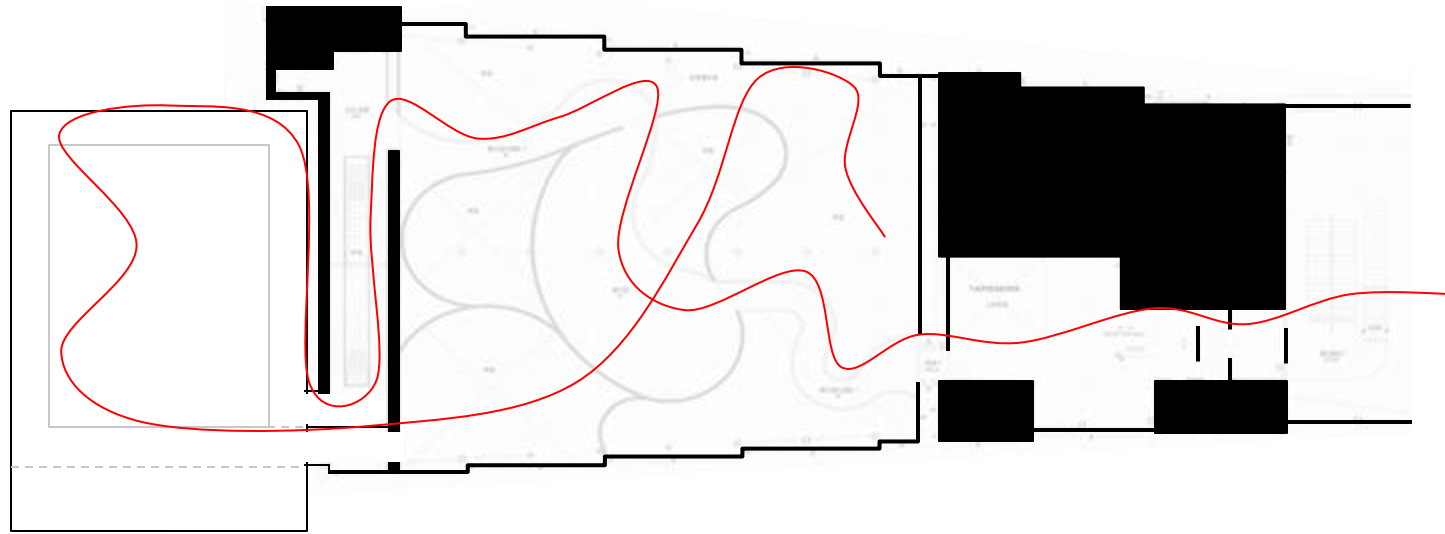
5.



THE MATERIAL

A golden accentuation runs through each space of the pavilion, tying them together with an elegant touch.

Made from materials like brushed gold or champagne-colored metal, similar to fine brass, this thread not only connects but also visually guides visitors. Its rich luster and high-quality finish enhance the exhibit's sophistication, leading visitors through the immersive journey.



Pulsation : an immersive scenography

A path along seven spaces

- Lobby
- Grande Image
- Louis Vuitton
- Axa
- Ninapharm
- Civa
- Dior

Lobby



- Public entrance
- Info & partners panels
- First encounter

Grande image : Passerelle

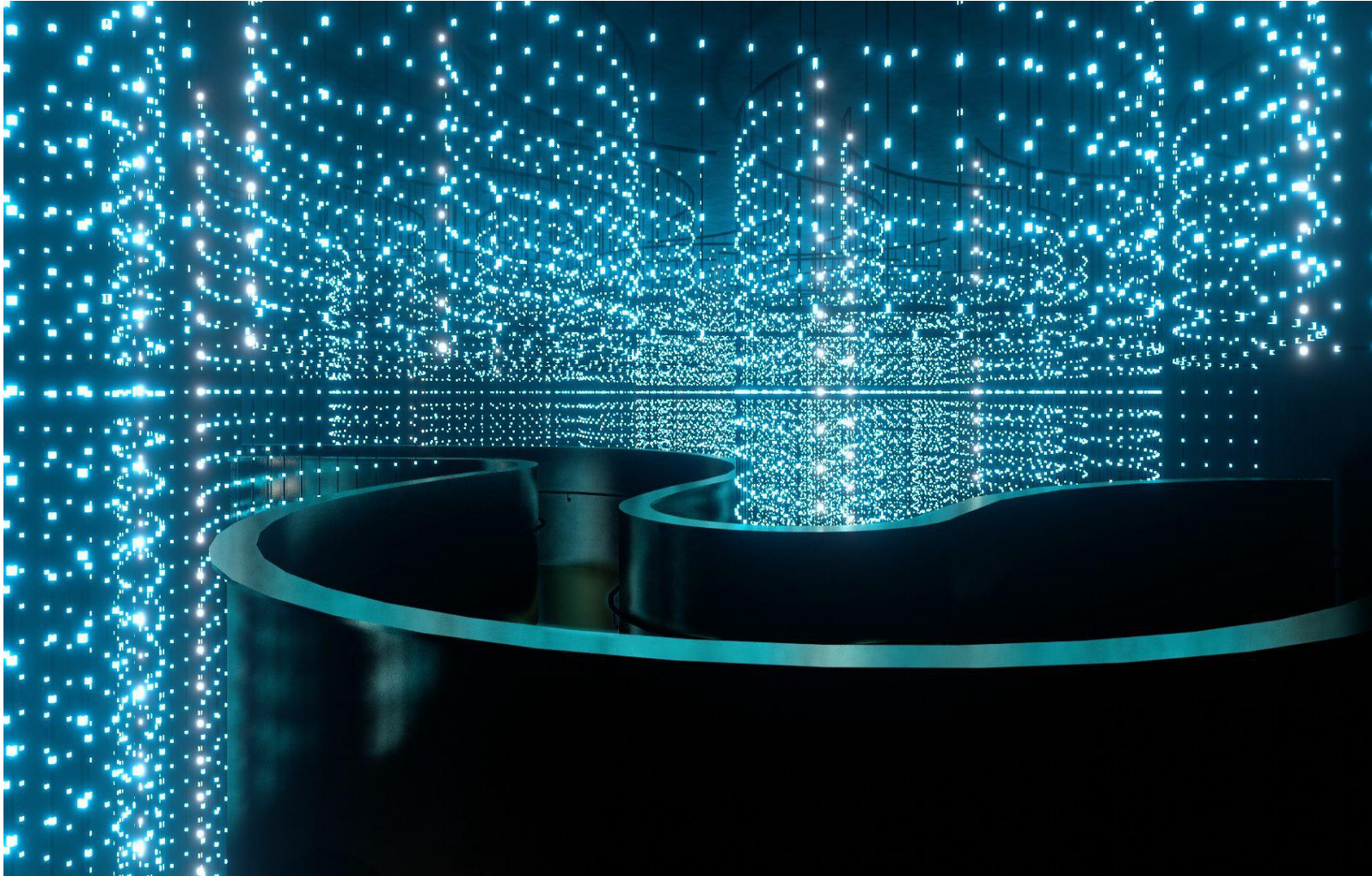


photo by justine emard

- 3D led curtains
- Light trajectories
- Sound follow the movement

Vuitton : First space



photo by justine emard

- AV Vuitton malls
- « savoir faire » soundtrack
- « Invisible sound system »

