

# Technology and trainer support in simulation

The case of Arc Sim'Pro and the use of ZED2 cameras for detailed participant  
monitoring

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1

**Background  
and issues**

2

**ARC Sim'Pro  
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3

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ZED 2**

4

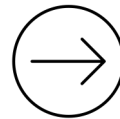
**Results and  
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# Content

# 1. Background



Training of pre-service teacher (secondary) implemented by the INAS at the University of Mons - Belgium (3 faculties).

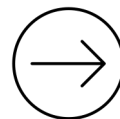


Micro-teaching simulation

Overview of the training system available (1)



Each pre-service teacher gives a lesson to another pre-service teacher playing the role of a pupil.



These students are asked to be authentic as possible



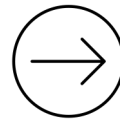
The trainer observes the lesson and then comments on it in a video debriefing session with the pre-service teacher who has given the lesson.

(1) Bocquillon, M. (2020). *Quel dispositif pour la formation initiale des enseignants ? Pour une observation outillée des gestes professionnels en référence au modèle de l'enseignement explicite* (Doctoral thesis). Université de Mons, Belgique.

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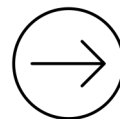


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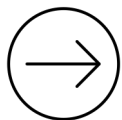
# 1. Issue

- Trainer collects information for debriefing
- Lesson dense with simultaneous and transitory information.
- Many things for the trainer to observe
  - *On the part of the “pre-service teacher”*
  - *On the part of the “pupils”*

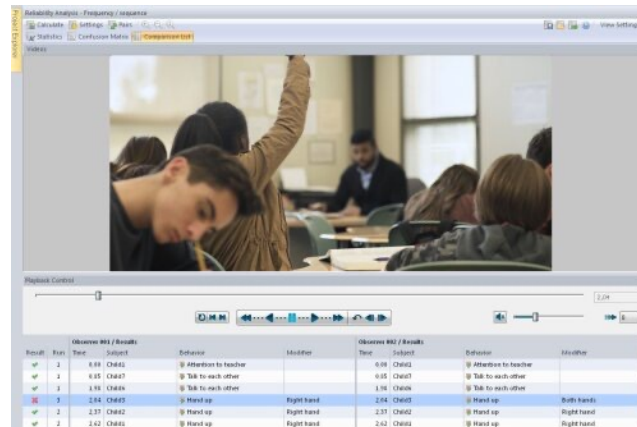


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Difficult even with a coding tool such as “The Observer XT.”



Teachers need **tools** that will help them to identify and process certain elements of the "classroom" in an **automatic way**.

## 2. ARC Sim'Pro projetc

Funded by the Wallonia-Brussels Federation (French-speaking Belgium)

### **Objectives:**

- Enhance detail of the trainer's observations
- Alleviate the trainer's cognitive load and workload
- Automate the collection of data

### **Features:**

- Non-intrusive as possible
- Adaptation to various contexts and environments
- Reasonable cost

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### EYETRACKING GLASSES





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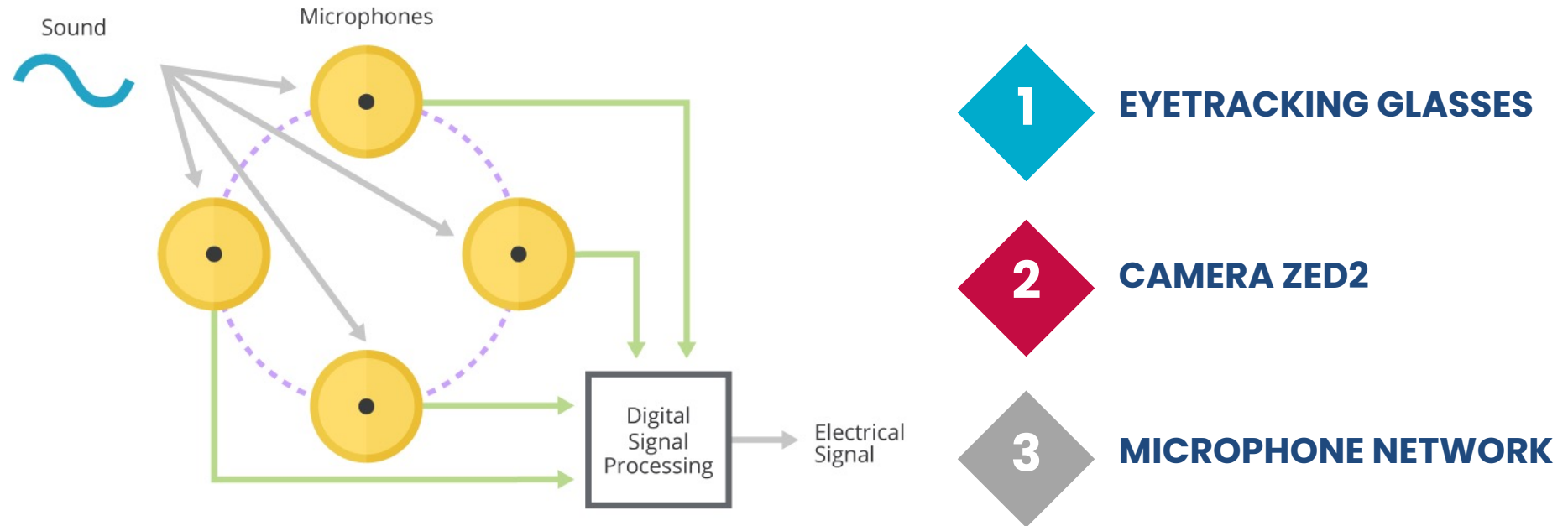
**CAMERA ZED2**



