

CAPTIV

Multimodal Research and Analysis Platform
for Ergonomics, Human Factors and HMI



Stéphane FOLLEY

Sales Manager

stephane.folley@teaergo.com

About us

Development of solutions for the **measurement** and analysis of **Human Behaviour** and interactions with their **environment**

Headquarters in Nancy, **France**



Founded in **2002**
Mother company in 1985



10+ full-time employees



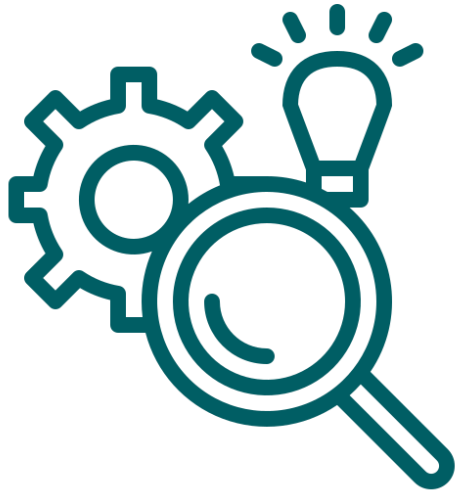
9 PhD thesis
+1 current



41 years of expertise with industry and research laboratories

Our activities

R & D



Supply of turnkey solutions



Services



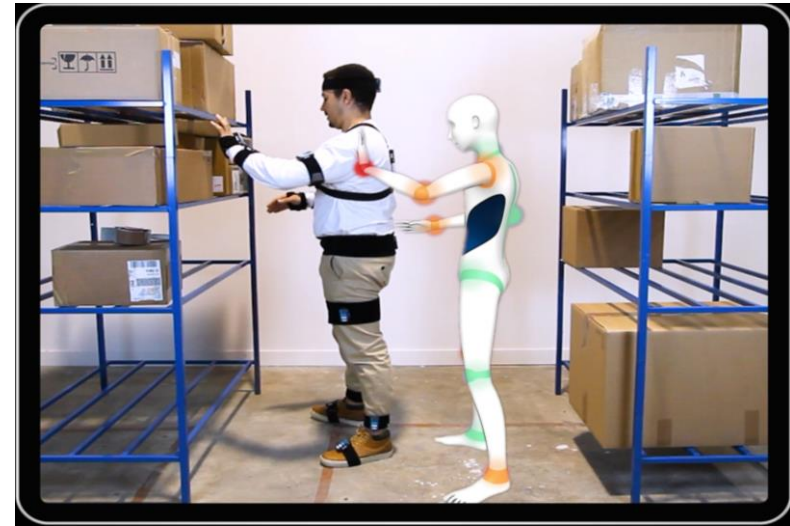
Our solutions



Expert solution – multi-sensors,
scalable, modular



Workplace Mapping via posture





Objective solution for **multifactorial diagnosis**
of occupational risks by **measurements**



Compatible in real and virtual situations



Postures



Muscle load



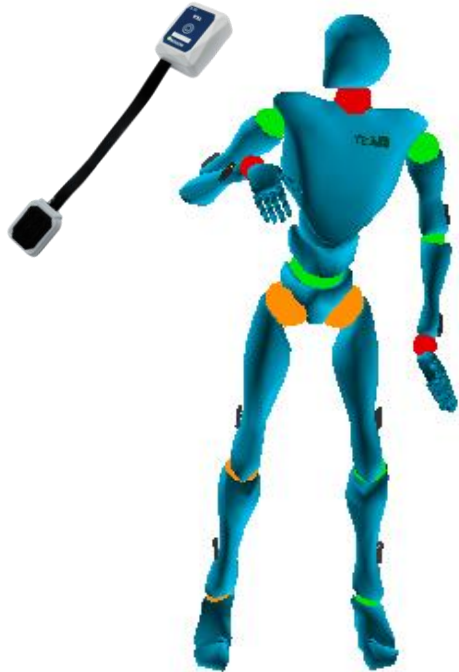
Heart strain



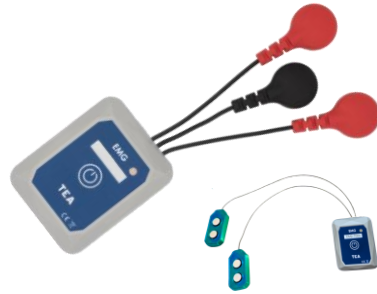
Work
environment,
cognitive load,...

T-Sens sensors

Motion Capture IMU



EMG



ECG



Accelero



EDA



Respiration



Temperature



Load Cell



FSR



CAPTIV full concept

Video



TEA sensors



ECG



Respiration



GSR



EMG



Load Cell



FSR



Accelerometer

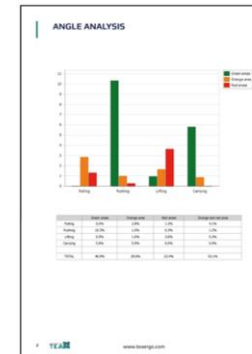
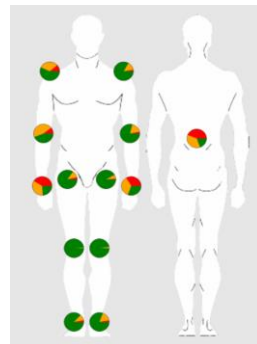


IMU

Physio

Force

Posture



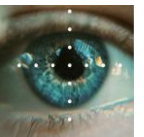
VR



Eye-Tracking



Workload



Others



Compatible with all types of environments



Typical applications



Workplace mapping



Ergonomics study



Evaluation and
comparison



Training



Internal standards

Customers testimonials



"CAPTIV is a **very innovative means** for measuring the ergonomics impact of our current and future activities at ALSTOM, by capturing **reliable and accurate data.**"



"CAPTIV enables me to **save a lot of time** and makes my posture exposure analysis **much more reliable.**"



"We acquired it for addressing our **work hardness issues** and for our workplace ergonomics studies.
A **complete toolbox** for our studies and daily activities with our Health department."

Analysis in CAPTIV



Activity Module

Included in CAPTIV software

Task analysis by observation

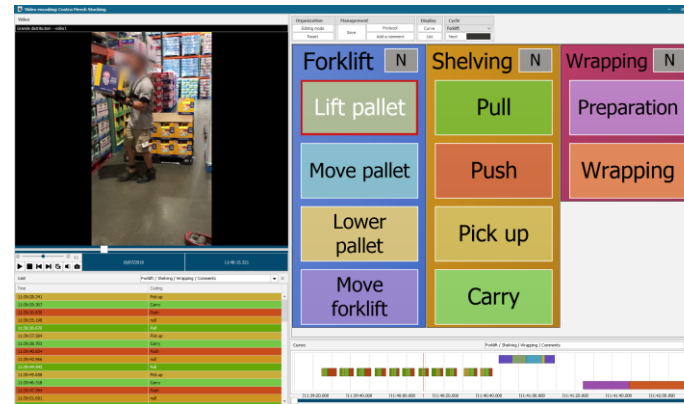
Import of video files

Tagging of pre-defined tasks

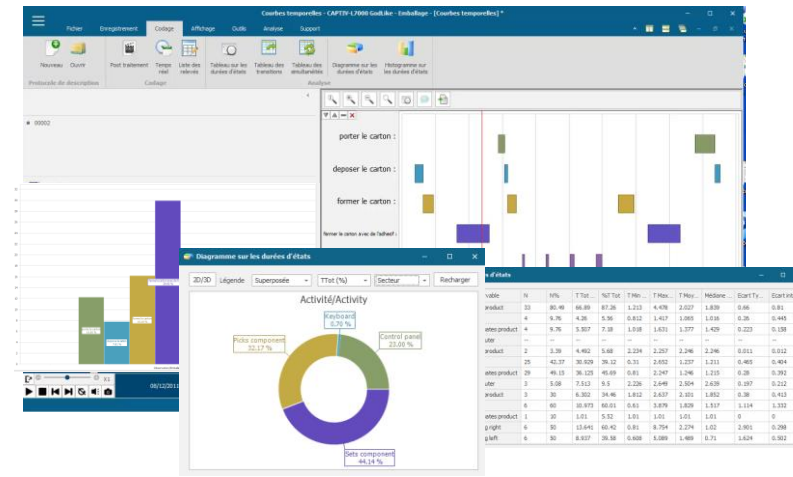
NEW – Automated by AI (optional)



