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AXEL DRIOLI

# ERIDANUS: THE 3D AUDIO MOVIE

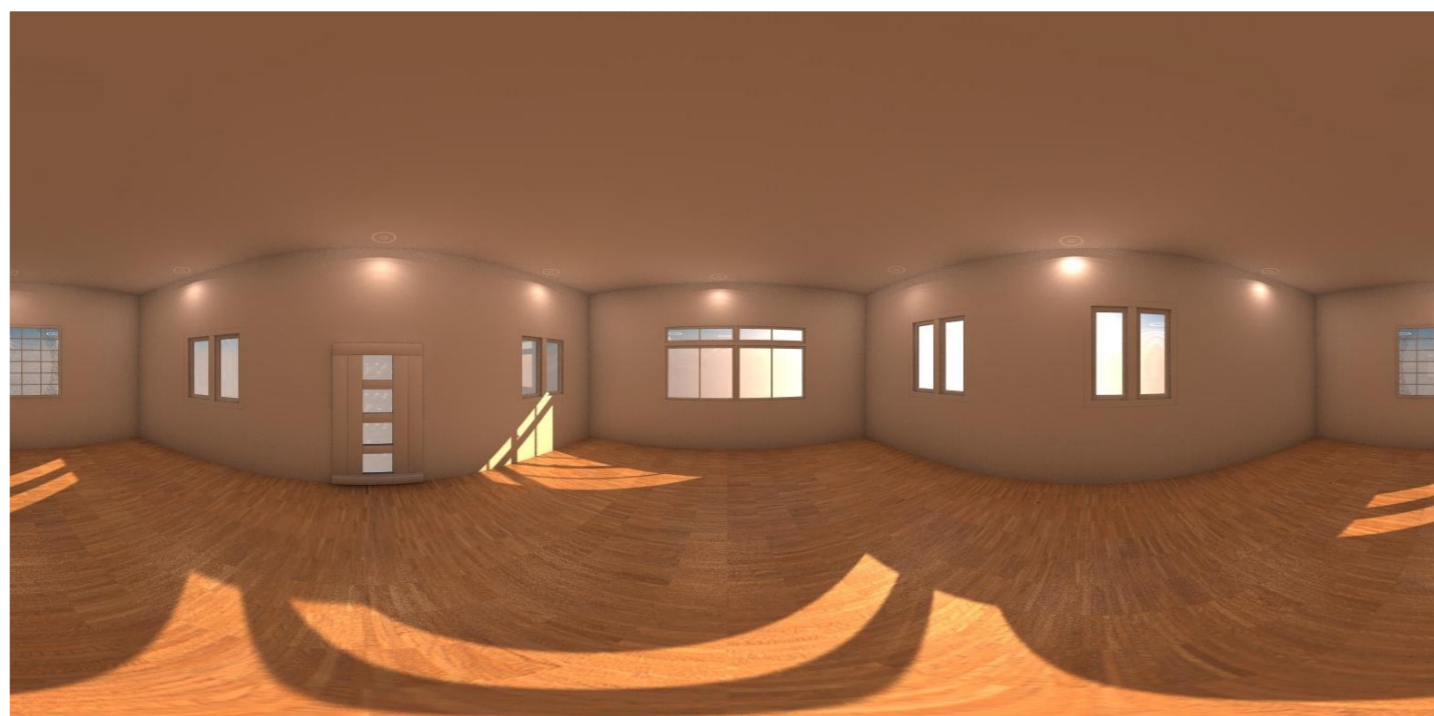
Sound in Space 2017

University of Derby

27th of June 2017

# A PRACTICAL USE OF SPATIAL AUDIO FOR ENTERTAINING, AUDIO-ONLY STORYTELLING

# WHERE DO WE FIND SPATIAL AUDIO USED FOR STORYTELLING, NOW?



HOW TO MAKE PEOPLE  
(OF ALL AGE) AWARE OF  
SPATIAL AUDIO,  
SHOWING HOW  
POWERFUL IT IS?

## RESEARCH QUESTIONS

1. How do common digital formats use sound to tell a story? What sonic elements do they rely on?
2. How can Spatial Audio technology be used for this scope? What sonic aspects are then available thanks to this technology?

# STORYTELLING THROUGH DIGITAL MEDIA

## Cinema

- Vision + sound.  
Dialogue, voice over, diegetic and non-diegetic sounds and music.
- "Collective awareness"

## Radio Drama

- Novel dramatisation for sound-only production
- Descriptive narration, dialogues, SFX and soundscapes.

## Audio Film

- The 'evolution' of Audio Description.  
Story tailored for sound only.  
Pre-recorded audio commentary integrated with foley, SFX, mixed in Spatial Audio.