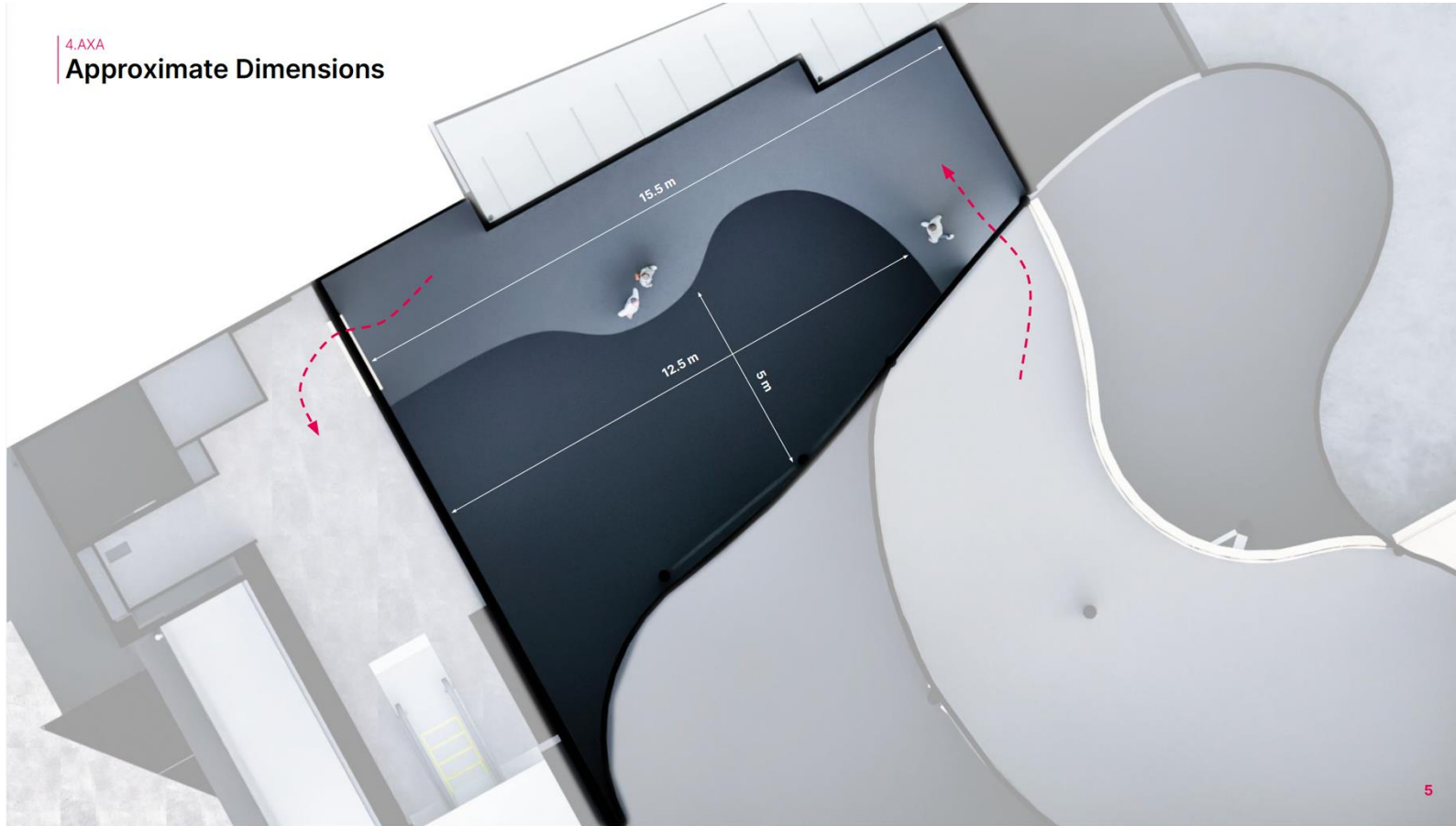
Vuitton : Second space



photo by justine emard

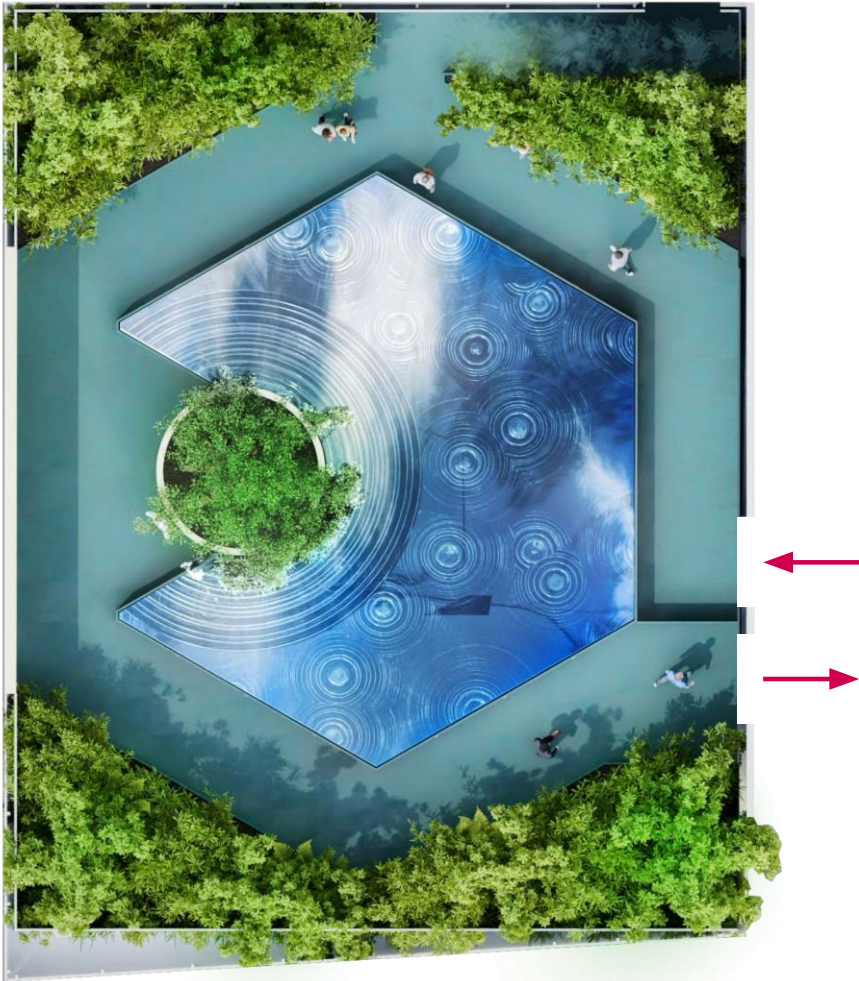
- Collaboration /w rhizomatics
- Video projection & mapping
- noisy & experimental soundtrack

AXA



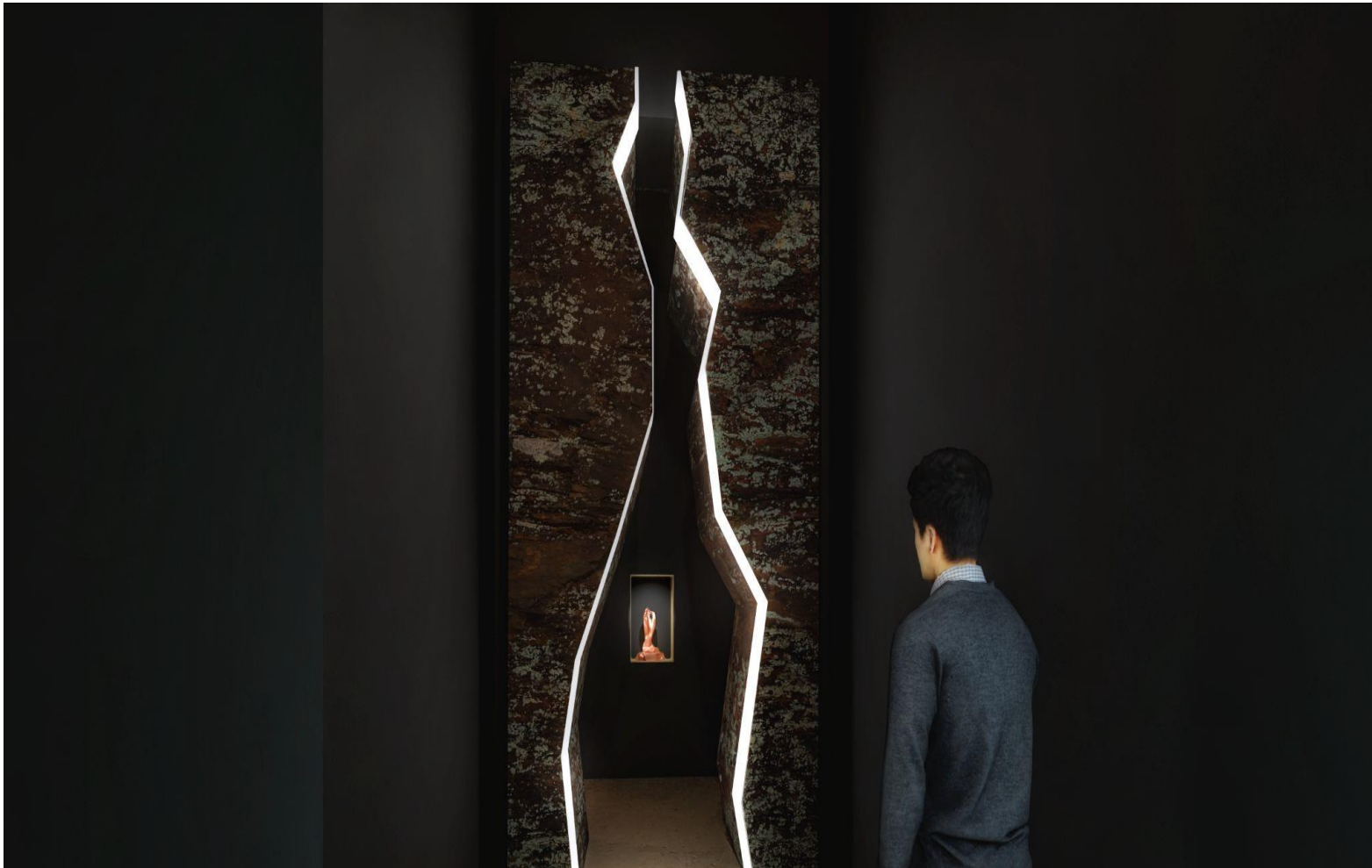
- 15 meter wide movie screen
- Rone immersive soundtrack
- Exhibition conductor

Ninapharm



- Outdoor space
- Pool with excitors
- A sonified 1000-year old olive tree

CIVA : First space



- Grotto ambiance
- Earth-shaking sounds
- No rigging on walls

CIVA : Second space



- Glistening soundtrack
- No rigging on walls

DIOR



- Robes on display
- Sound system inside the scenography

Grande Image : ground



photo by justine emard

- Three islands
- 3D led curtains
- Final room

Major constraints

Artistic Constraints

- Speaker integration must fit the scenography
- Create seven different sound environnements with the same pulse that can coexist
- All pavillon soundtrack must be looped

Major constraints

Acoustic Constraints

- All is built in an empty warehouse.
- Few possibilities for acoustic treatment
- Poor isolation between spaces.