① Record a video



② Import video and observe



③ Detailed analysis

Posture Module

Included in CAPTIV software

Posture constraints

IMU sensors

- 9 sensors for upper body measurement
- 15 sensors for full body

Real-time data transfer to PC

And/or

Recording in internal memory:
no limitation with range or
distance

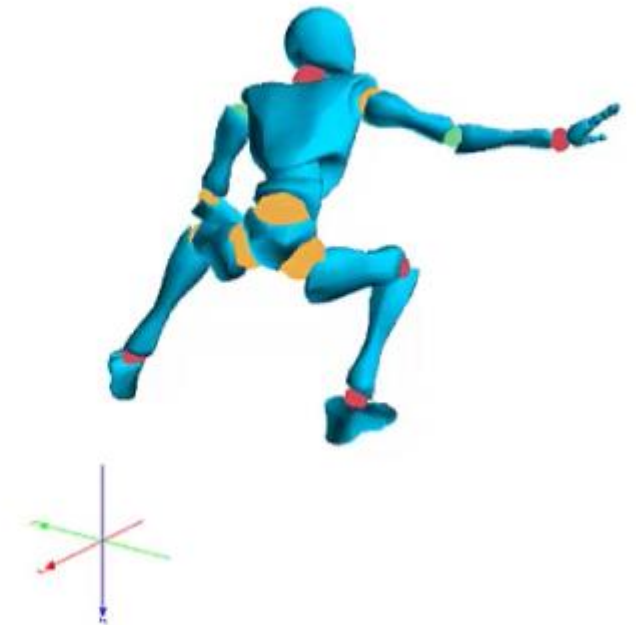
Adjustable non-intrusive straps



3D avatar

Colorisation of joints based on
postural constraints

green, orange and red



Posture Analysis

Included in CAPTIV software

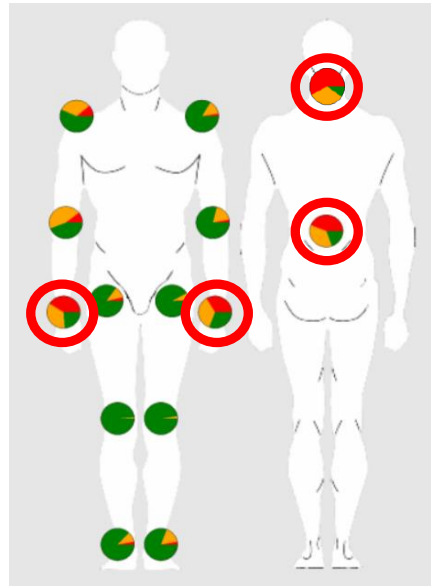
Funnel analysis

Job mapping: « macro » view and prioritization of constraints

Analysis per joint, identification of postures and joint axes the most at risk

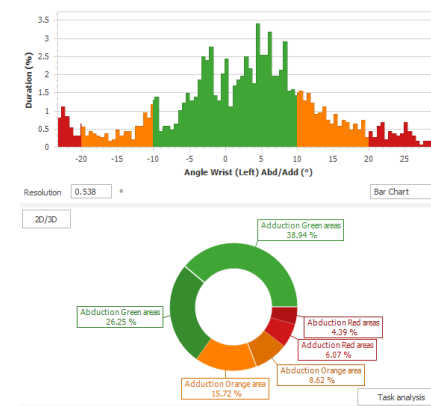
Correlation with task analysis for identifying tasks with the highest postural strain

From MACRO...

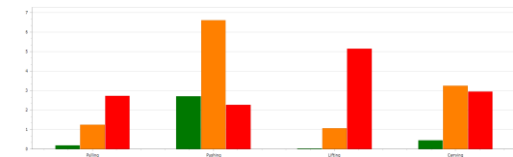


Overall risk mapping

... to MICRO



Detail per joint and axis



Most impacting tasks

EMG Module

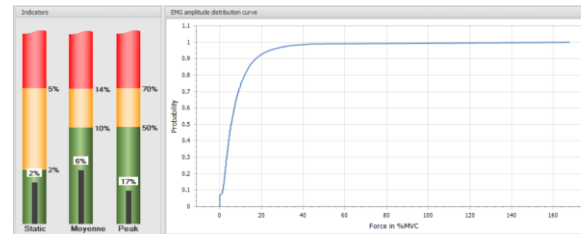
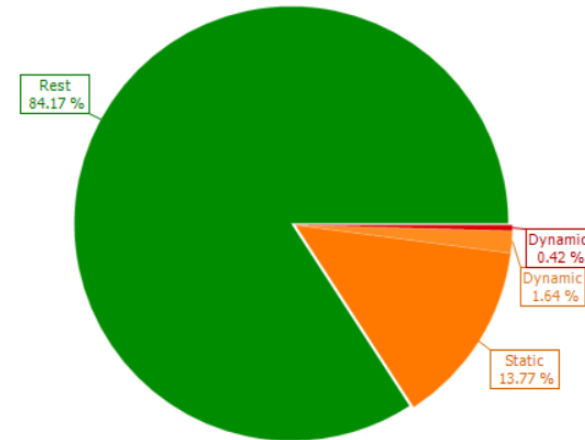
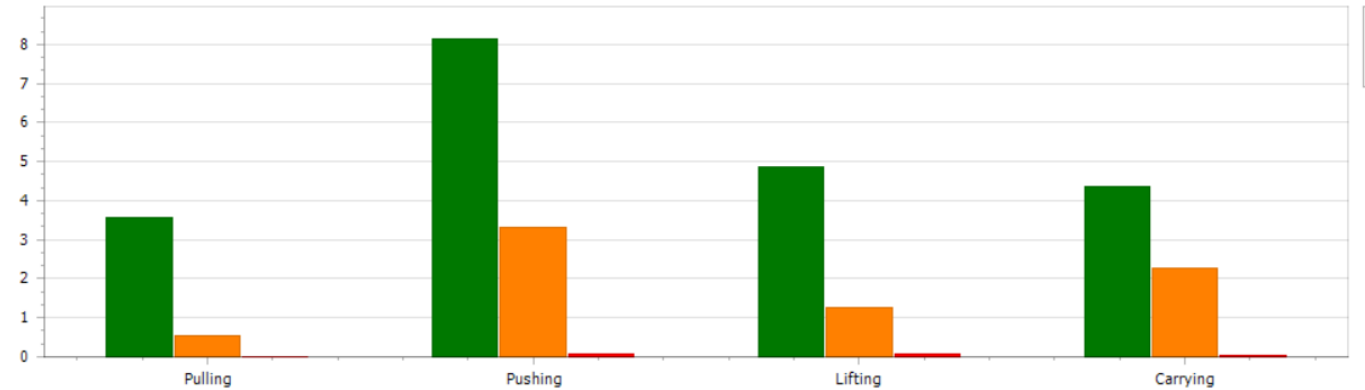
Included in CAPTIV software

Measurement of muscle load

Analysis of static and dynamic contractions

Comparative analysis (with or without, before/after, ...)

Relative analysis (% MVC)



Heart Rate Module

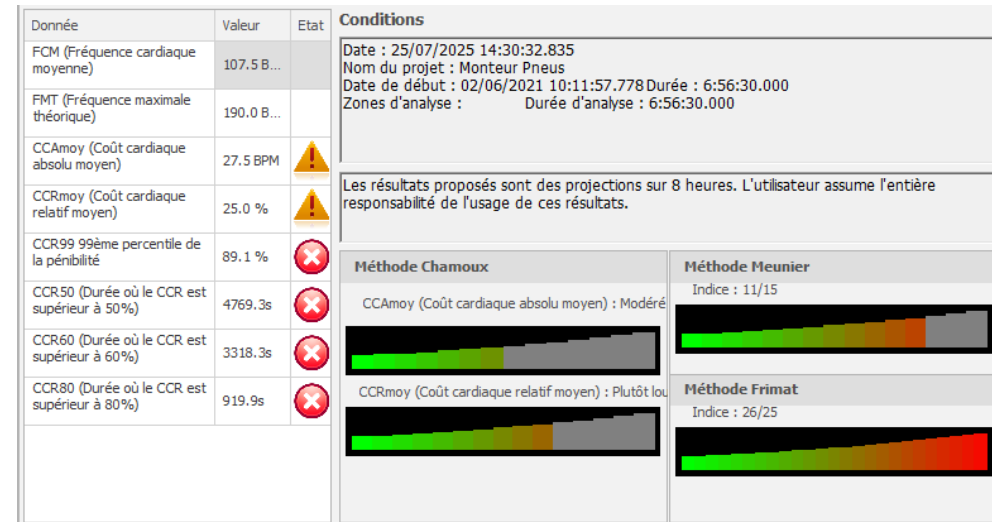
Ergonomics objective

- Objective evaluation of work-related arduousness
- Highlighting the most impacting tasks