# SPATIAL AUDIO TECHNOLOGY

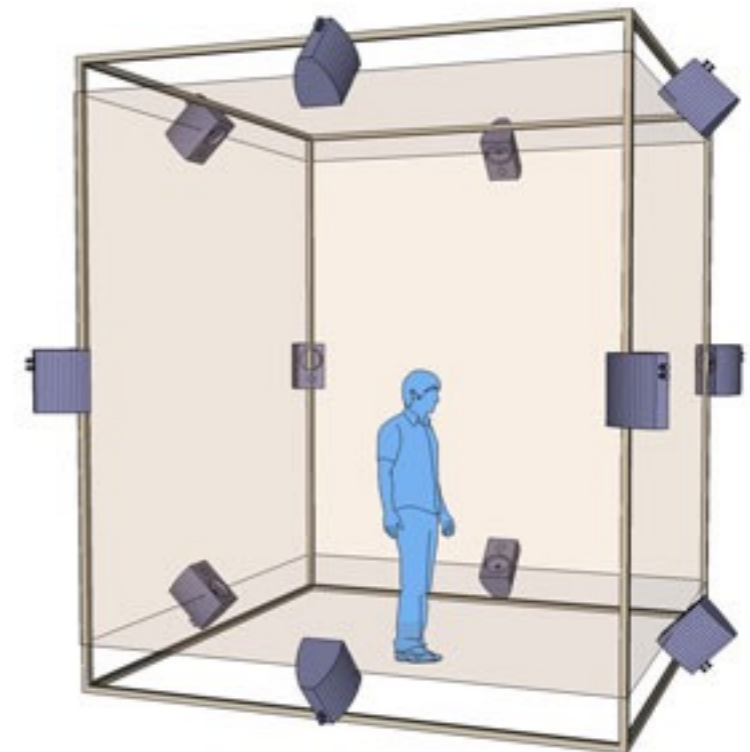
## WHY CHOOSING SPATIAL AUDIO?

- Object-based over channel-based mixing
  - ▶ Mixing (almost) independently from the loudspeaker (or headphones) system reproduction
  - ▶ Objects can be mixed organically, linked together, grouped etc.
  - ▶ 360 degree canvas available for mixing
- Versatile loudspeaker system
  - ▶ Depending on what is needed for best reproduction of the piece, (almost) any loudspeaker array can be used

# THE TECHNOLOGIES

## Ambisonics

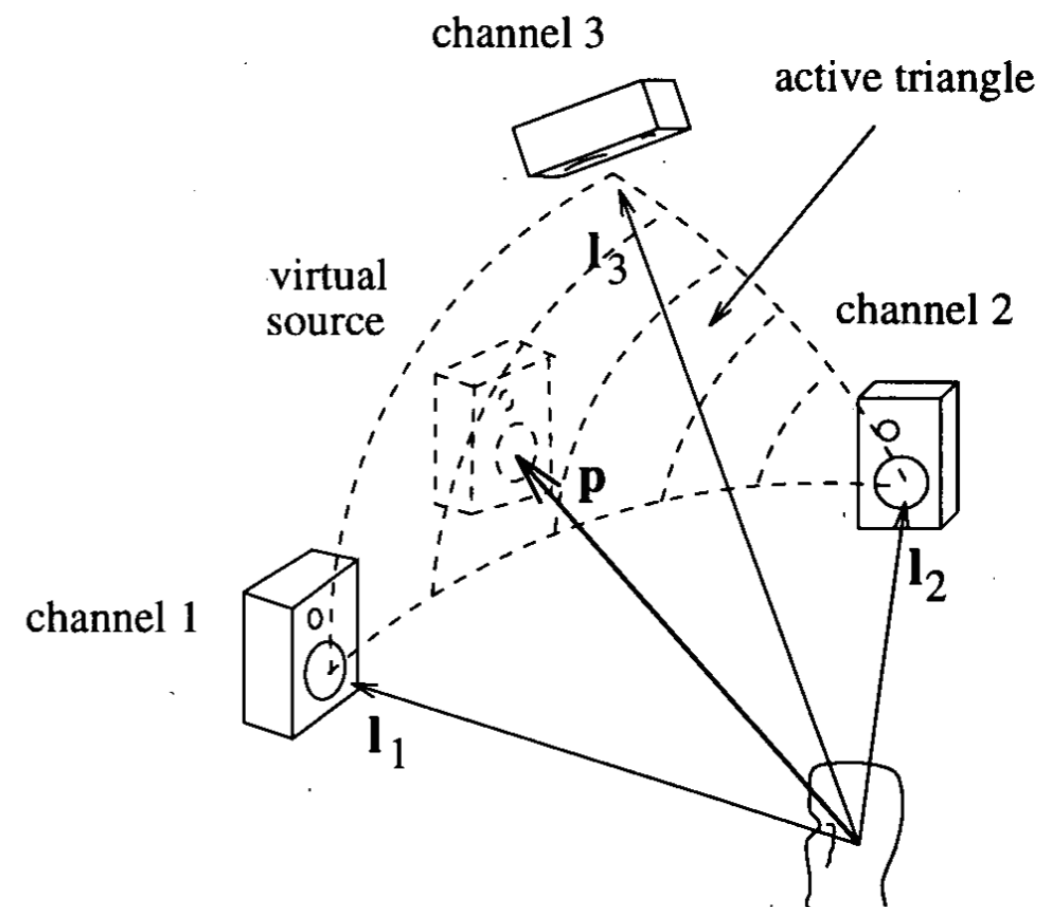
- Sound field oriented
  - All loudspeakers contribute for the decoding (small sweet spot)
- Spatialisation quality
  - First Order Ambisonics
  - Higher Order Ambisonics
    - Better quality than FOA, necessary for loudspeaker reproduction



