

## Partner search/offer

Date (23-04-24)

### (\*) – Mandatory

- (\*) Relevant topic(s) in work programme (code & name of the topic(s) line(s))

HORIZON-CL4-2024-HUMAN-03-02

- Quick description of the project concept

#### Describe the

- objectives,
- activities,
- type of partners already involved and their skills
- partners requested and their skills

In the robotics field, visual scene capture and image processing have been the subject of particularly increased R&D attention for years. It is quite different with **robotic audio listening**. Interactive robotics technology for the audio listening modality has been developed for more than 20 years (more than 50 years for the automatic speech recognition, ASR) and provides convincing results in quiet and controlled laboratory sound environments. On the other hand, this technology is flawed in real-use environments which are noisy, multi-sound source or multi-speaker environments and thus lacks accuracy and phonological relevance for speech recognition and more generally for the recognition of audio signals. By roughly breaking down and analyzing the processing chain into two parts, listening/capture and pattern recognition based on **automatic speech recognition (ASR)**, we easily identify that, unlike vision, the domain of audio capture is neglected in robotics. The spatial property of the captured acoustic field (one of the two fundamental capacities of human and animal hearing) is not fully exploited today in robotics. ASR technologies are, for their part, mature, widely tested and relatively robust. It is proposed to compensate for all of this by adding increased detection capabilities to the first stages of the processing chain (physical system for capturing the 3D acoustic field, denoising and separation techniques from audio and/or **Microphone Array Techniques (MAT)**). This will then involve adapting ASR principles (phonetics, phonology, prosody) for the analysis and detection of various industrial noises (machines, vehicles, etc.). Thus 'augmented', the current automatic speech recognition technology which has become **3D automatic sound recognition technology (ASR3D)** will be capable of detecting, recognizing and identifying any industrial sound environment even in an unfavorable signal-to-noise ratio configuration.

None partner involved yet.

Both academic and private partners, working on robotic audio listening, are requested.

- (\*) Description of the expertise requested/proposed (up to 1000 characters)

Mechanical strength:

Expertise in performing mechanical simulations for linear and non-linear materials and geometries, combined with our ability to simulate and perform fatigue tests, to address wear and vibration-induced damage.

Vibroacoustic comfort:

Vibroacoustic analyses, simulations and measurements, to ensure optimum comfort for mobility, capital goods and buildings.

**Safety :**

Dealing with fatigue, structural damage and worker exposure to noise and vibration, in compliance with current standards and regulations.

**Geometric stability:**

Design of vibration- and shock-resistant solutions to protect sensitive equipment, including microscopes, precision measuring equipment and advanced optical devices.

Innovative solutions for the early detection of failures or abnormal behavior, using multi-physics analysis to ensure the reliability and performance of monitored systems (e.g. gas leak detection).

• (\*) **Keywords describing the expertise requested/proposed (up to 10 words)**

Digital humanism  
Artificial Intelligence  
Big data & analytics  
Internet of Things  
Robotics  
Software Technologies  
International Cooperation  
Responsible Research and Innovation  
Digital skills

**Organisation information**

**(\*) Organisation and country:**

Metravib Engineering, France

**(\*) Type of organisation:**

Enterprise  SME  Academic  Research institute  Public Body  Other: Association

**Former participation in FP European projects?**

Yes  No

**Web address:**

<https://www.metravib-engineering.com/fr/>

**Description of the organisation:**

Since 1969, Metravib has been helping its customers to solve problems related to acoustics and vibration, to improve the reliability of structures and associated components and to ensure their regular monitoring (health usage monitoring). Involved in the silent submarine development program supported by the DGA (French Defense forces) until the early 80s, Metravib then rapidly became a privileged partner of industry, bringing its expertise in various sectors of activity.

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