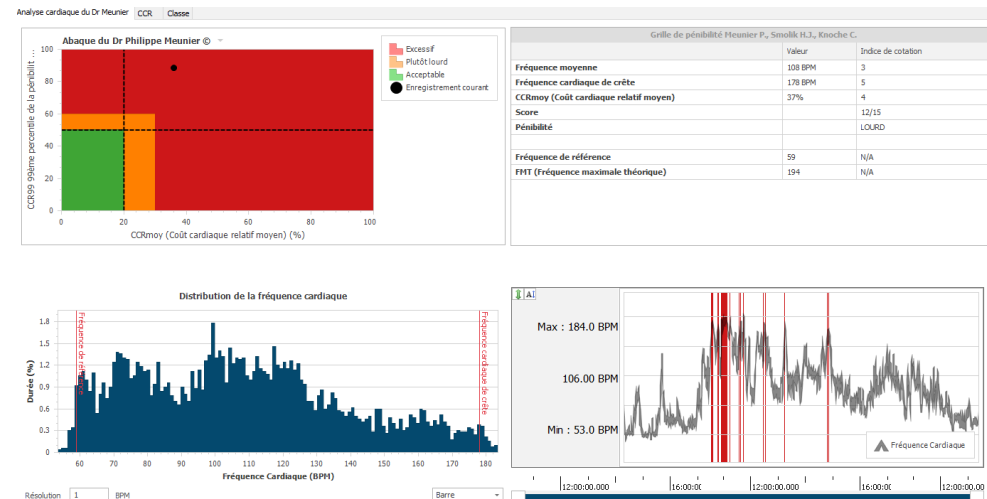
Support for decision

- Better understanding of the skills required for the job position
- Preparation for return to work after heart issue
- Validation of job accommodation or reassignment

Base module (included)



Optional module: Methodology of Dr Philippe Meunier



SCORE Module

Optional

RULA indicator

Analysis of constraints on upper limbs

- Posture of upper limbs (neck, trunk, arms)
- Duration and frequency of posture and activity
- Arm muscles exertion
- Environmental factors (noise, vibrations, etc...)

RULA By CAPTIV

Task Description

Project name RULA xxxxxxxxxxxxxxxxxxxx
Date of measurement 07/02/24 14:24:36
Date of analysis 07/01/25 17:18:04
Recording duration 0 min 38s
Author j.balmont

RULA Score

Average RULA score (/7)

Right Limb
4.6

Left Limb
4.7

Average A score: Arm and Wrist (/9)

4.6

4.8

Average B score: Neck, Trunk and Leg (/9)

3.6

3.6

Interpretation	
Score 7	High Risk
Score 5-6	Medium Risk
Score 3-4	Low Risk
Score 1-2	Negligible Risk

Score 1-2

% of time
4.9

% of time
1.2

Score 3-4

38.8

36.5

Score 5-6

46.8

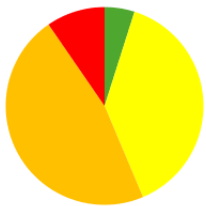
49.2

Score 7

9.6

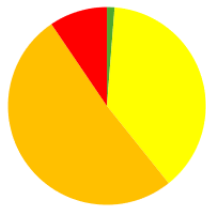
9.1

% of time by RULA score



■ Score 1-2
■ Score 3-4
■ Score 5-6
■ Score 7

% of time by RULA score

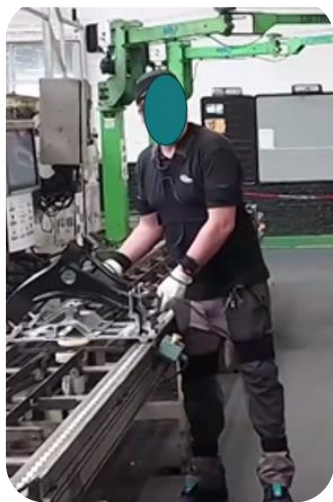


■ Score 1-2
■ Score 3-4
■ Score 5-6
■ Score 7

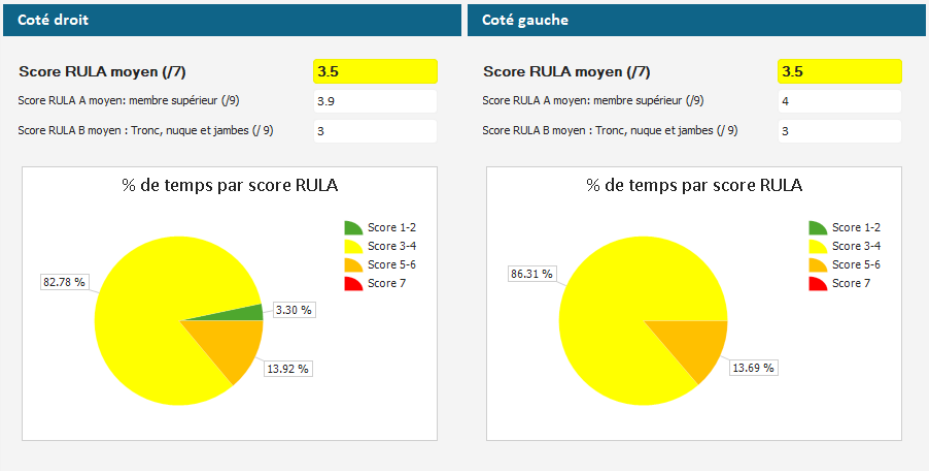
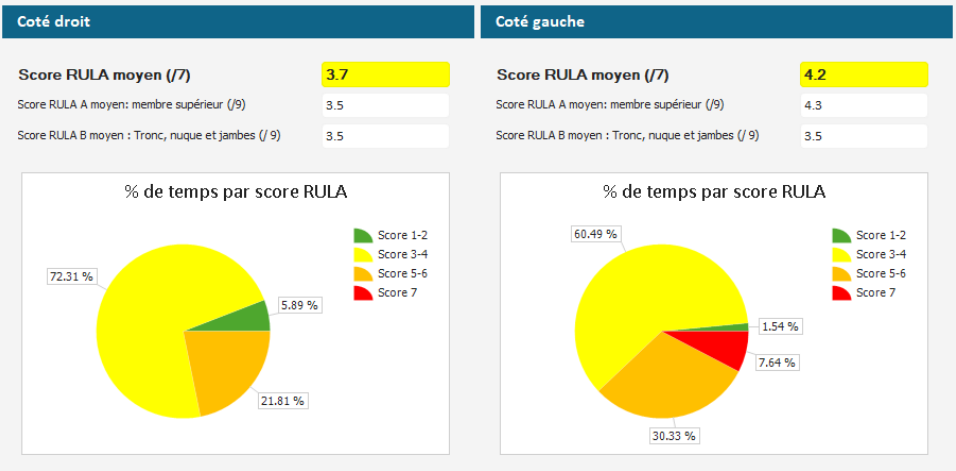




Without assistive device



With assistive device



SCORE Module

Optional

OCRA Checklist and Index

Analysis of repetitive tasks

- Repetitiveness
- Force – muscle strain
- Straining postures and movements
- Lack of sufficient recovery periods

Page 1 / 3

OCRA Index by CAPTIV - REPORT



Task Description

Task name	Logistic Warehouse A
Date of measurement	12/11/2024
Date of analysis	12/12/2024
Record Duration	14 min 18s
Number of cycle	3
Author	D. Martin

