ARTEMIS PROJECT

R2B @ Aalto Acoustics Lab

INTRODUCTION

- Project led **by Aalto University Acoustic's Lab** to mature and commercialize disruptive new **Spatial Audio** technology.

- Technology based on new methods for **Parametric Spatial Audio**, a field combining human auditory models and statistical signal processing.

- Enabling high-resolution Spatial Audio recording with **minimal hardware and bandwidth requirements** for both mobile and wearables devices.

- Project has produced several real-time PoCs and successfully validated them in perceptual studies.

- The team will seek investment in 2nd H 2024 and expects to establish a company in January 2025.

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Acoustics Lab

WHAT IS SPATIAL AUDIO?

- Audio technology that immerses listeners by rendering sounds from all directions, just like in the real world.

- It is essential technology for upcoming immersive technologies like VR/AR/XR.

- It increases listener engagement and consumption of media content. (Dolby Atmos on Apple Music is getting traction)

- It enables more bandwidth for expression in teleconferencing applications. (Nokia make's first immersive voice and audio call)

- Apple, Meta, Microsoft & Google are actively investing in Spatial Audio for their XR platforms. (Samsung, Google are attacking Dolby's Monopoly)

THE CHALLENGE – RECORDING

- Current high-resolution **Spatial Audio recording** technology is expensive and does not scale.

- Current approaches require a large amount (16 or more)* of high-quality microphones in specific spherical configurations.

- The amount of audio signals increases the data bandwidth requirements for storage and streaming.

- It is restricted to specialized/expensive hardware (12k€). Not feasible for current mobile nor future wearable devices.

- Direct recording for object-based Spatial Audio formats, such as IAMF or Dolby Atmos, is not possible and requires post-production

* Amount of microphones required for 3rd Order Ambisonics

OUR SOLUTION: S³MASH

S³MASH*, or Spatial Sound Scene Matching using Single-Channel Audio, is a codec for high-resolution Spatial Audio capture for consumer recording devices.

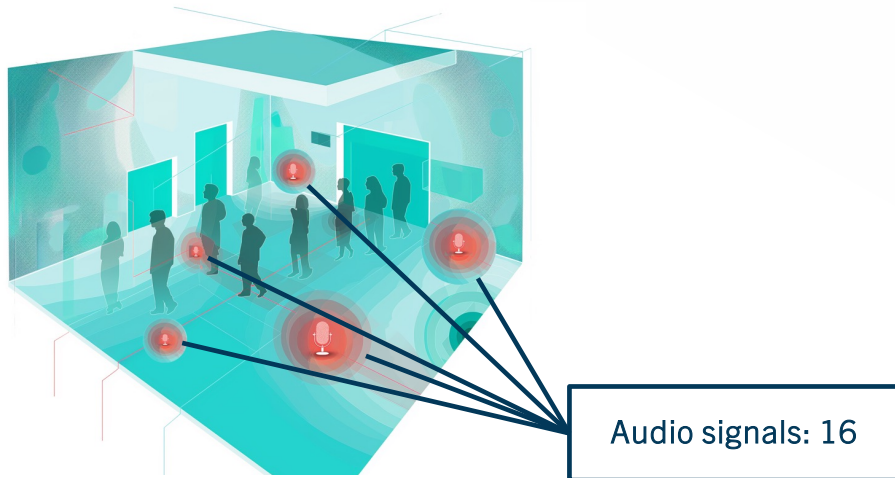| S³MASH			
1. Minimizes the required number of microphones. At encoding stages, the codec estimates acoustic parameters which enables extreme spatial upmixing.	**2. Adapts to irregular array configurations.** The codec can easily adapt to the physical form factor of the recording devices, including mobile phones, cameras, as well as mixed-reality headsets and smart glasses.	**3. Minimizes data requirements.** After encoding, the sound scene data can be either stored or transmitted as one audio signal plus metadata.	**4. Flexible decoding** The encoded sound scene can be decoded to common formats such as Binaural or Ambisonics, or object-based formats such as Dolby Atmos or IAMF.

* **Gonzalez, R, McCormack, L. Politis, A. "S³MASH: Spatial Sound Scene Matching using Single-Channel Audio",** AES 5th International Conference on Audio for Virtual and Augmented Reality, Redmond, WA, USA, (August 2024).