# THE TECHNOLOGIES

## Vector-based Amplitude Panning (VBAP)

- Just speakers adjacent to virtual source reproduce sound
- Precise and clear sound localisation
- Bigger sweet spot
- But, 'Inside sphere' virtual positioning difficult/unclear



# SPATIAL AUDIO AND ITS SONIC ASPECTS

# SPATIAL AUDIO AND ITS SONIC ASPECTS

## Spatial Cognitive Maps.

(Lennox, 2013)

- "Sonic Maps" dependant on basic features such as:
  - ▶ Type of sound object
  - ▶ Reverberation
- Lennox explores how humans gain spatial knowledge from complex environments.
  - ▶ How to prioritise certain sonic elements within a complex environment.

# SPATIAL AUDIO AND ITS SONIC ASPECTS

## Recreation of Virtual Soundscapes.

(Wagner, 2004)

Creation of highly immersive environments with sound particles, by combining layers of:

- ▶ Random Atmospheres (Rain Drops)
- ▶ Path-based Atmospheres (Flies passing by)
- ▶ Static Atmospheres (Birds chirping)

# SPATIAL AUDIO AND ITS SONIC ASPECTS

## "Sound Shapes"

- ▶ Understand what the physical object is (and what it is doing) only by its sound.

*Example:*

*understand sonically that there is a dancer in front of us, various elements of the dancer have to be presented.*

# SPATIAL AUDIO AND ITS SONIC ASPECTS

## Emotions in Spatial Audio

- ▶ Different sound sources' spatial positions can enhance emotions and amplify their affecting power, such as fear. (Ekman and Kajastila, 2009)
- ▶ 'Evolutionary motivated' emotions triggered by sound localisation.
- ▶ Front/back sound source spread can enhance emotions.

# SPATIAL AUDIO AND ITS SONIC ASPECTS



## FOCUS POINT:

Make people aware of the power of  
Spatial Audio.

# TELLING A STORY USING SPATIAL AUDIO

Steps I have followed:

- ▶ Story easy to follow for all ages (14 to 60+).
- ▶ It should be as simple as a cinematic experience.
- ▶ Make it a collective experience.
- ▶ Highly immersive.
- ▶ Force the audience to use their ears.

## **“ERIDANUS, THE 3D AUDIO MOVIE”**

Eridanus is a 40 minutes long sci-fi/thriller novelette, written by Kristoffer Bübeck. The audience (4 people) sits in the middle of a pitch black room, surrounded by a 21.4 loudspeaker system.

# ERIDANUS, THE 3D AUDIO MOVIE

## Storyline format

- Based on combination of
  - ▶ Narration (to describe environments, states of mind..)
  - ▶ Dialogues
  - ▶ SFX
  - ▶ Soundscapes
  - ▶ Music