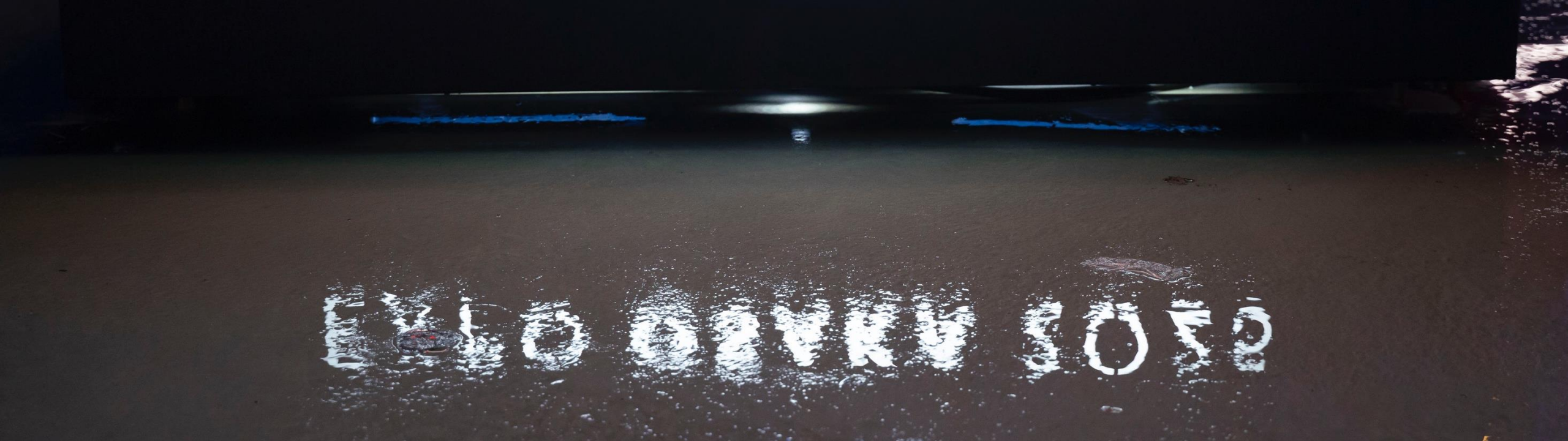
Major constraints

Design Constraints

- Rigging possibilities
- Audience coverage
- Design must be realistic production-wise



02 Off site : Sound system & content & spatialization design



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Sound System Design

Technical Solutions

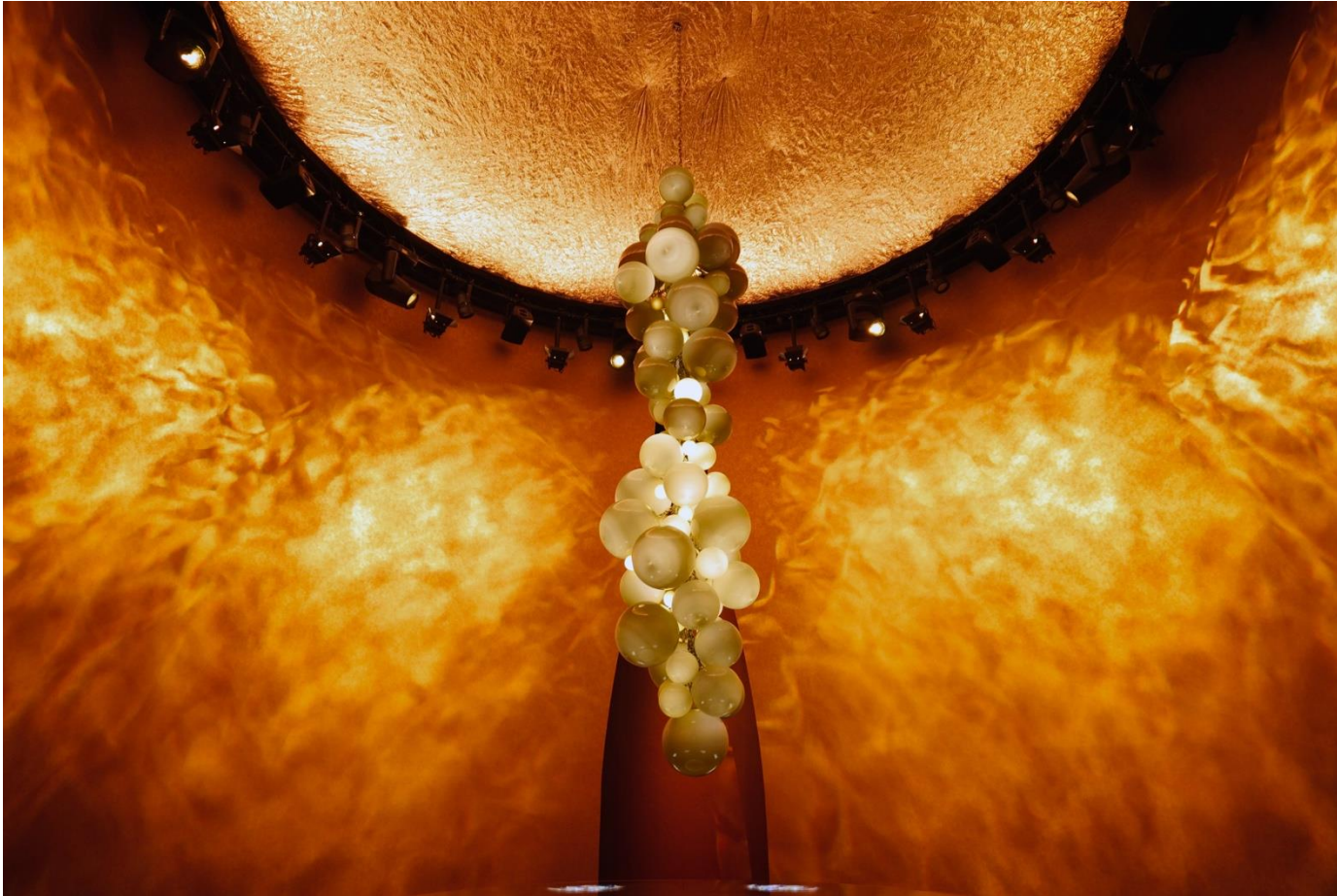


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Constraints

- Speaker integration must fit the scenography

Technical Solutions

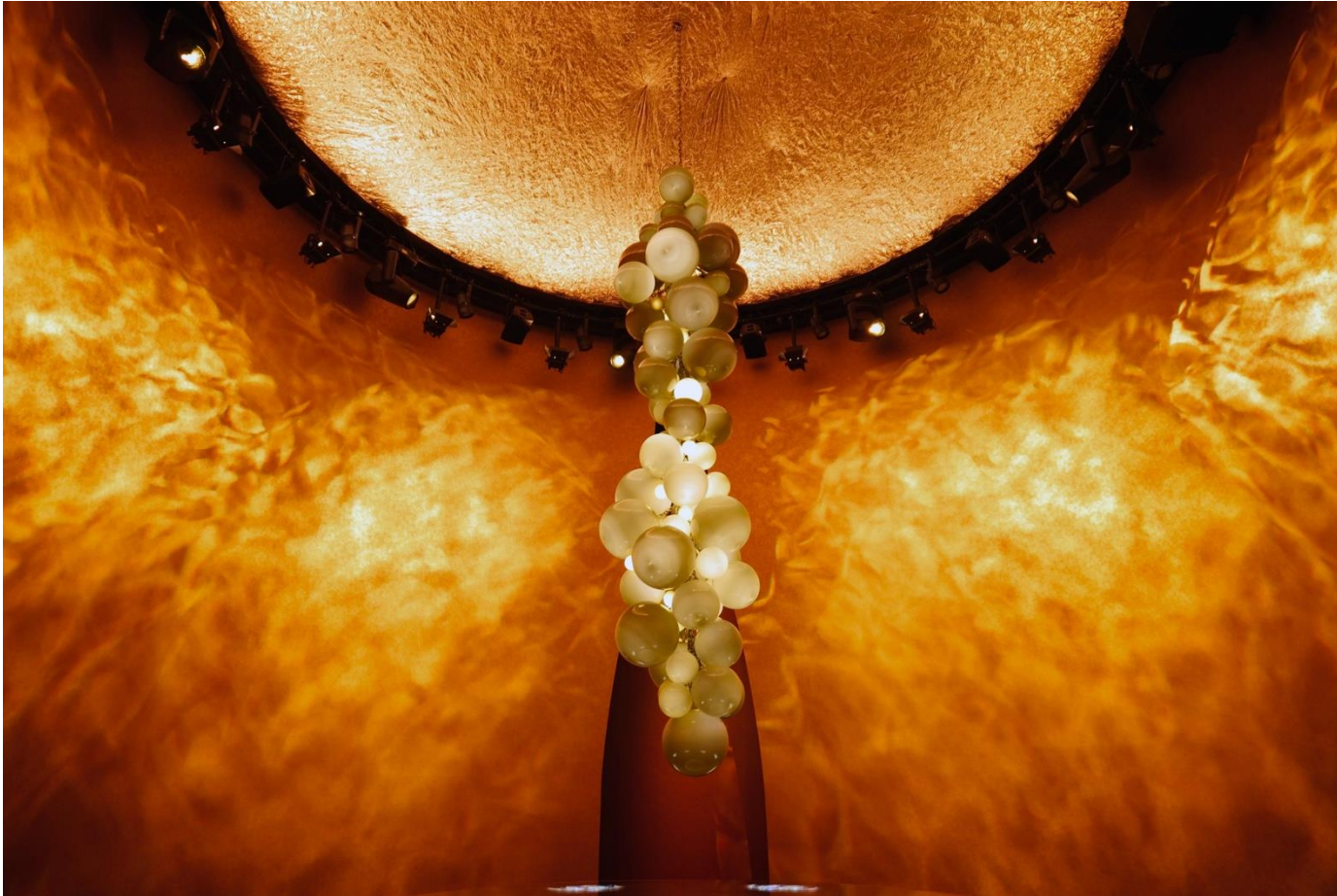


photo by justine emard

Constraints

- Speaker integration must fit the scenography
- > We adapt the setup to each space, therefore one diffusion format per space