OUR ASSETS

Closed Software

S³MASH

Ongoing HW Development

Spatial Audio Hardware Design

Microphone Arrays & Hearables

Embedded Audio

Ongoing SW Development

Deep Learning for Acoustics

Room Parameter Estimation

Acoustic Visualization

AR Reverberation Engine

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Open Software

SAF
(Spatial Audio Framework) link

SPARTA
(Spatial Audio Real Time Applications) link
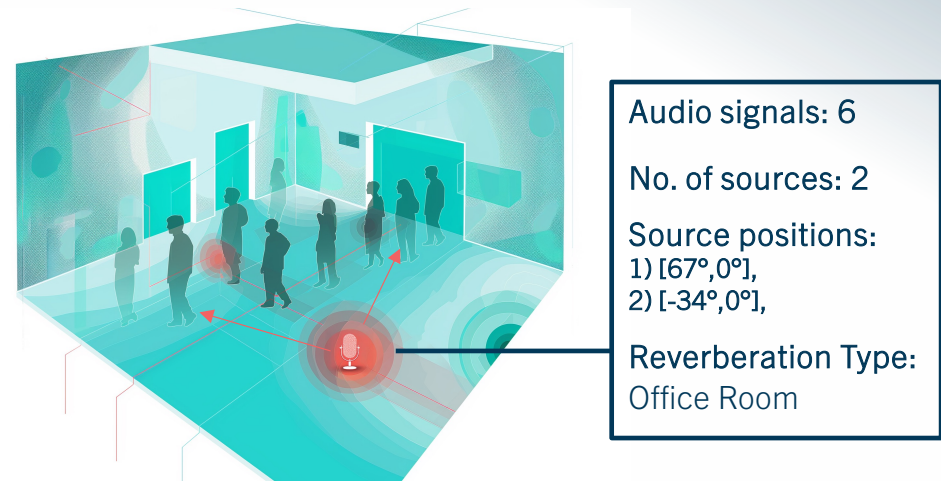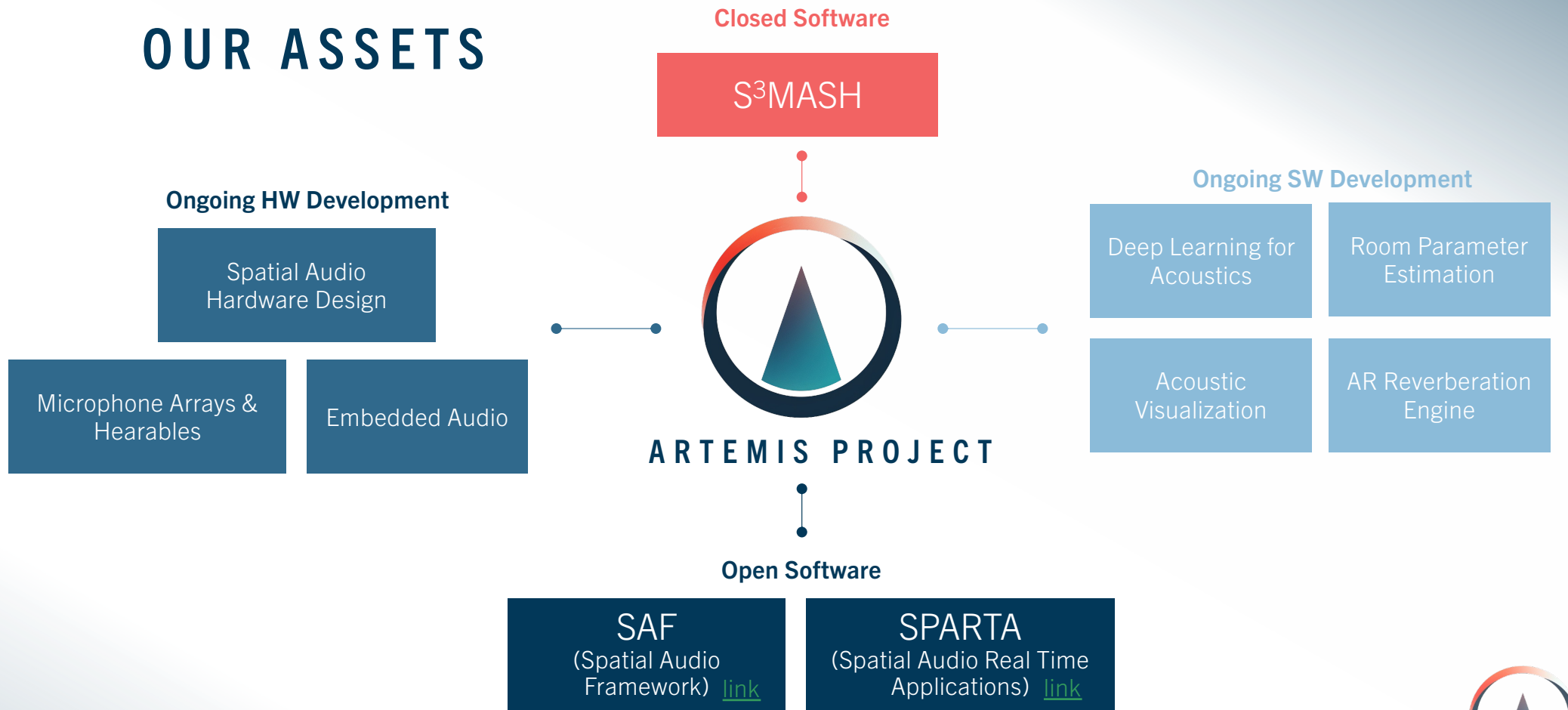
OUR VISION

- To enable high-resolution Spatial Audio recording in all mobile and wearable devices.

- An open and efficient Parametric Spatial Audio format - information is universally available for rendering (IAMF, IVAS, .DAW)

- Post-production software suite for creating and editing Spatial Audio.

- An industry leader in Spatial Audio capture for 6 Degrees of Freedom (6DoF).

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THANK YOU!

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