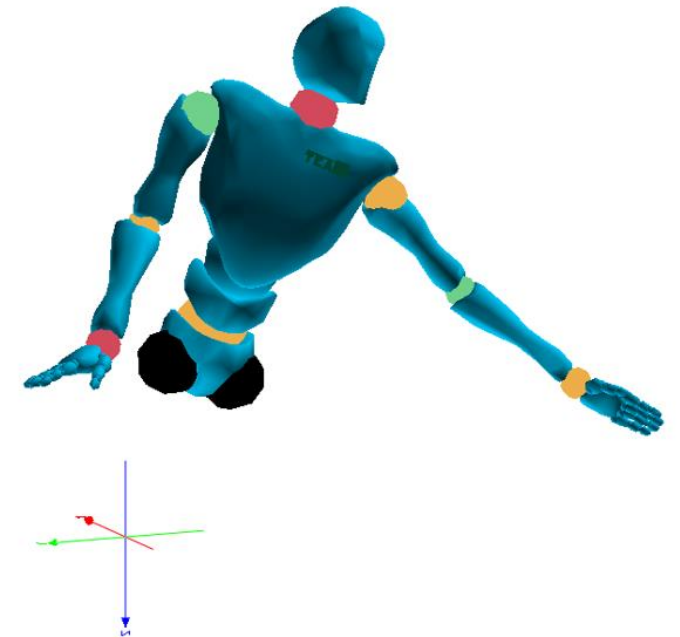
Task Risk

OCRA Index	4.8
Interpretation	Medium Risk

OCRA Index Interpretation

> 9	High Risk
4.5-9.0	Medium Risk
3.5-4.5	Slight Risk
2.2-3.5	Borderline
1.5-2.2	Acceptable Risk
<1.5	Optimal

Recommendation	Improve working conditions Health surveillance Training
----------------	---



SCORE Module

Optional

NIOSH Indicator

Load lifting analysis

NIOSH Lifting Index By CAPTIV

Task Description

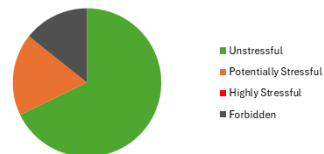
Project name NIOSH xxxxxxxxxxxxxxxx
 Date of measurement 04/09/25 11:26:13
 Date of analysis 07/01/25 17:19:53
 Recording duration 7 min 5s
 Author n.ferveur
 Profile Revised NIOSH (23kg)

Lift Evaluation

Number of Lifts 28
 Total weight lifted (Kg) 105.1
 Weight lifted per hour (Kg/h) 889.9
 Average recommended weight load (Kg) 5.2

	Number	Ratio	Frequency
Unstressful (LI < 1)	19	67.90%	2.7 /min
Potentially Stressful (1 < LI < 3)	5	17.90%	0.7 /min
Highly Stressful (LI > 3)	0	0%	0 /min
Forbidden	4	14.30%	0.6 /min

% of lifting by NIOSH Index



Lift	Load	Recommended Weight Load (RWL)	Lifting Index (LI)	Horizontal Multiplier	Vertical Multiplier (VM)	Distance Multiplier (DM)	Asymmetric Multiplier (AM)	Frequency Multiplier (FM)	Coupling Multiplier (CM)
0	6.5	7.2	0.9	0.5	0.9	1	0.7	0.9	1
1	2.3	7.6	0.3	0.5	1	1	0.7	0.9	1
2	2.3	7.5	0.3	0.5	1	1	0.7	0.9	1
3	2.3	0	0	0	1	1	0.8	0.9	1
4	2.3	0	0	0	1	1	0.8	0.9	1
5	2.3	6.1	0.4	0.5	0.9	0.9	0.7	0.9	1
14	5.6	6.9	0.8	0.5	0.9	1	0.7	0.9	1
15	4.2	4.8	0.9	0.5	0.8	0.9	0.7	0.9	0.9
16	5	4.8	1	0.5	0.8	0.9	0.7	0.9	0.9
17	5	0	0	0	0.9	1	0.7	0.9	1
18	5	4.4	1.1	0.4	0.8	0.9	0.7	0.9	0.9
19	4.2	5	0.8	0.5	0.8	0.9	0.7	0.9	0.9
20	5	5	1	0.5	0.8	0.9	0.7	0.9	0.9
21	5	5.7	0.9	0.4	0.9	1	0.7	0.9	1
22	4.2	7.6	0.6	0.5	0.9	1	0.7	0.9	1
23	4.2	0	0	0	0.9	1	0.7	0.9	1
24	9.2	6	1.5	0.4	1	1	0.7	0.9	1
25	4.2	4.2	1	0.4	0.8	0.9	0.7	0.9	0.9
26	3	4.8	0.6	0.5	0.8	0.9	0.7	0.9	0.9
27	3	5.4	0.6	0.5	0.9	0.9	0.7	0.9	0.9

Assessment of the maximum acceptable weight during load grabbing and releasing phases, considering:

- Operator posture
- Grip type
- Load values



Lifting score of



NIOSH

Centers for Disease Control
and Prevention
National Institute for Occupational
Safety and Health



NIOSH Lifting Index By CAPTIV

Task Description

Project name NIOSH xxxxxxxxxxxxxxxx
Date of measurement 04/09/25 11:26:13
Date of analysis 07/01/25 17:19:53
Recording duration 7 min 5s
Author n.ferveur
Profile Revised NIOSH (23kg)

Lift Evaluation

Number of Lifts
Total weight lifted (Kg)
Weight lifted per hour (Kg/h)
Average recommended weight load (Kg)

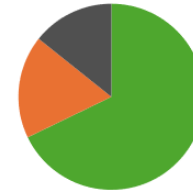
28
105.1
889.9
5.2

Unstressful (LI < 1)
Potentially Stressful (1 < LI < 3)

Highly Stressful (LI > 3)
Forbidden

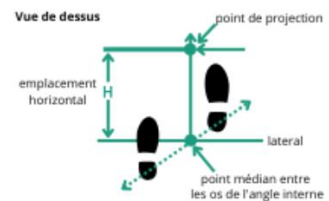
Number	Ratio	Frequency
19	67.90%	2.7 /min
5	17.90%	0.7 /min
0	0%	0 /min
4	14.30%	0.6 /min

% of lifting by NIOSH Index



■ Unstressful
■ Potentially Stressful
■ Highly Stressful
■ Forbidden

Lift	Load	Recommended Weight Load (RWL)	Lifting Index (LI)	Horizontal Multiplier	Vertical Multiplier (VM)	Distance Multiplier (DM)	Asymmetric Multiplier (AM)	Frequency Multiplier (FM)	Coupling Multiplier (CM)
0	6.5	7.2	0.9	0.5	0.9	1	0.7	0.9	1
1	2.3	7.6	0.3	0.5	1	1	0.7	0.9	1
2	2.3	7.5	0.3	0.5	1	1	0.7	0.9	1
3	2.3	0	0	0	1	1	0.8	0.9	1
4	2.3	0	0	0	1	1	0.8	0.9	1
5	2.3	6.1	0.4	0.5	0.9	0.9	0.7	0.9	1
14	5.6	6.9	0.8	0.5	0.9	1	0.7	0.9	1
15	4.2	4.8	0.9	0.5	0.8	0.9	0.7	0.9	0.9
16	5	4.8	1	0.5	0.8	0.9	0.7	0.9	0.9
17	5	0	0	0	0.9	1	0.7	0.9	1
18	5	4.4	1.1	0.4	0.8	0.9	0.7	0.9	0.9
19	4.2	5	0.8	0.5	0.8	0.9	0.7	0.9	0.9
20	5	5	1	0.5	0.8	0.9	0.7	0.9	0.9
21	5	5.7	0.9	0.4	0.9	1	0.7	0.9	1
22	4.2	7.6	0.6	0.5	0.9	1	0.7	0.9	1
23	4.2	0	0	0	0.9	1	0.7	0.9	1
24	9.2	6	1.5	0.4	1	1	0.7	0.9	1
25	4.2	4.2	1	0.4	0.8	0.9	0.7	0.9	0.9
26	3	4.8	0.6	0.5	0.8	0.9	0.7	0.9	0.9
27	3	5.4	0.6	0.5	0.9	0.9	0.7	0.9	0.9