Technical Solutions



photo by justine emard

Constraints

- Poor isolation
- Coverage
- Budget

Technical Solutions

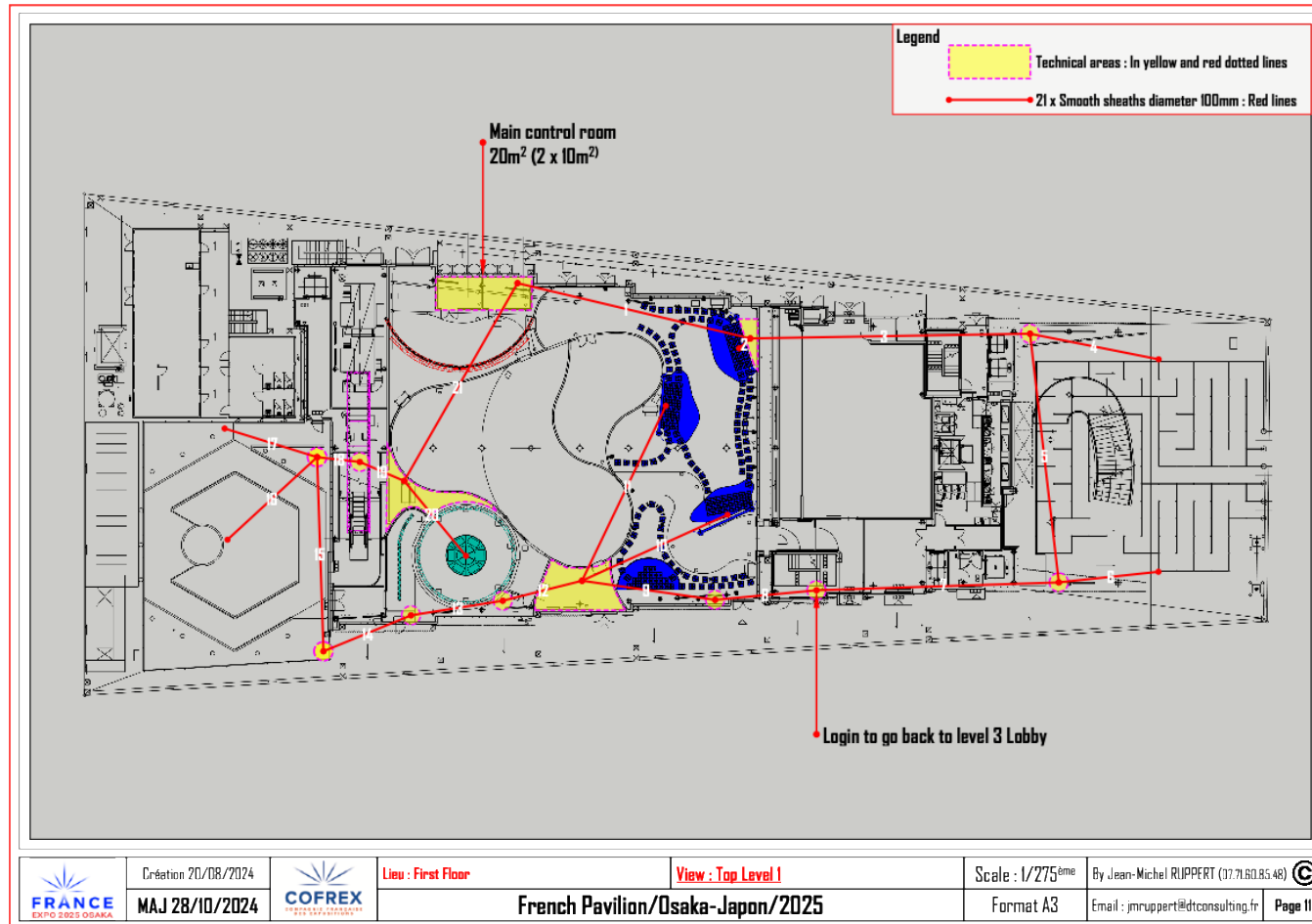


photo by justine emard

Constraints

- Poor isolation
 - Coverage
 - Budget
- ➔ We focus on small point sources spread regularly, except for rooms with low frequency content (Axa, Vuitton, Grande image...)

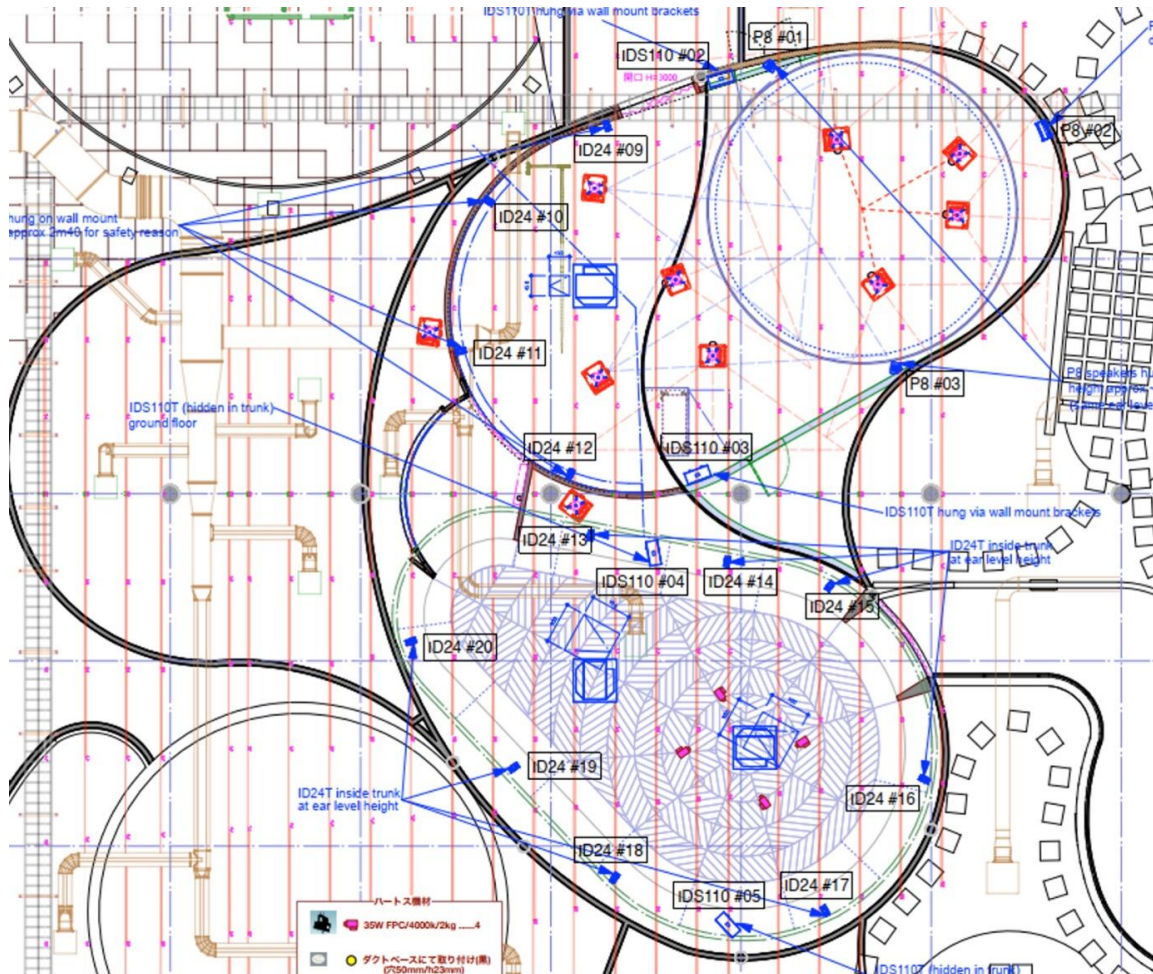
Technical Solutions



Workflow

- All technical elements were added to one single 3D Sketchup plan
- 3D visit for the sense of space
- Pre spatialized mix