Picture from [https://docs.clearpathrobotics.com/docs/ros1noetic/robots/accessories/sensors/cameras/stereolabs\\_zed\\_2/](https://docs.clearpathrobotics.com/docs/ros1noetic/robots/accessories/sensors/cameras/stereolabs_zed_2/)

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**CAMERA ZED2**



**MICROPHONE NETWORK**

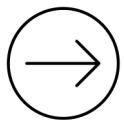
# 3.1. Role and Technical Overview of ZED2 Cameras

## Technical Specifications:

- High-resolution stereoscopic cameras  
Captures detailed 3D data for accurate tracking of movements and behaviors
- Uses Stereolabs' models and supports OpenPose for skeleton detection and YoloV5 for object detection

## Application in Simulation Training:

- Tracks movements and behaviors in real-time



For analyzing interactions and supporting trainer activity



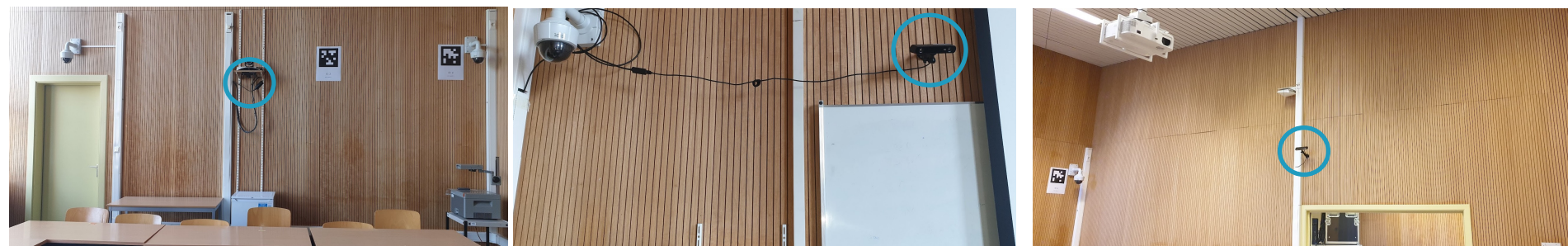
## 3.2. Functioning of ZED2 Cameras in the Project

### Camera Setup and Synchronization:

- We started with two cameras. A third camera is now added to improve coverage and reduce occlusions
- Eye-tracking synchronization is currently manual, done with a clapboard

### Data Capture Process:

- The cameras track movements continuously, enabling detailed behavior analysis.



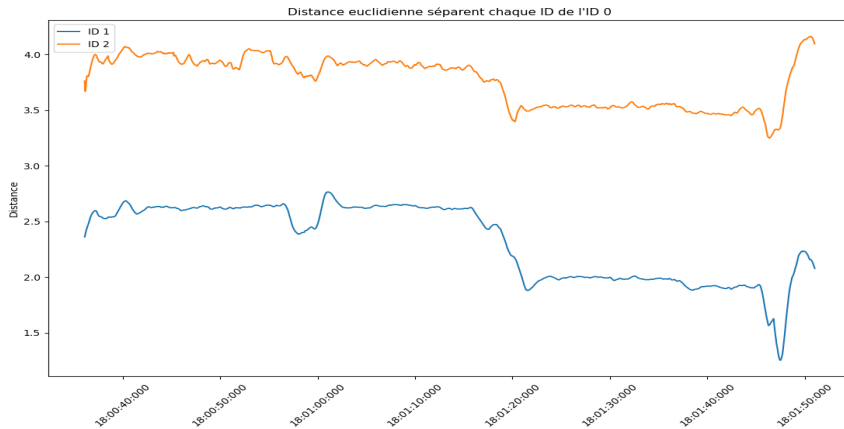
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# 4. Results Achieved with ZED2 Cameras