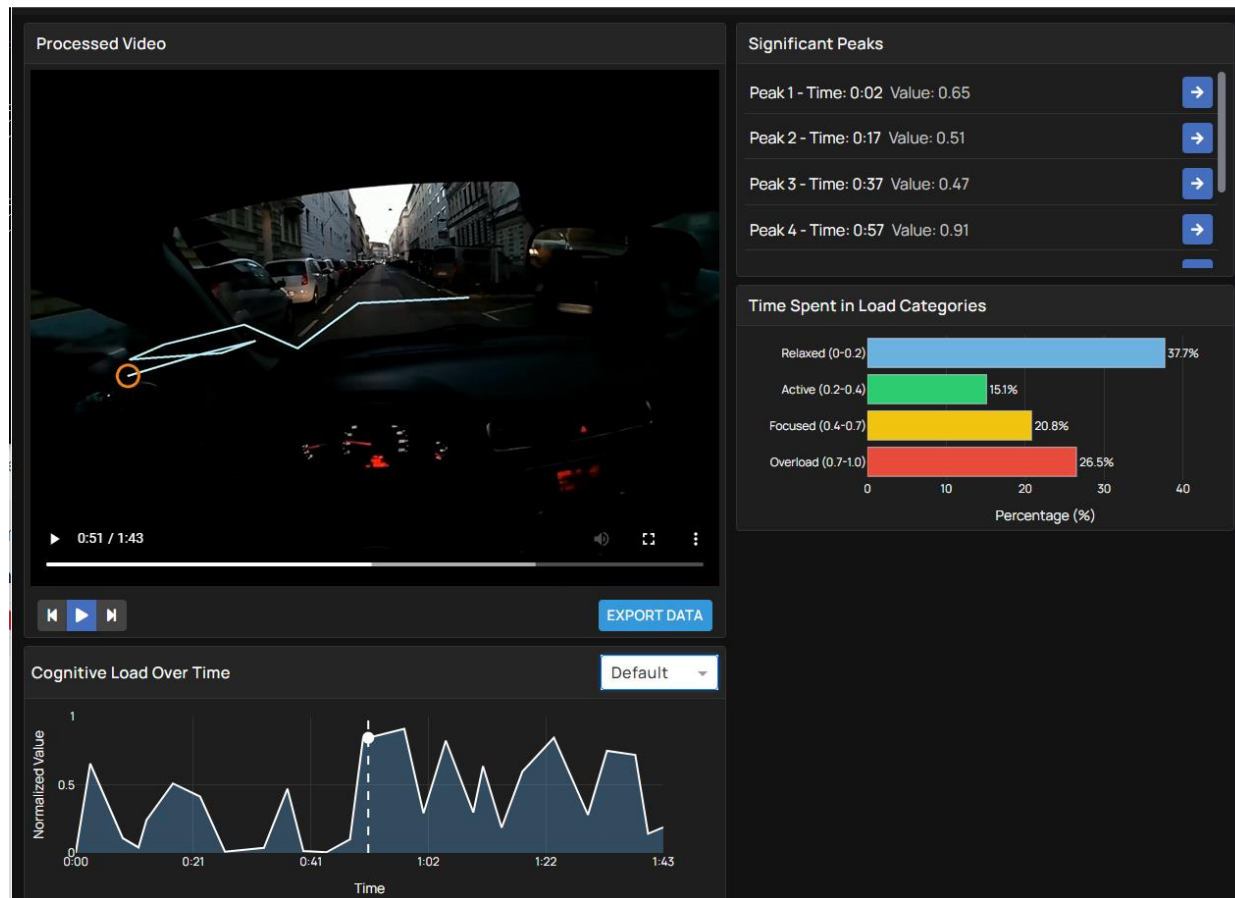




**Compatible with
multiple third-party
sensors**

Pupillometry

Calculation of cognitive indicators based on pupil movements and eye-tracking data.



CL Indicator (cognitive load)

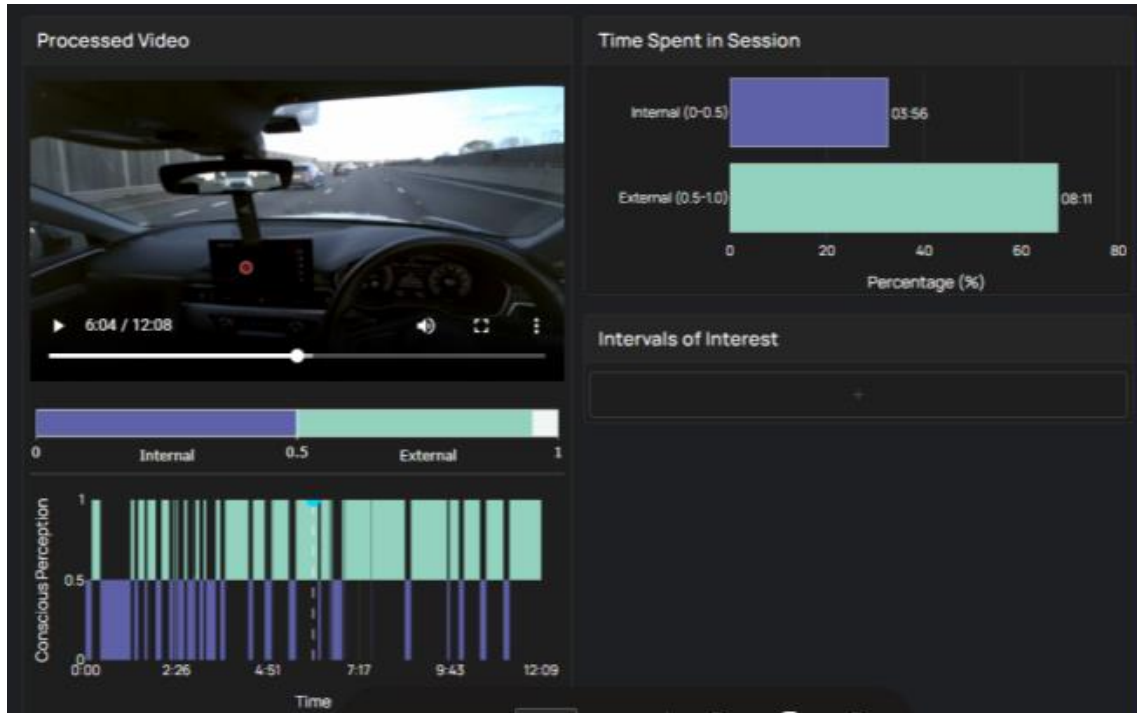


Classification of cognitive load into 3 categories (low, medium, and high):

- **Weak (0-30%):** Minimal mental effort, spontaneous mind-wandering or resting periods, highly automated activities.
- **Medium (30%-70%):** Active participation, interactions, targeted task execution.
- **High (70%-100%):** Intense concentration, problem-solving, reactions to unexpected events, studying, risk of overload in case of prolonged practice.

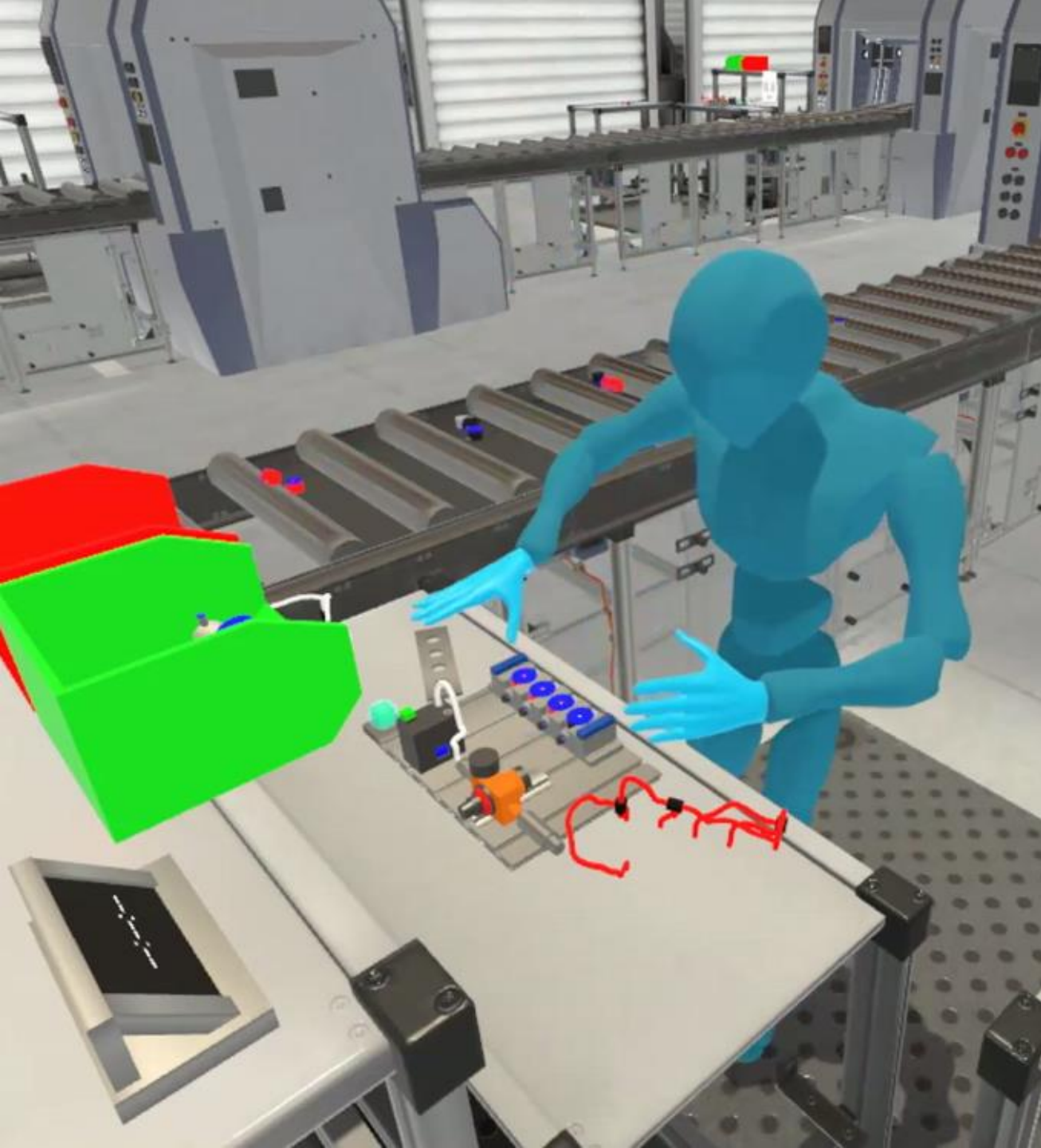
CPI Indicator (conscious perception index)