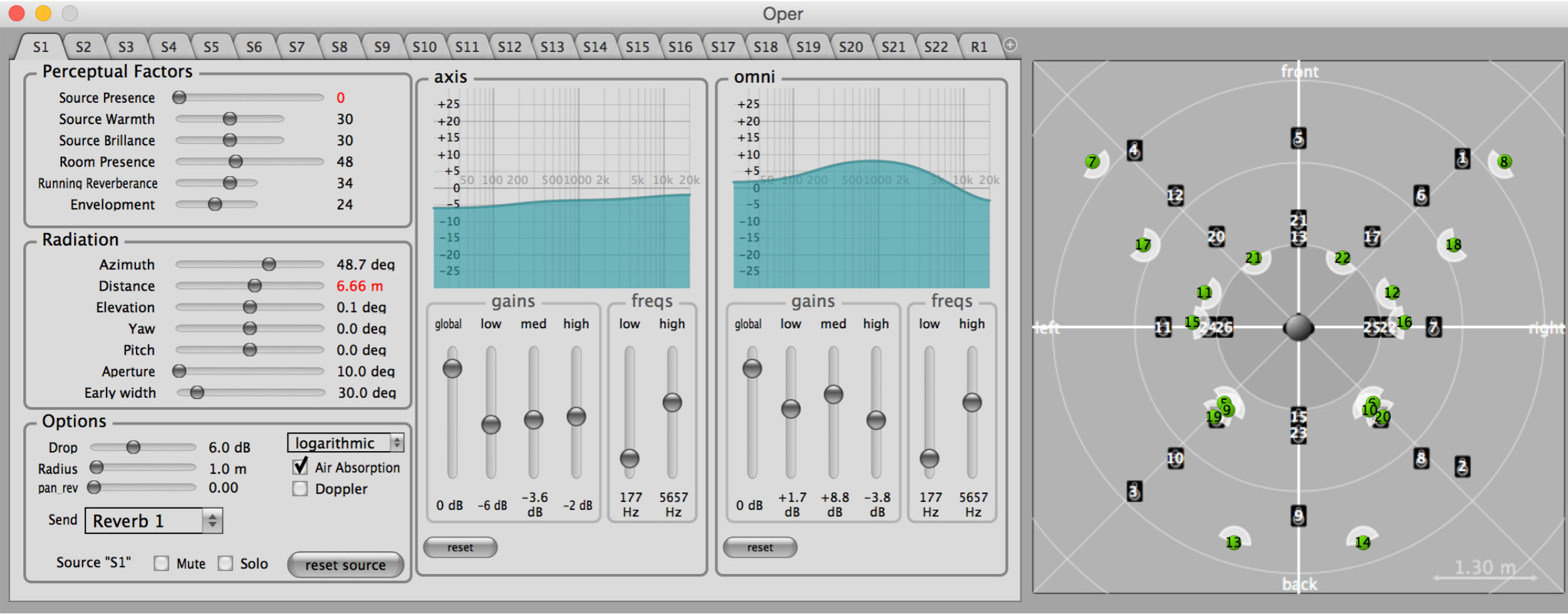
# ERIDANUS, THE 3D AUDIO MOVIE

Spatialiser tool:

SPAT by IRCAM (Max7 library)

- Needed to create a editing/mixing workflow (Reaper + Max)
- Room Synthesis unit
- More than just HOA as panning method available (and able to AB them instantaneously)
- Custom loudspeaker setup
- Automatic speakers time-alignment depending on their position (slightly bigger sweet spot)