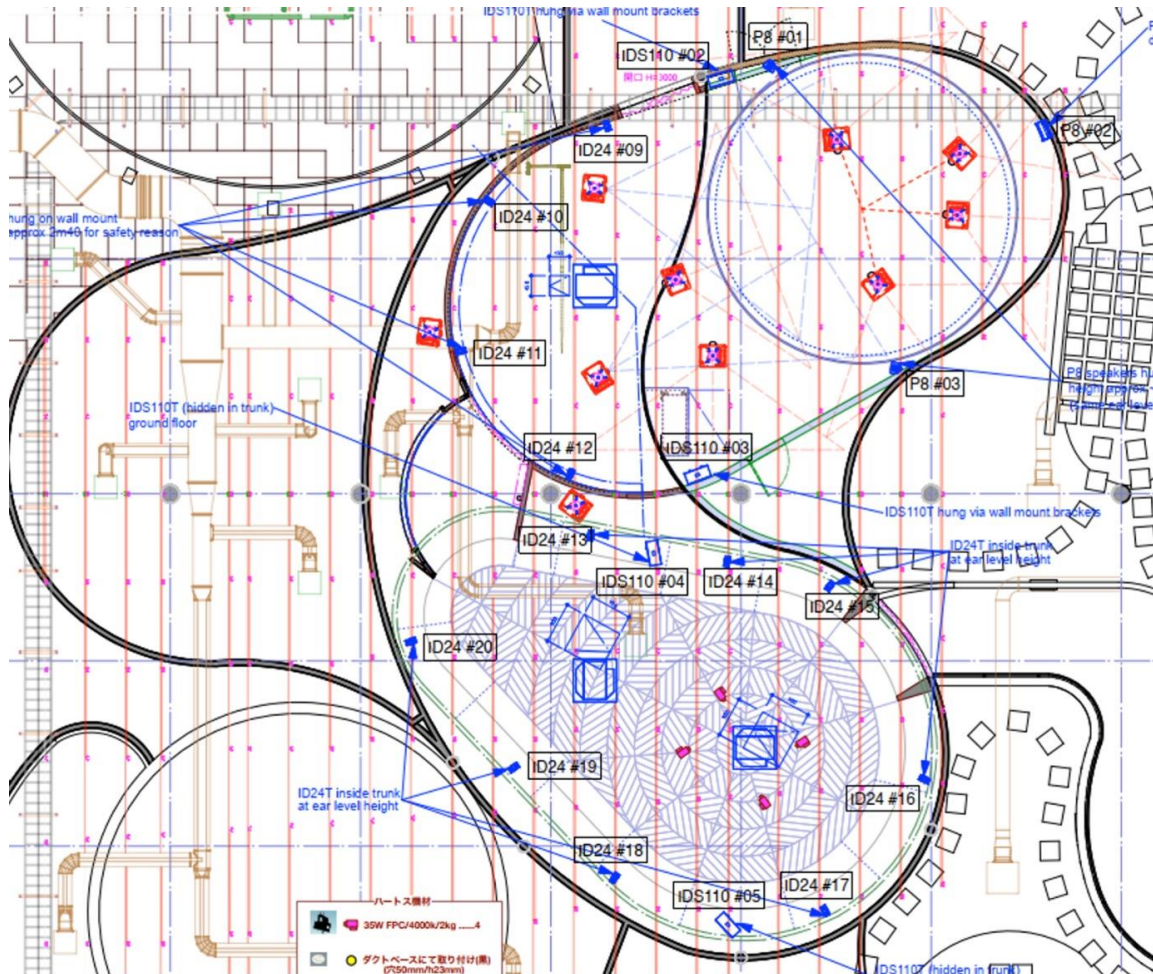
Exemple : Vuitton spaces



First space

- 8 ID24 (120° x 60°) in a 8.0 setup
- 2 IDS110 for bass management
- Position depending on trunks position

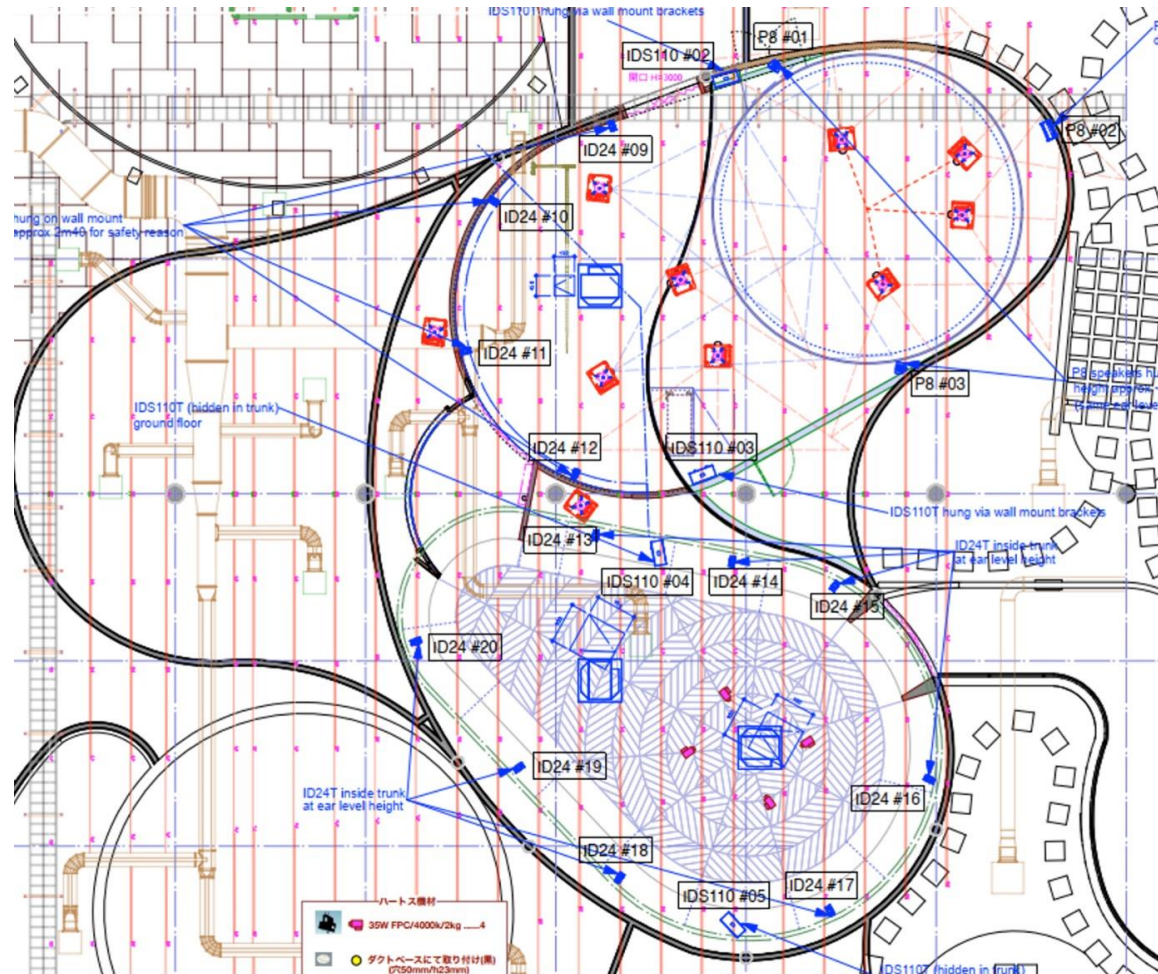
Louis Vuitton spaces



Second space

- LCR with P8 speakers
- Surround with ID24
- 2 subwoofers IDS110

Louis Vuitton spaces



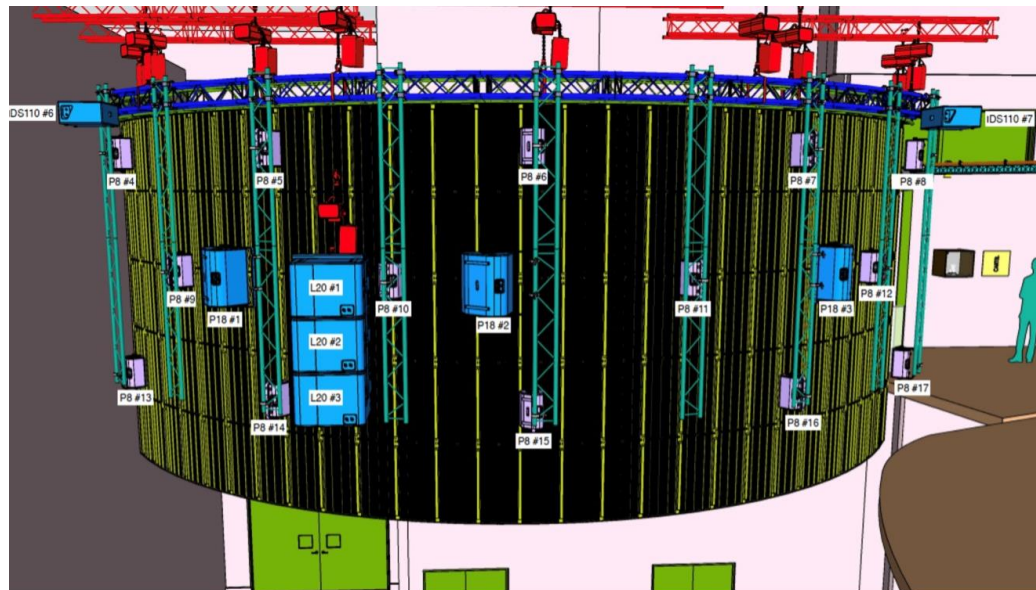
Second space

- LCR with P8 speakers
- Surround with ID24
- 2 subwoofers IDS110

Axa Space

- 3 min 30 dance movie with Rone soundtrack
- A corridor space with a fifteen meter wide screen
- Strong low frequency content