Conscious perception oscillates between internal signals (thoughts, memories, emotions) and external stimuli (sensory data, events, people).



Classification of conscious perception into internal and external signals:

- **Internal signals (0-50%):** The subject is immersed in their thoughts and reflections; they are “lost in thought.”
- **External signals (50%-100%):** The subject actively interacts with their environment, absorbs information, and visually tracks elements.



CAPTIV in Virtual Reality

« Making measurements in VR »

What are the benefits of Virtual Reality ?



Training



Rolls-Royce and Qatar airways are training their maintenance engineer in virtual reality (L'usine nouvelle, 2019)

Supporting Innovation process

Design and virtual prototyping



Shared virtual environments allow a collaborative work on a digital prototype, and its validation by usage evaluation.

- Reduction of training time and costs
- No disruption of real process
- Increased knowledge and memory retention
- Increased learner perception of training quality

- Interaction with prototype at correct scale
- Considerable time-saving and cost efficiency
- Reduced design cycle and unchallenged ROI
- Allows long distance collaboration (no travels)

CASE STUDY N°4

Setting up of a new packing machine
Validation in VR

Motion Capture

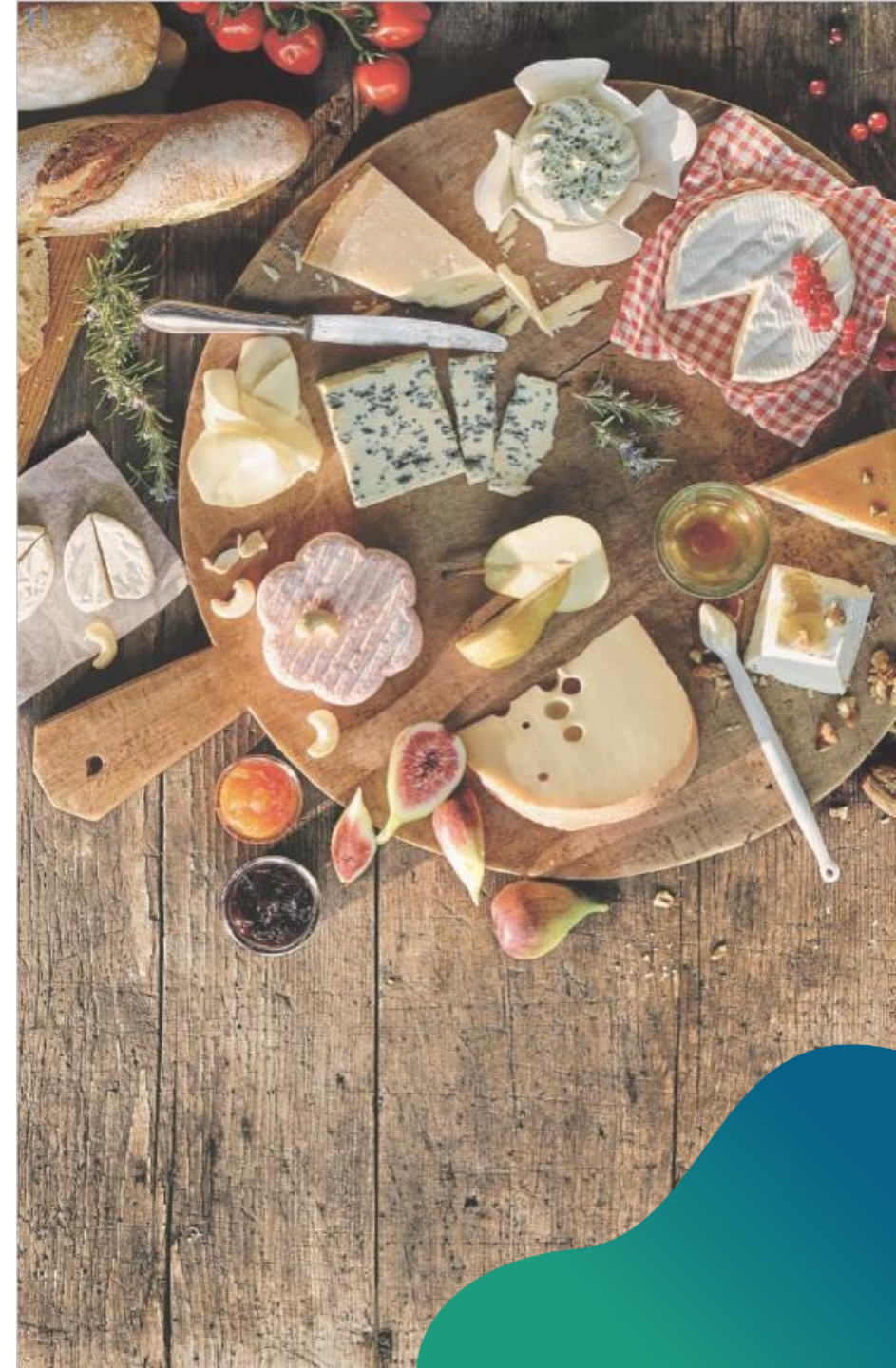


5,6
Billion € turnover

5th
dairy group
worldwide

21 927
people in **31**
countries

Customers in **120**
countries



The context



Making an ergonomic evaluation of the deployment of a new packing machine via VR, while involving all stakeholders in the process (employees and management)