# ERIDANUS, THE 3D AUDIO MOVIE



# ERIDANUS, THE 3D AUDIO MOVIE

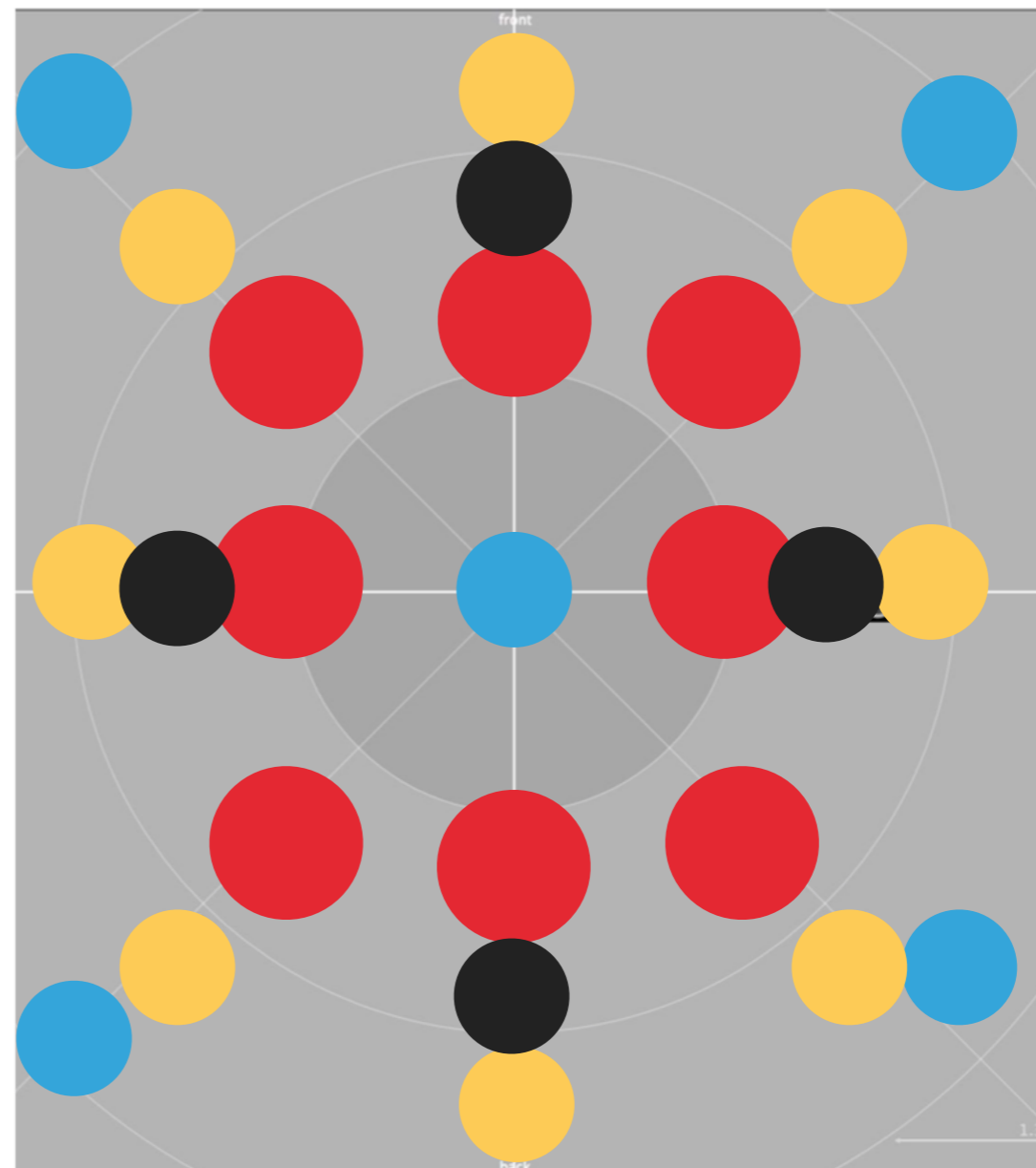
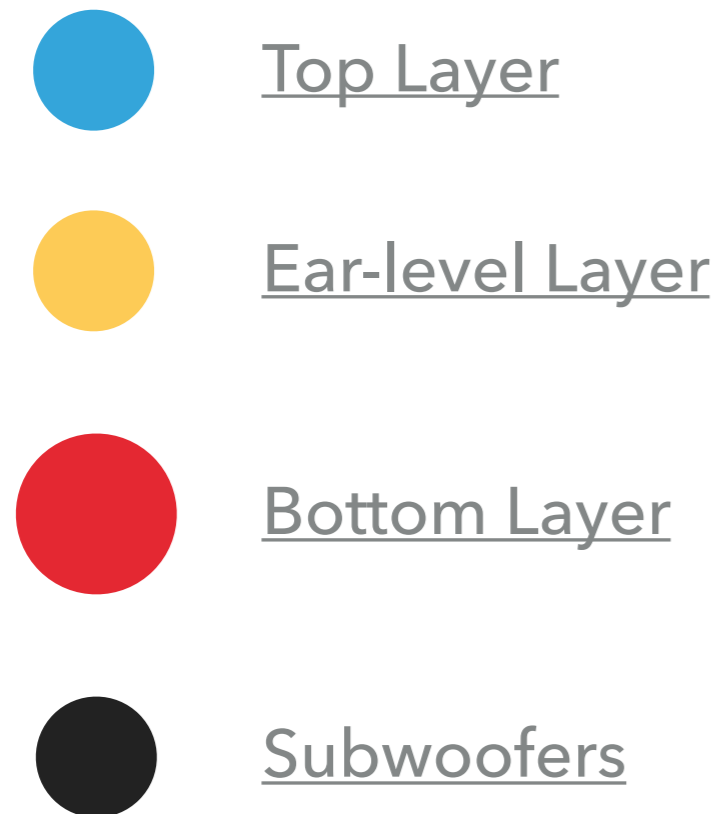
## Reproduction system

- Loudspeaker system chosen over headphones reproduction.
- Focus speaker arrangement where is needed (ear-level and bottom layer).
- 'Voice of God' speaker to keep the narrator separated from the rest.
- Pitch black environment, no need of blindfolds.
- Max 4 people per listening session.