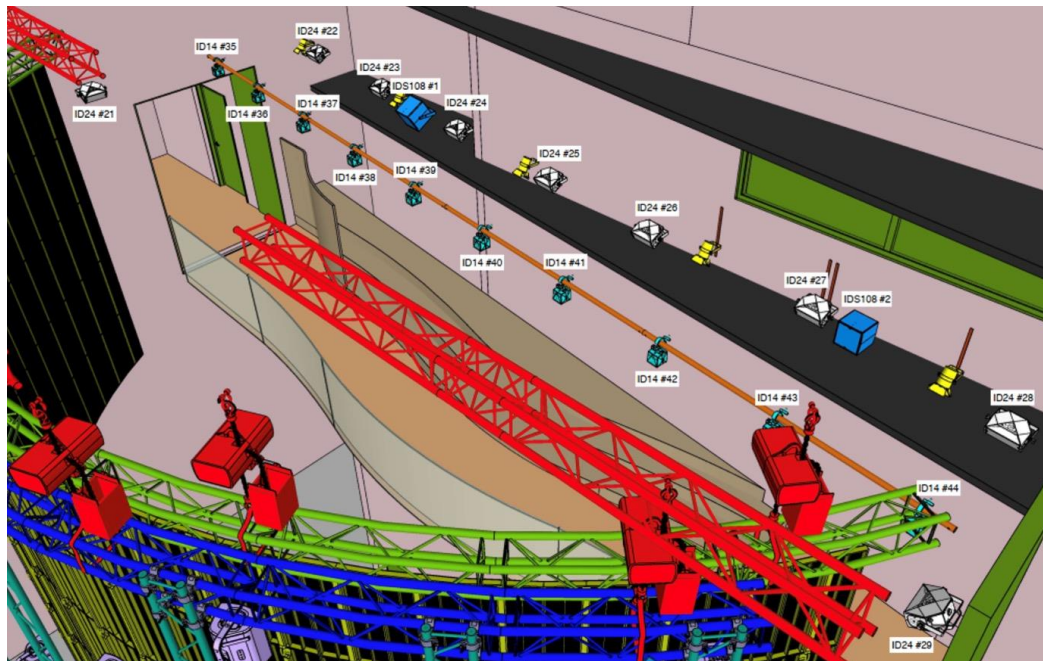
Axa space



System design

- Three main systems
 - LCR with P18 +L20 (cardiod setup)
 - 14 P8 speakers on 3 vertical layers to cover all screen
 - Ambisonics surround with ID14 / ID 24 / IDS110T

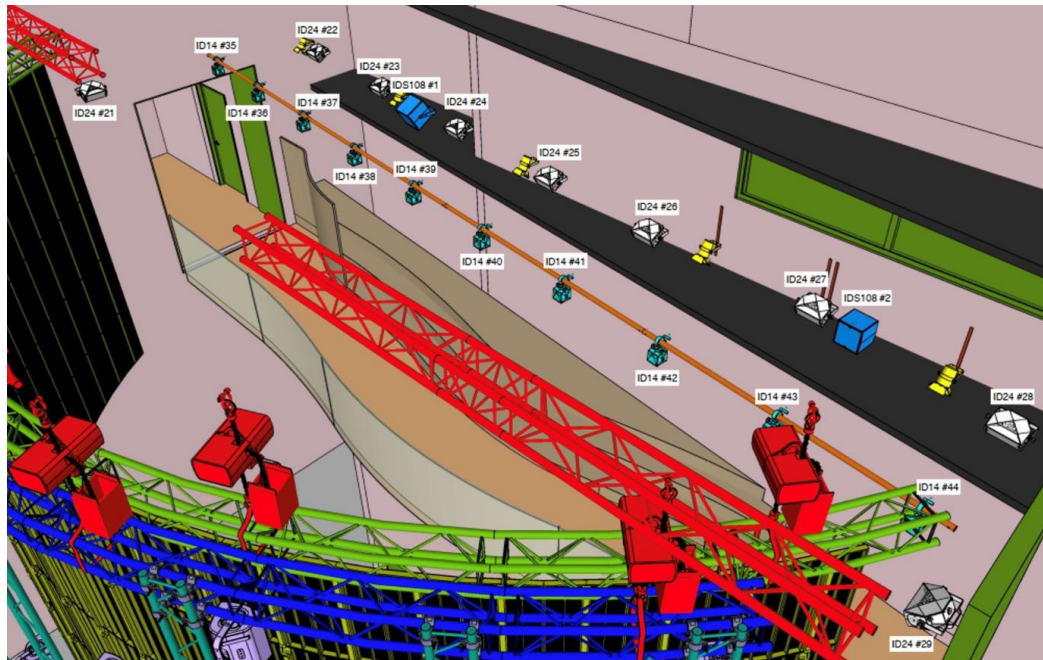
Axa space



System design

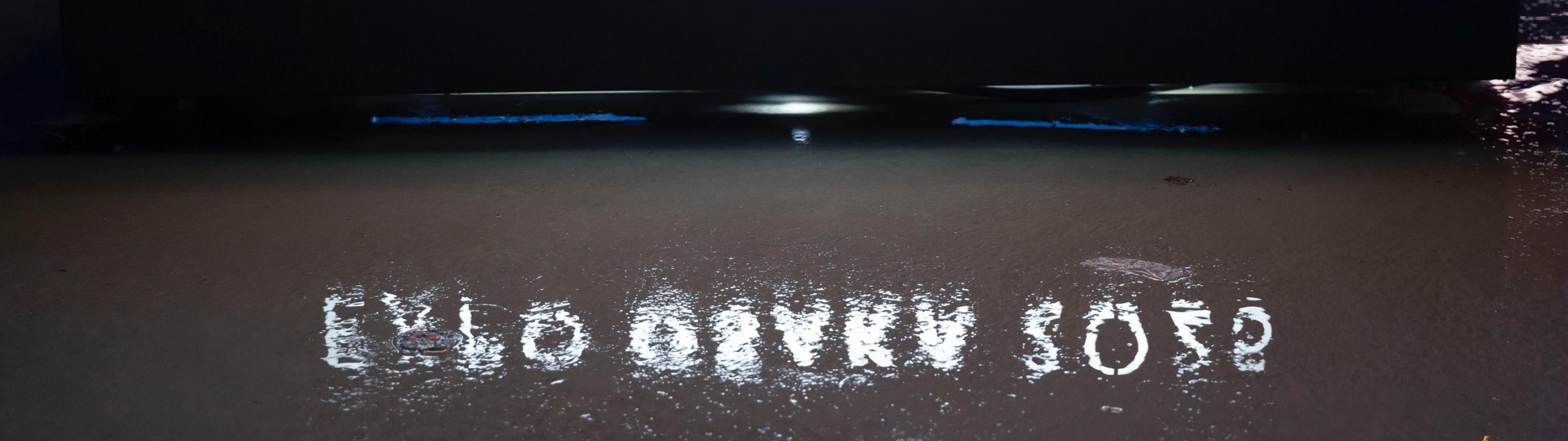
- Three main systems permits different panning laws
 - KNN + random effects for screen
 - Ambisonics for surround
 - Standard LCR panning for percussive content
f.ex

Axa space



System design

- Three main systems permits different panning laws
 - KNN + random effects for screen
 - Ambisonics for surround
 - Standard LCR panning for percussive content
f.ex



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Sound Content Design



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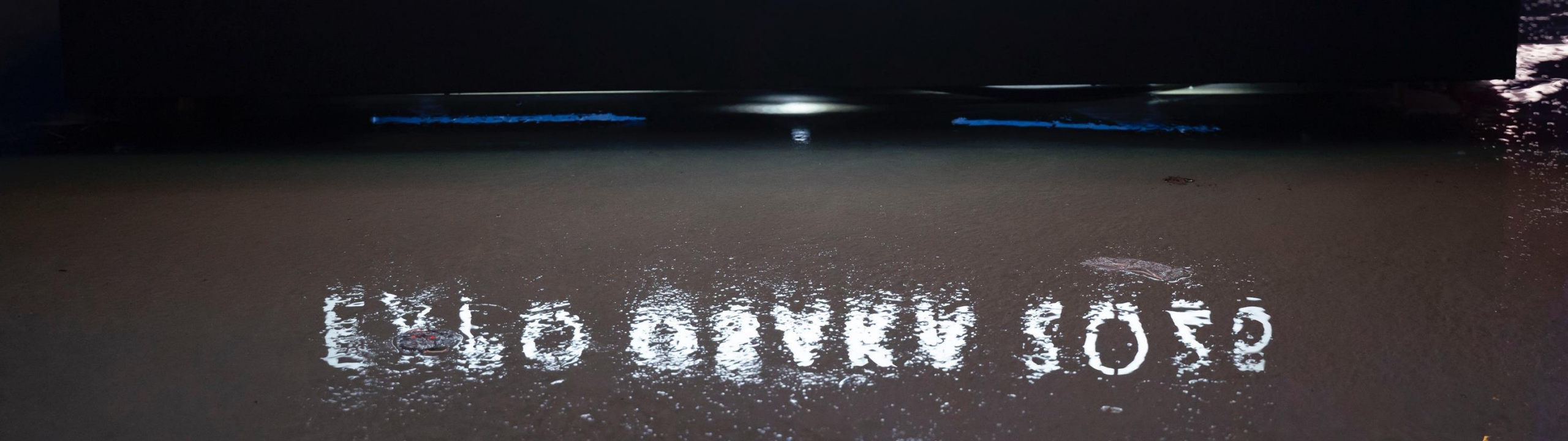
Sound Content Design

Made by **Pierrick Pedron**

Spectral balance was thought for each space to avoid too much recovery & mask effect