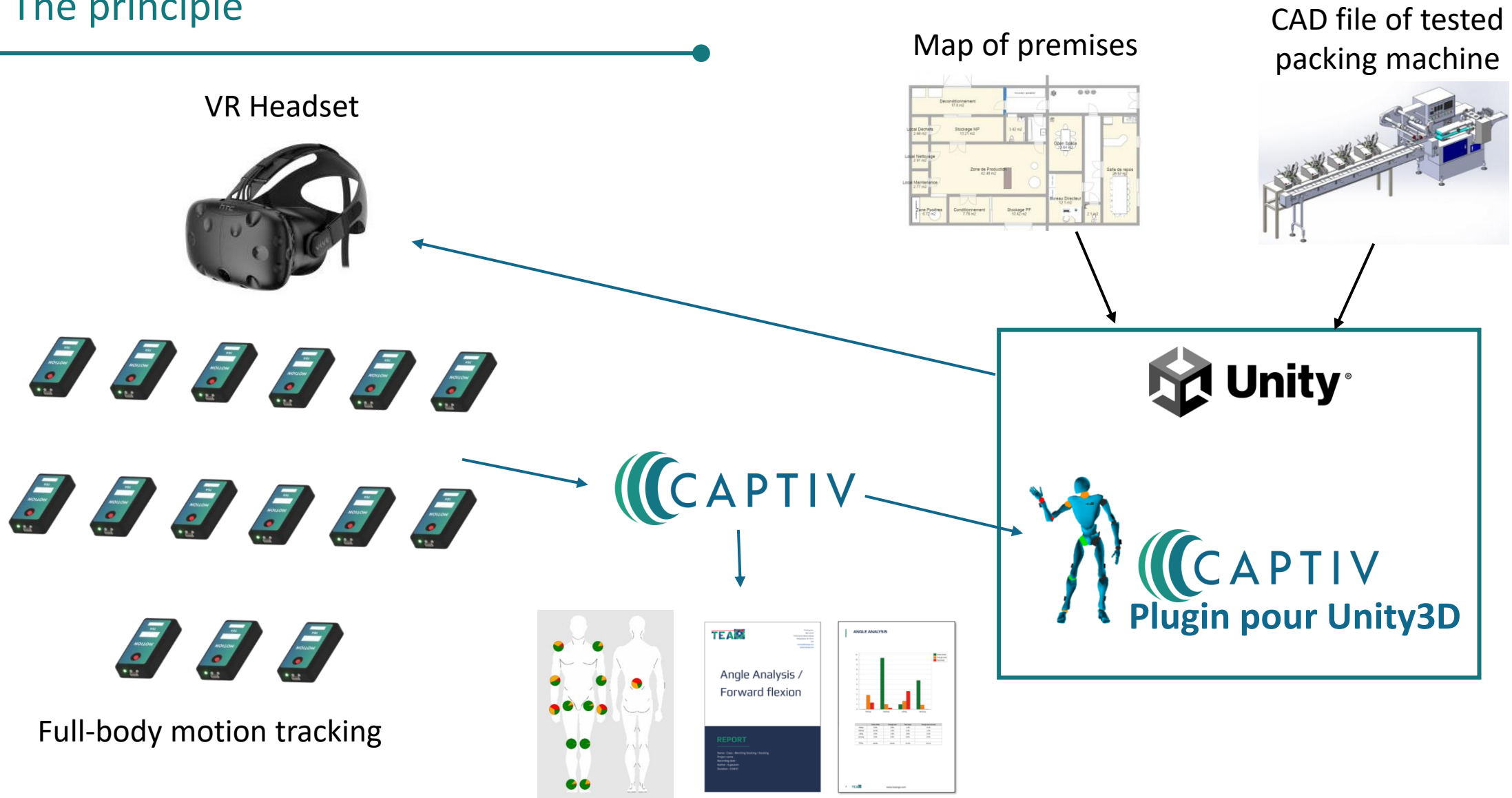
The context of the packing department



- Old building: 1898
- Aging equipment
- Cramped and cluttered workspace
- Numerous manual handling and weight carrying
- Lots of interactions with in/outgoing flows
- Pain in neck / back / shoulders / wrists



The principle





Follow this link: <https://www.youtube.com/watch?v=HRHMSxNj8bo>

Ergonomics 4.0 in Virtual Reality

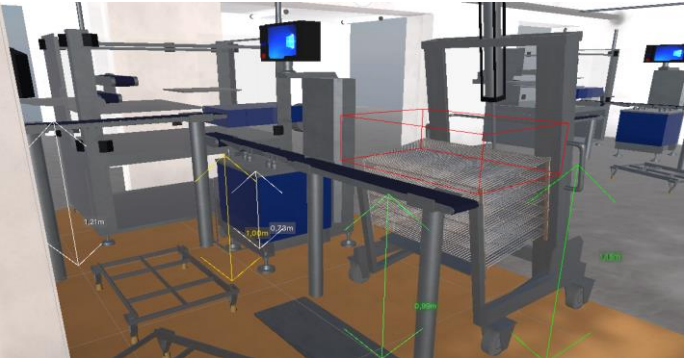
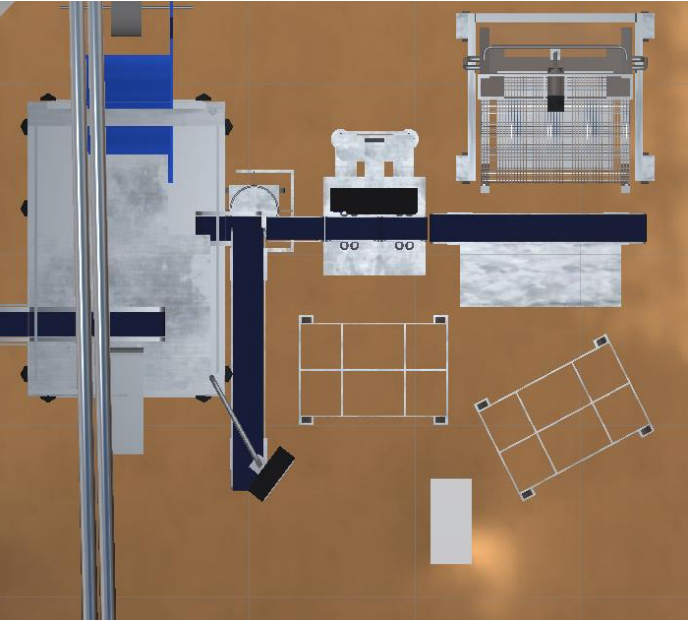
Simulation of the implementation
of a new workstation

Agro-food sector

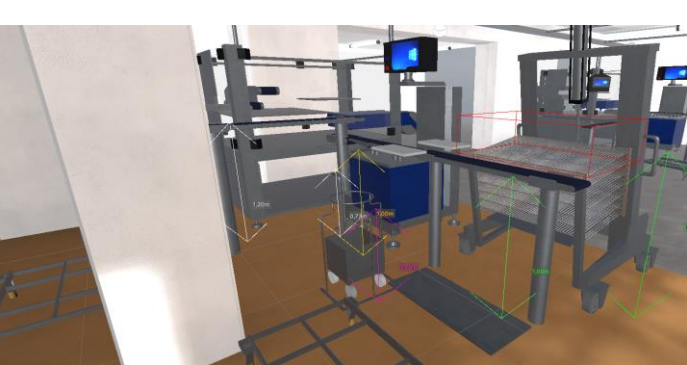
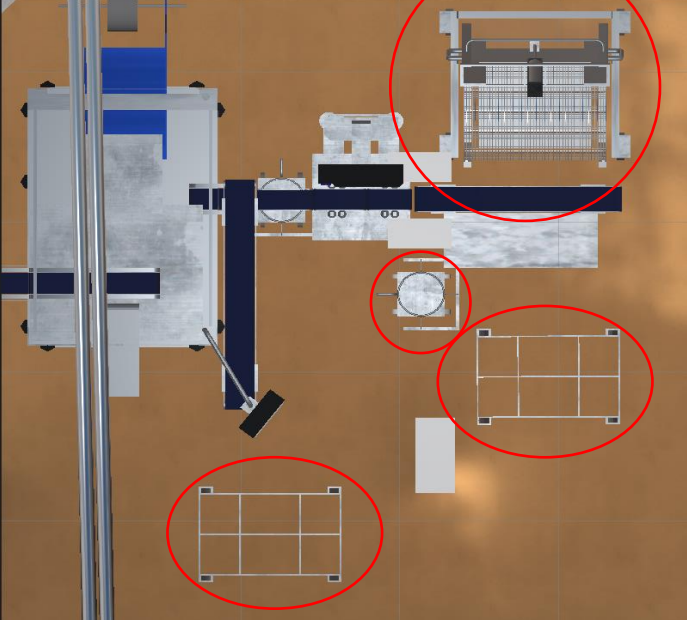




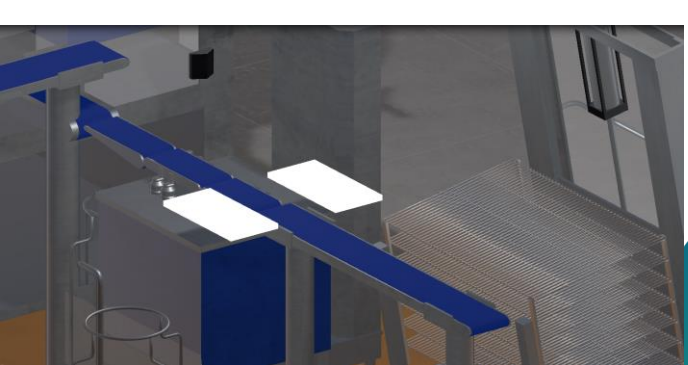
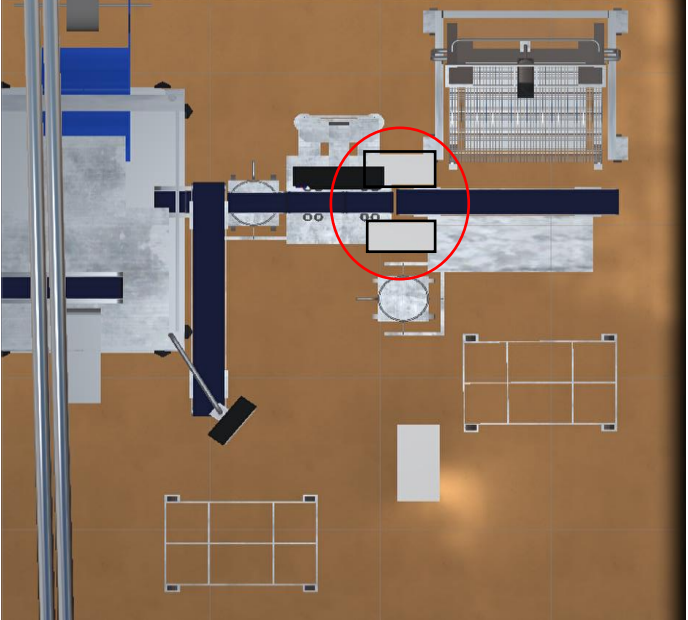
scenario 1