# ERIDANUS, THE 3D AUDIO MOVIE



# ERIDANUS, THE 3D AUDIO MOVIE



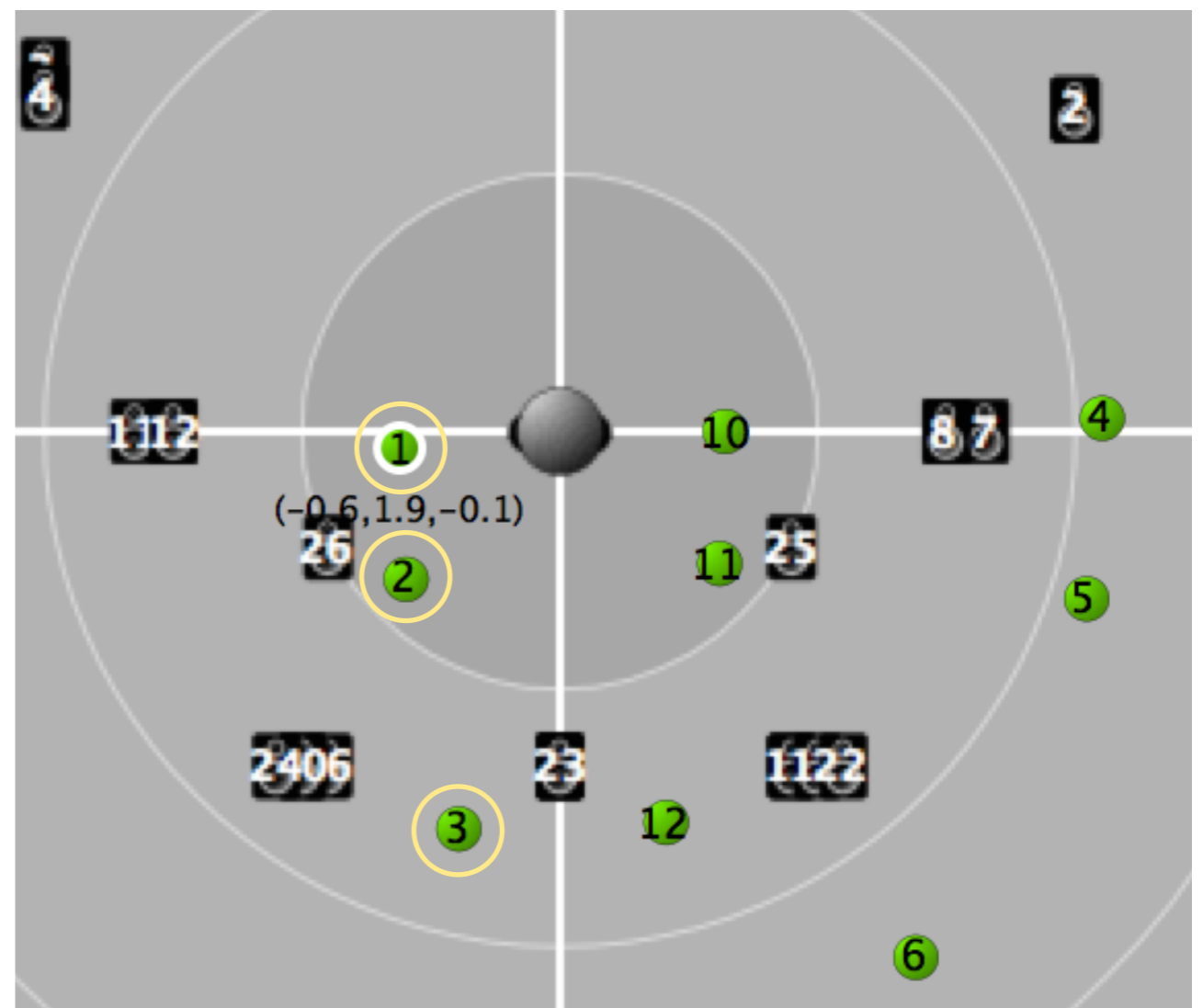
Top View

# ERIDANUS, THE 3D AUDIO MOVIE

## Characters' sonic shapes

- Combination of three fundamental objects per character, spatialised (HOA) and linked together at various height:

1. Ear level object:  
Voice, breaths
2. Mid-level object:  
body movements
3. Bottom object:  
footsteps



# ERIDANUS, THE 3D AUDIO MOVIE

## Immersive Soundscapes

- Combination of real life environments and experimental sound design, to make the environments sounding 'familiar':
  - ▶ Ambisonics recordings as 'room tone'
  - ▶ Random elements, such as water dripping and air gushing
  - ▶ Single spatialised objects (VBAP chosen over HOA), such as fans and light buzz