All tracks share the same pulse 88 BPM

Recording of ateliers Louis Vuitton & Japanese fauna



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Spatialization Design

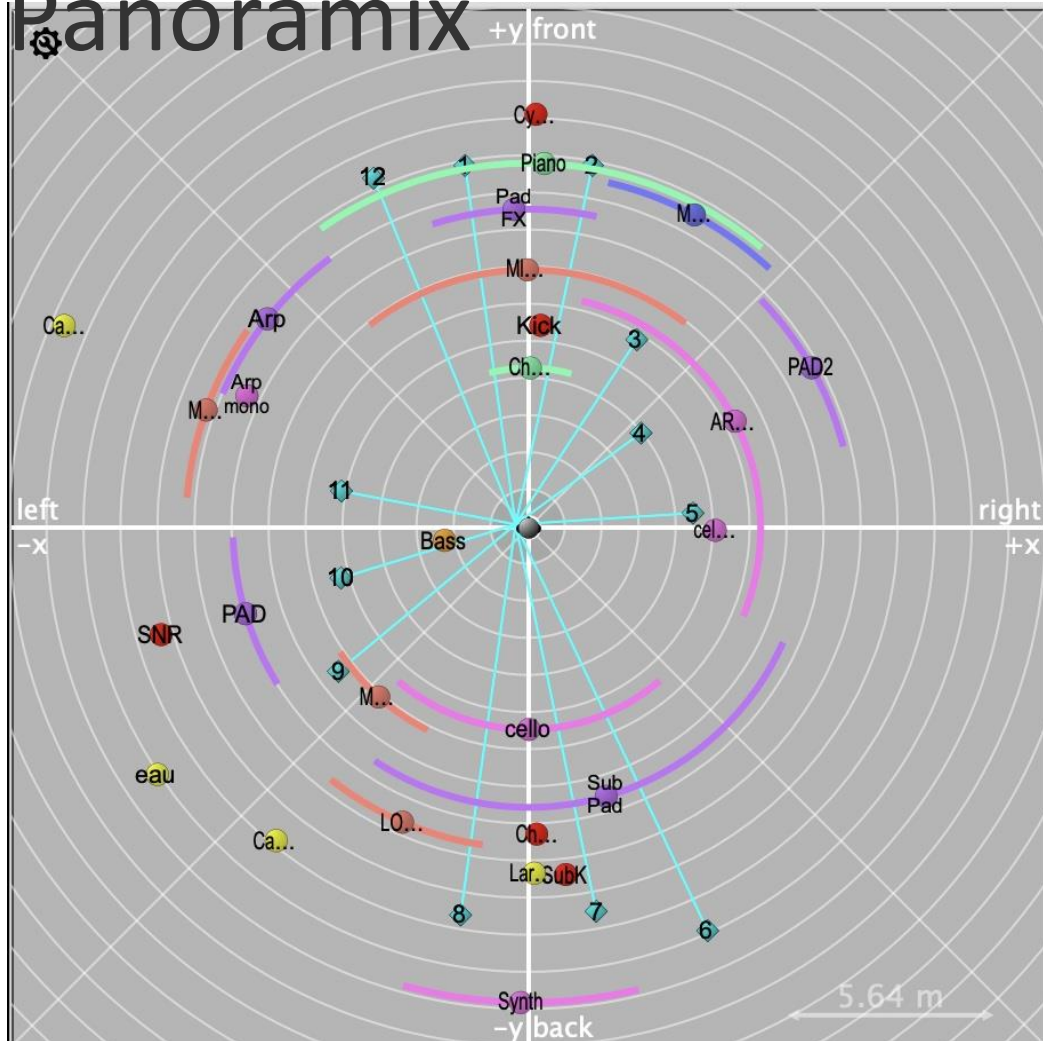
Spatialization :



- Made by Thibault Carpentier
- « Mixing desk » approach

Spatialization :

Panoramix



Panoramix

- Based on IRCAM Spat Library
- Remote controlled by OSC via OSCar plugin
- Several panning laws (KNN, VBAP, HOA, WFS...)
- Ambisonics Impulse response

Spatialization



- One reaper + panoramix session per space
- Ambisonics pre-mix in IRCAM studio
- Custom setup with Nexo speakers
- Virtual speakers to check premixes /w partners



03

**On site : Mixing
& Mastering &
Playback Design**

Nexo Speakers

Installation



- All speakers & amps were installed before our arrival (at least some of them...)
- All devices on one single Dante network

Speakers



1st phase :

- Measurements
 - Time & Phase Alignment
 - Volume matching

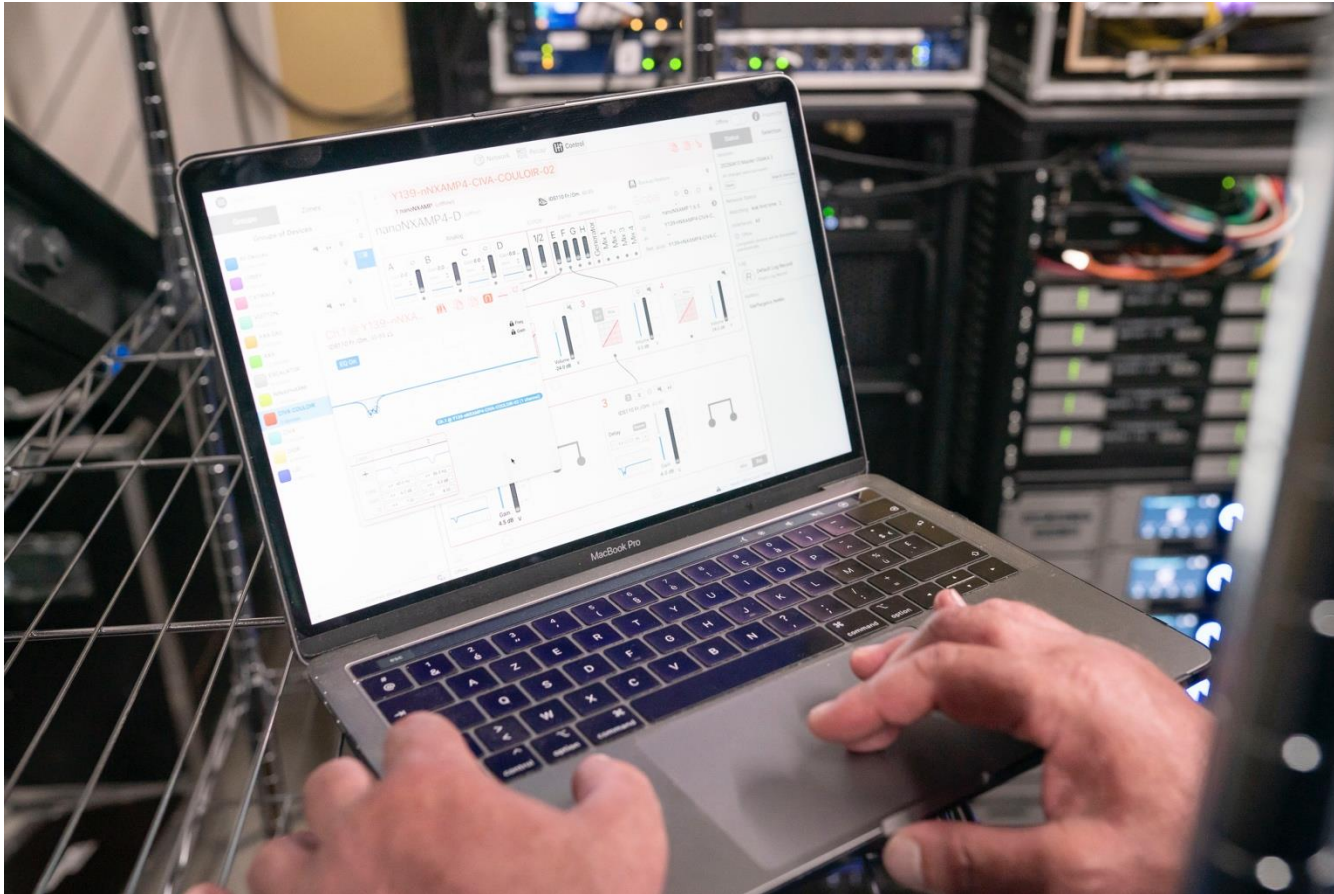
Speakers



2nd phase :

- Nexo Nemo processor
 - Amp Management
 - EQ, Delay

Mixing on site



- Nomad setup : computers & Digiface Dante (with very long ethernet cable)
- Reaper session for playback
- Panoramix session for spatialization
- Coping with acoustics & construction work on site