scenario 2



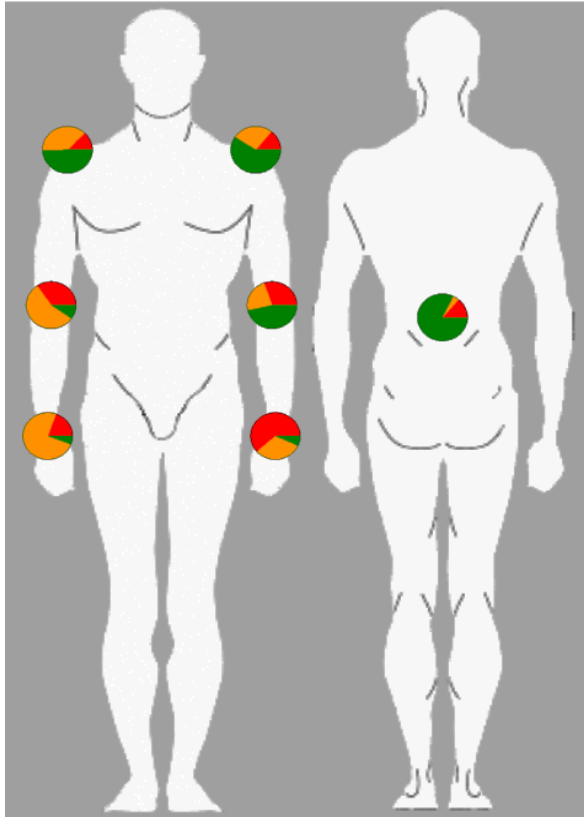
scenario 3



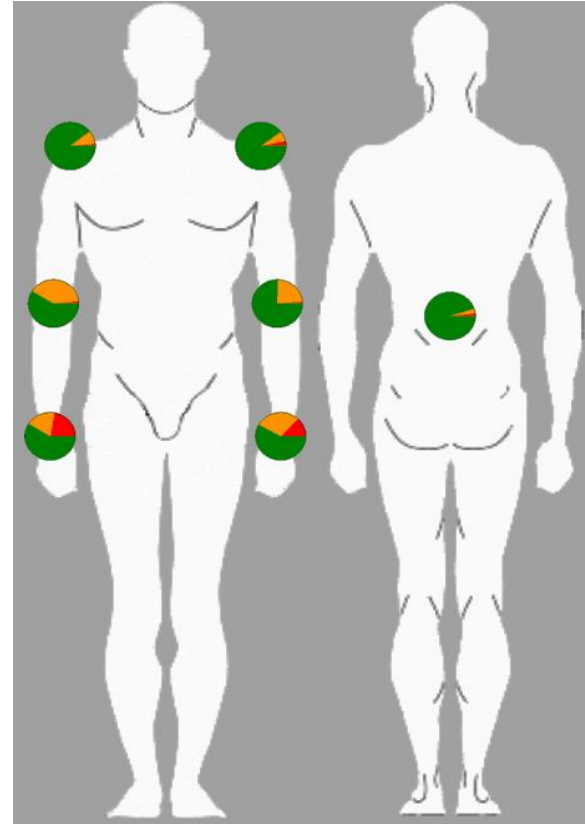
Reduction of constraints on operators



scenario 1



scenario 3





Accessibility for replacement of mechanical parts

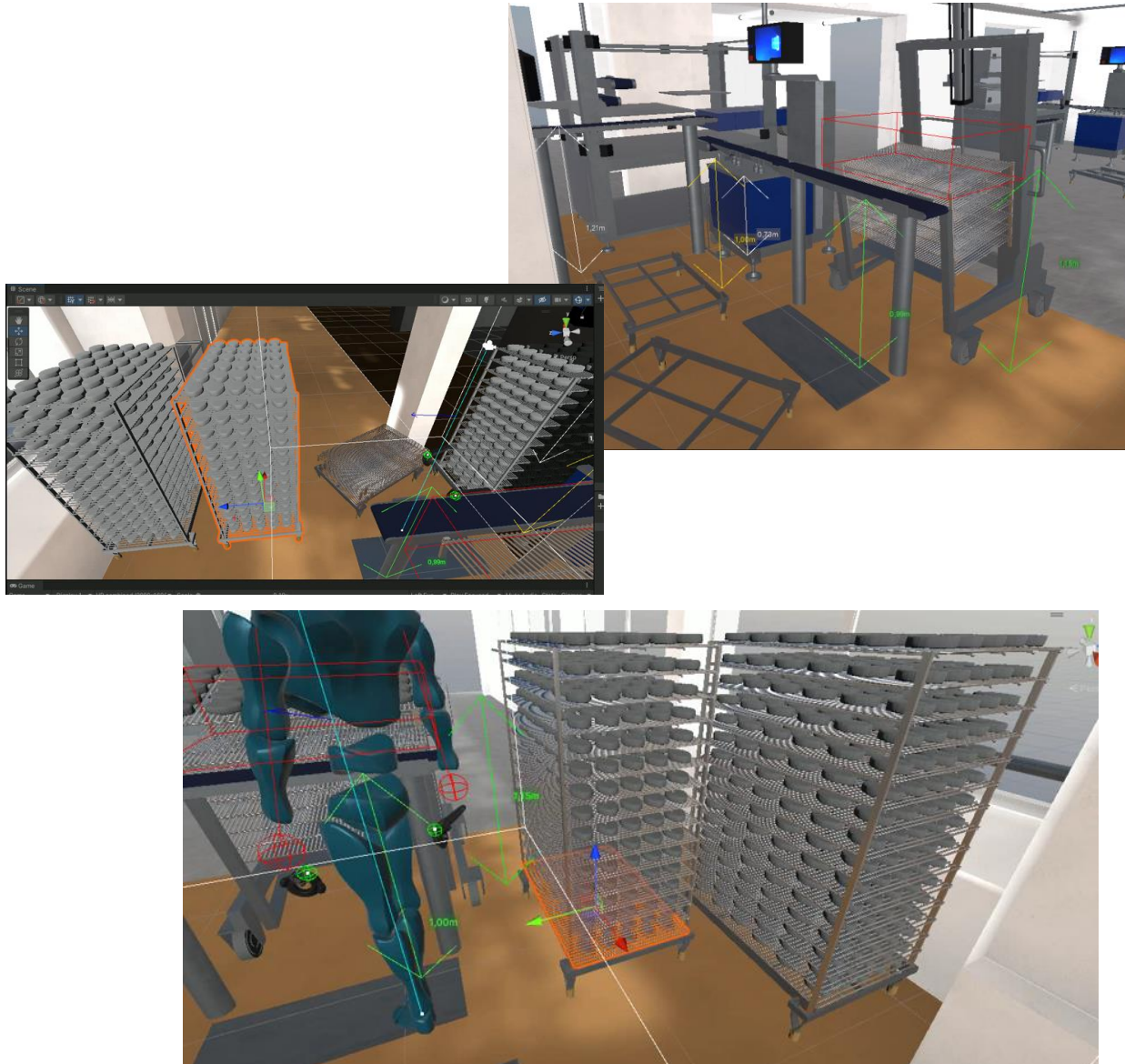
SITUATION:

Optimized setup with consideration of pillars, access ways, etc

But impossible for the Maintenance Team to access inside the machine: the doors are blocked against the wall.

SOLUTION:

Replacement of standard doors by a « roll-up » hard curtain.





www.teaergo.com

contact@teaergo.com

Stephane.folley@teaergo.com

© TEA 2026