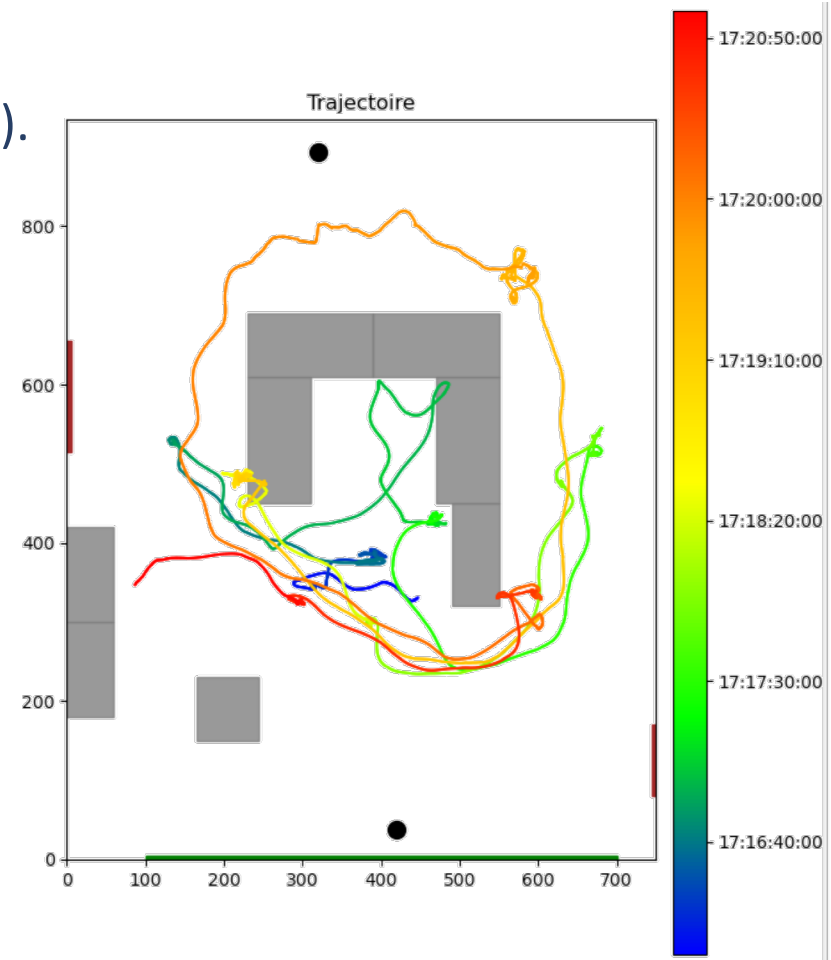
## Behavioral Tracking and Analysis:

- Tracks participants' movements (trajectory).
- Tracks head orientation, interpersonal distances, hand pointing, raised arms, and seated/standing positions.
- Analyzes these behaviors over time.