Mastering on site



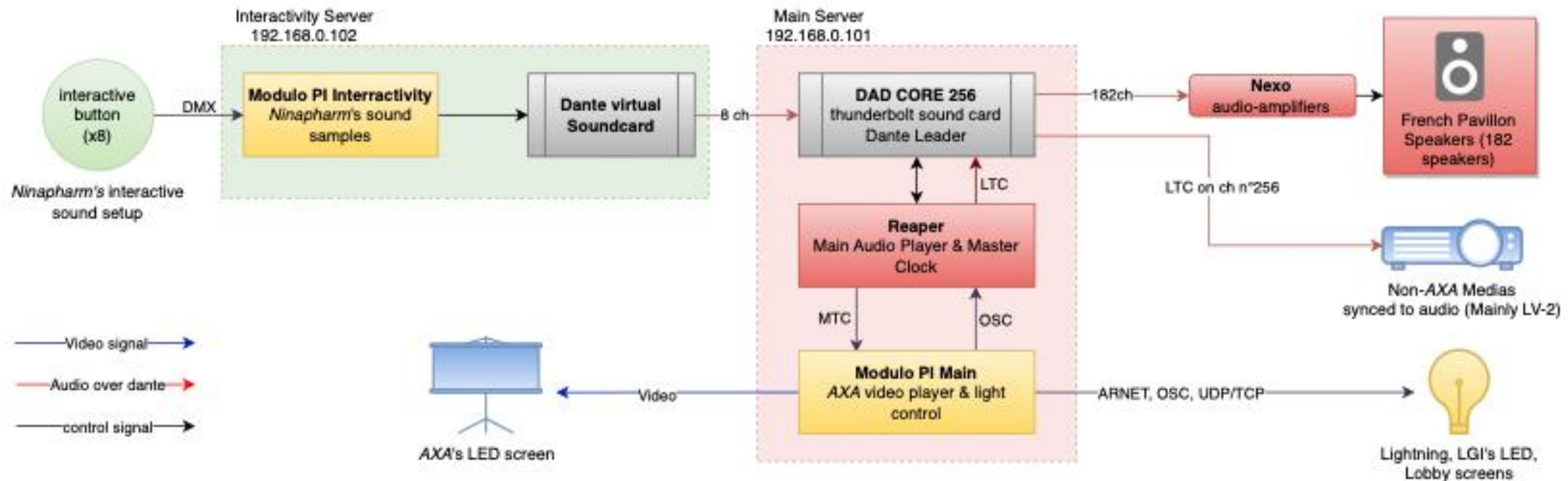
photo by Nexo

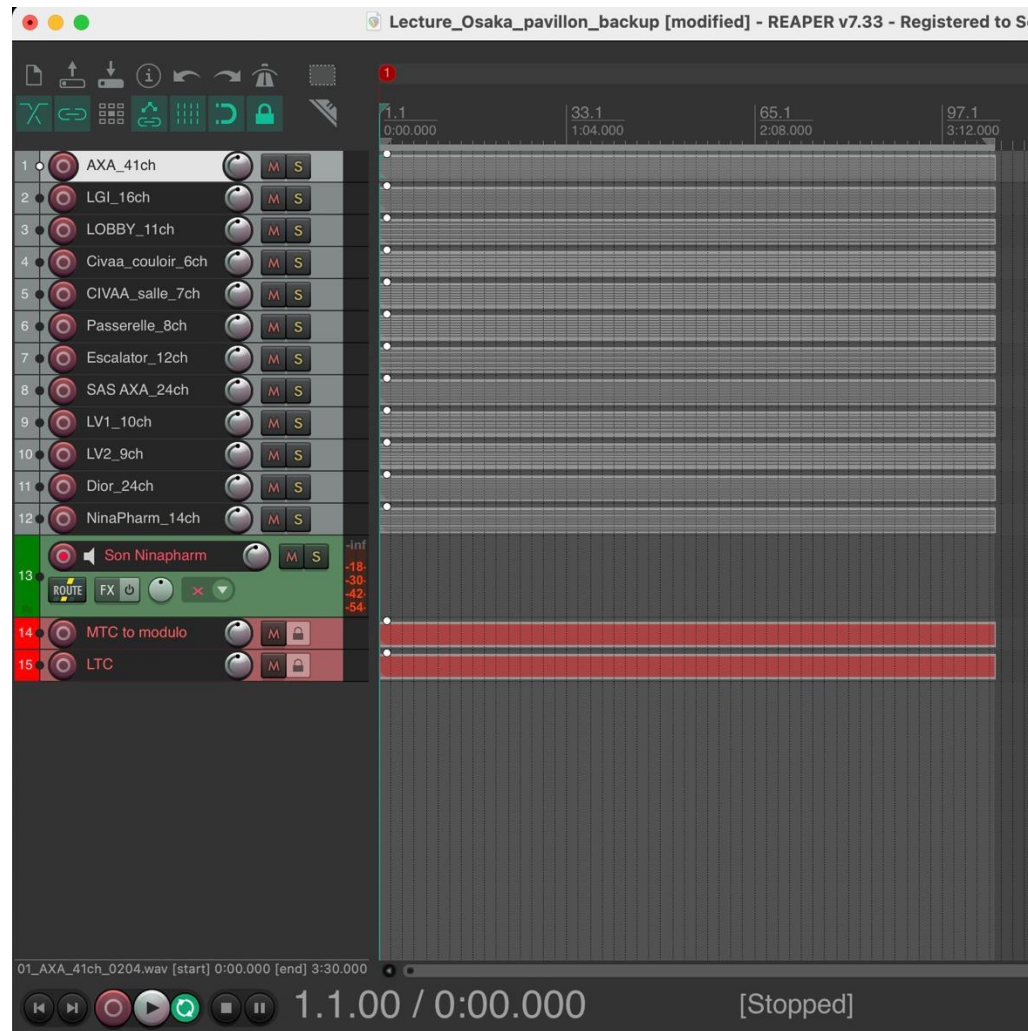
- Export Room by Room
- SPL Balance between rooms
- Low frequencies adjustments

System diagram

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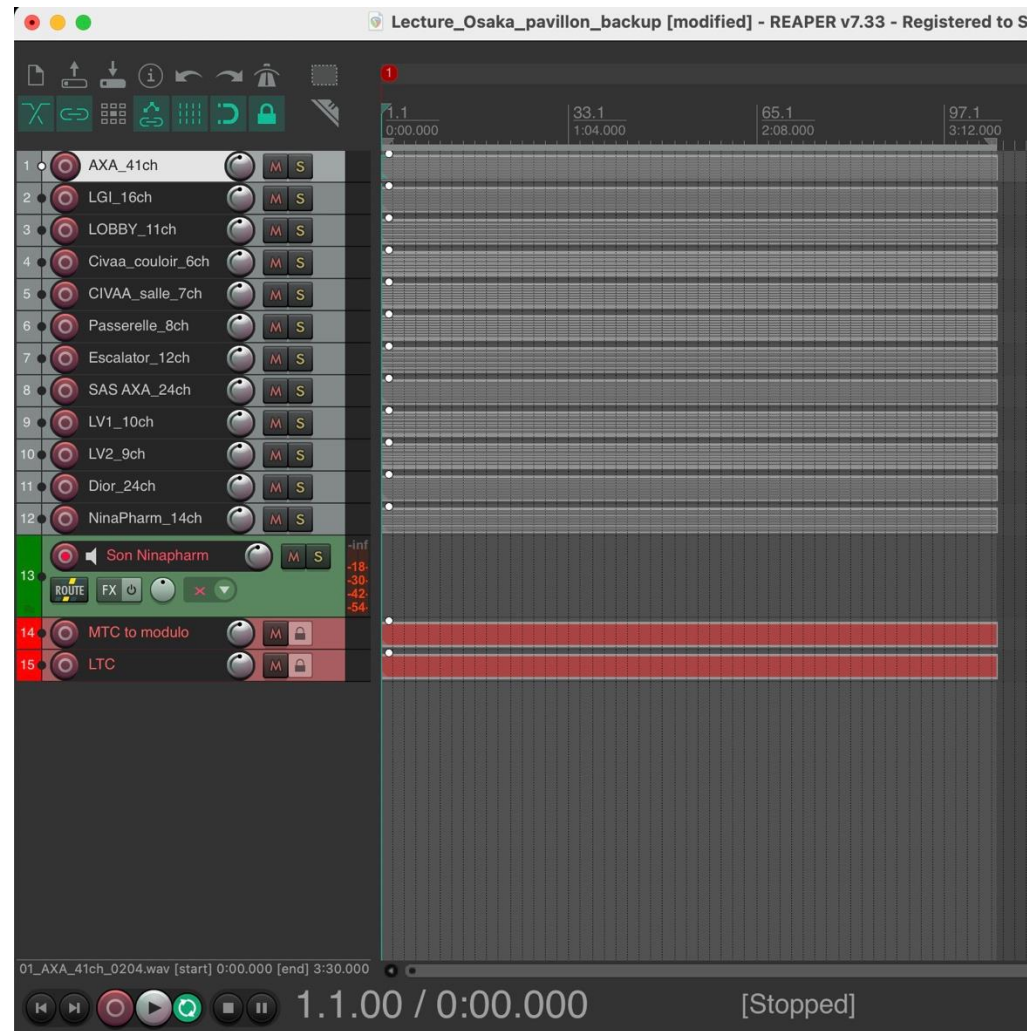
Comprehensive diagram of IRCAM's sound setup





Audio Playback

- Reaper session containing all multichannel files
- LTC & MTC for synchronisation
- Ninapharm track for haptic modules playback



Audio Playback

- Lobby 11 channels
- Passerelle 8 channels
- Vuitton : 10 + 9 channels
- Sas Axa 22 channels
- Axa 41 channels
- Escalator 12 channels
- Ninapharm 14 channels
- Civa 6 + 7 channels
- Grande image 16 channels

- Total 156 channels played simultaneously



Video & Light Playback

- Modulo PI
- Controlled by reaper via MTC
- DMX bridge for haptic module and OSC for audio playback
- ARNET, OSC, UDP for other devices control



04

Virtual Tour

Rappel du titre de partie

Virtual Tour

3D video made by Cofrex

The audio export has been made with Spat tools with this venue configuration.



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**Thanks for your
attention**