## Music

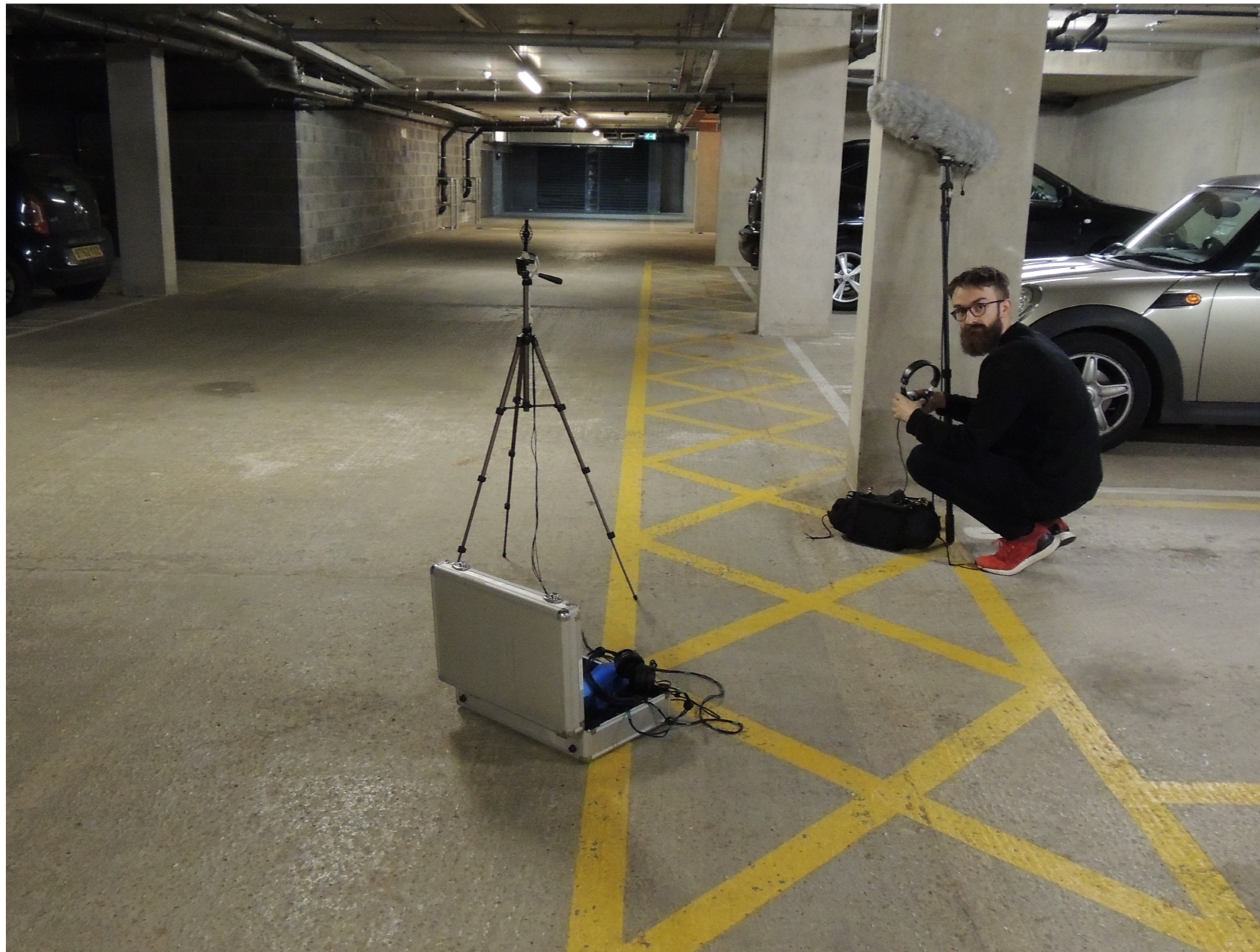
(composed by Marco Caricola)

- ▶ Mixed in HOA and VBAP, depending on what instrument to focus on the most, and what to keep far away.