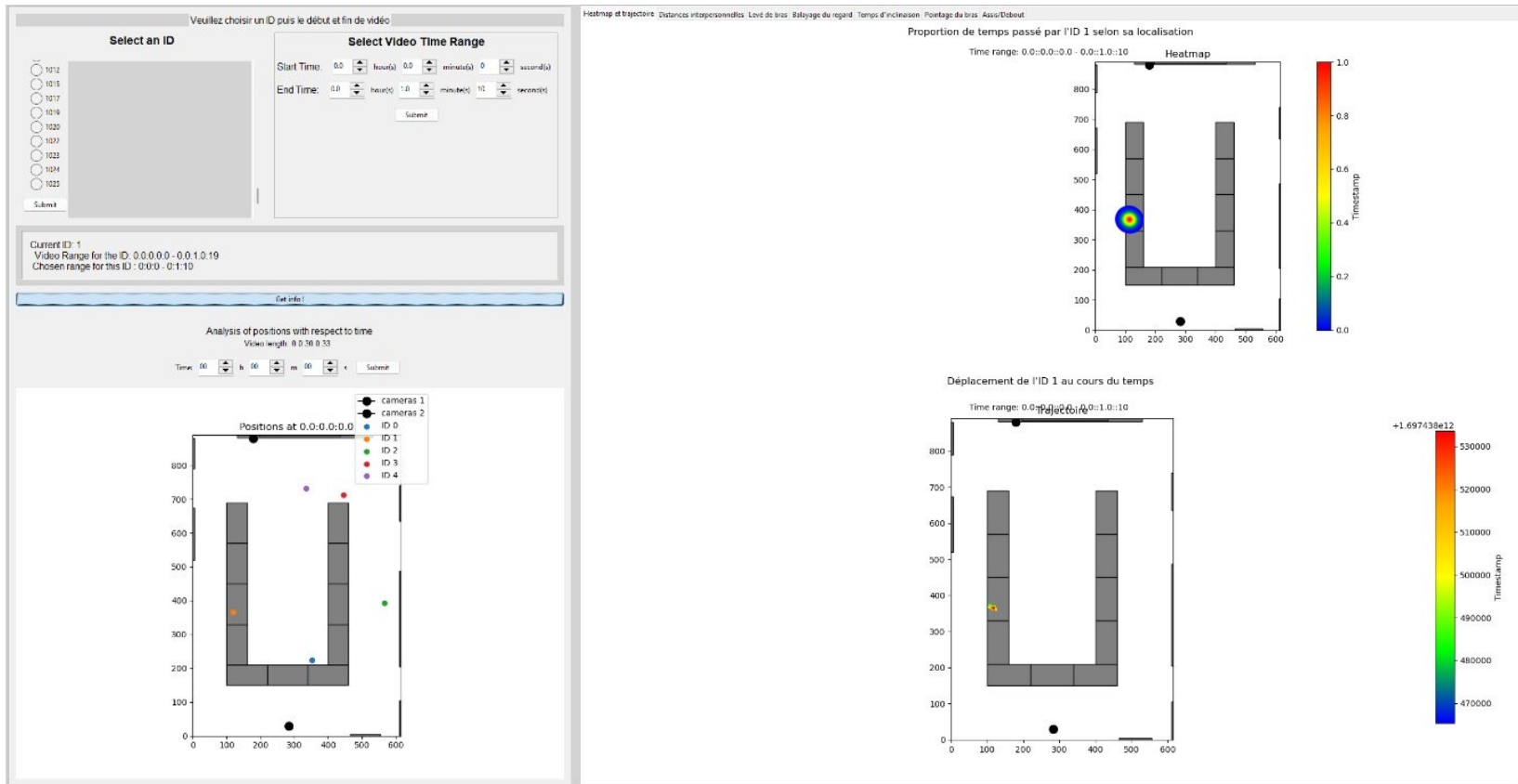


## Data Extraction and Analysis:

- Data can be extracted for entire sessions or specific intervals.
- This flexibility supports detailed analysis of training performance.



# 4. Results Achieved with ZED2 Cameras





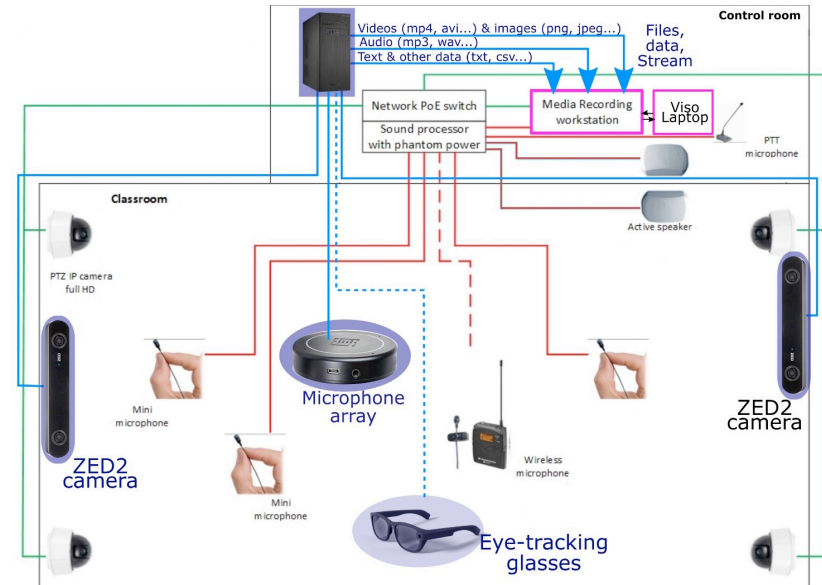
# 4. Conclusion and Perspectives

## Application and Benefits:

- Enhances monitoring and evaluation of training sessions
- Provides insights to improve training outcomes ( e.g. : Noldus integration)

## Challenges and Solutions :

- Even with three cameras, we still face issues with person tracking, especially when two people are close or pass by each other
- This can lead to identifier loss or switching between individuals
- We are investigating re-identification methods to resolve this problem and improve tracking accuracy
- We've recorded many classroom simulations to test, train, and validate our system, ensuring its robustness and reliability.



# Thank you for your attention !

01.

**WEB SITE**



02.

**PUBLICATION**



03.

**INFOGRAPHIC  
DEDICATED TO  
ZED 2 CAMERAS**



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**Engineering side**

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