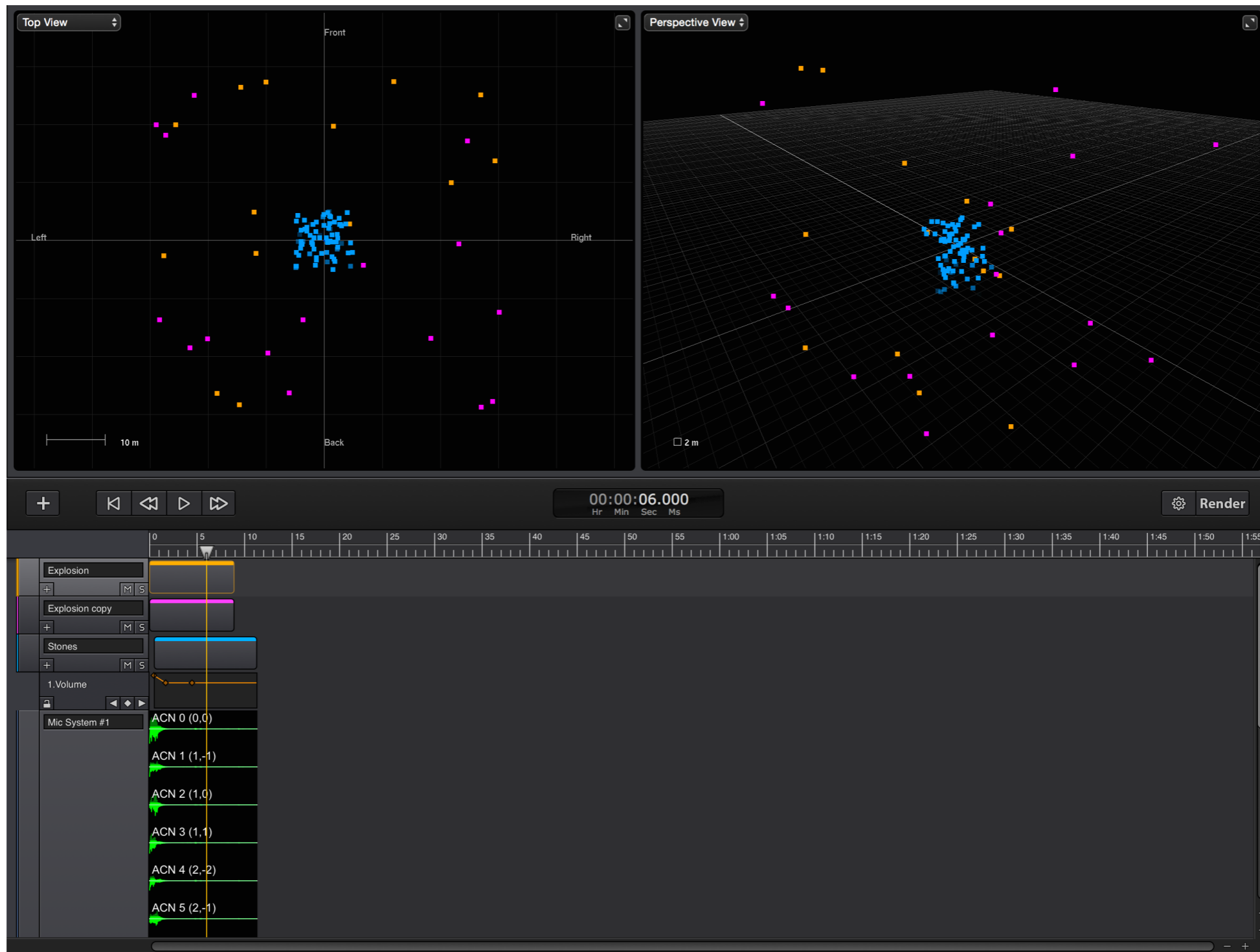
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# ERIDANUS, THE 3D AUDIO MOVIE



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# ERIDANUS, THE 3D AUDIO MOVIE

## Mixing a story on a 360 degree canvas

- DO NOT MAKE IT GIMMICKY!
- Keep it simple, but effective. Make it easy to follow for the audience.
  - ▶ Most of the action happening on the frontal 180 degree (do not need to turn the head to follow the story).
  - ▶ Mixing it like a 360 video, audience fixed in the centre.
    - ▶ *Example:* Entrance door of the virtual space behind the audience, exit door in front.

# ERIDANUS, THE 3D AUDIO MOVIE

LET'S LISTEN!

*'A band of human test subjects, taken to an alien city in the centre of the Earth must work together, in order to escape. They must navigate an underground kingdom and negotiate a series of obstacles, whilst being stalked by a deranged alien- who's determined to destroy them before they can escape.'*



# CONCLUSIONS

- 'Visual cues vs. Sound cues', how to use them properly?
- Pitch black environment really effective.
- 40 minutes immersive audio story don't feel like 40 minutes.
- Writer and sound designer working together to make a better use of sound features.
- The format is more a 3D Audio 'Book' than 'Movie', but the overall experience is more 'cinematic-like', because collective.

# THANK YOU FOR LISTENING!

Reviews available on

[www.facebook.com/eridanus3dsound](http://www.facebook.com/eridanus3dsound)

Get in touch!

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