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Co-funded by the Erasmus+ Programme of the European Union



SafeCrobot | Partners

Partners

UWE - University of the West of England Bristol (UK Lead)

CTM - Centro Tecnológico del Marmol Piedra y Materiales (Spain)

BZB - Bildungszentren des Baugewerbes e.V. (Germany)

WUST - Wrocław University of Science and Technology (Poland)

Funding

Erasmus+ (EU Commission)

Acknowledgements



Nick Bell Risk

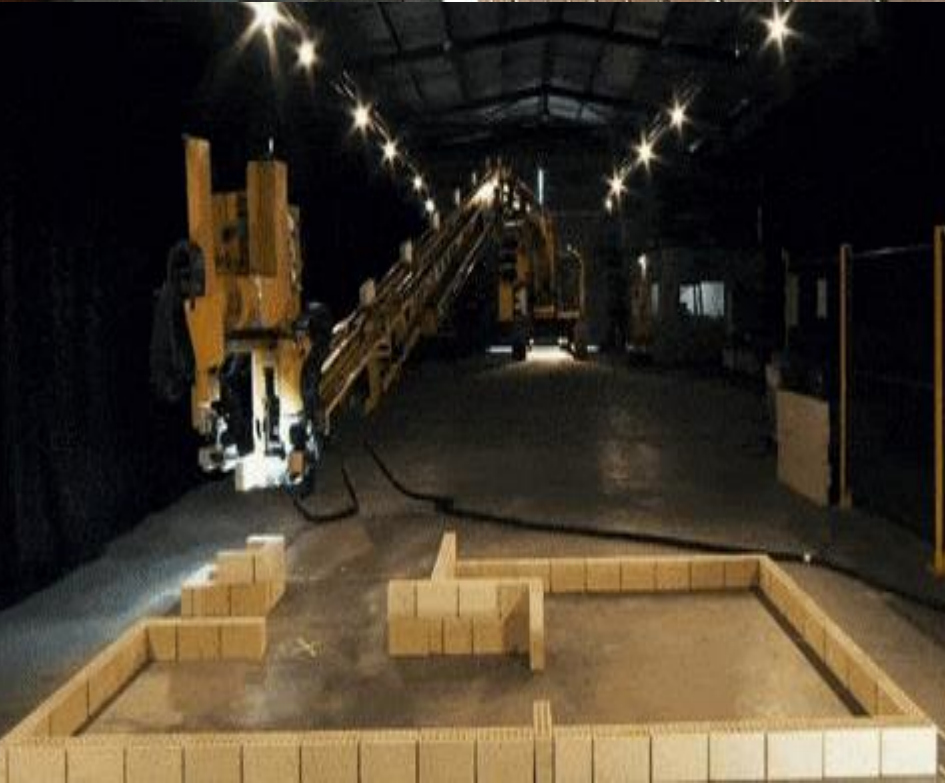
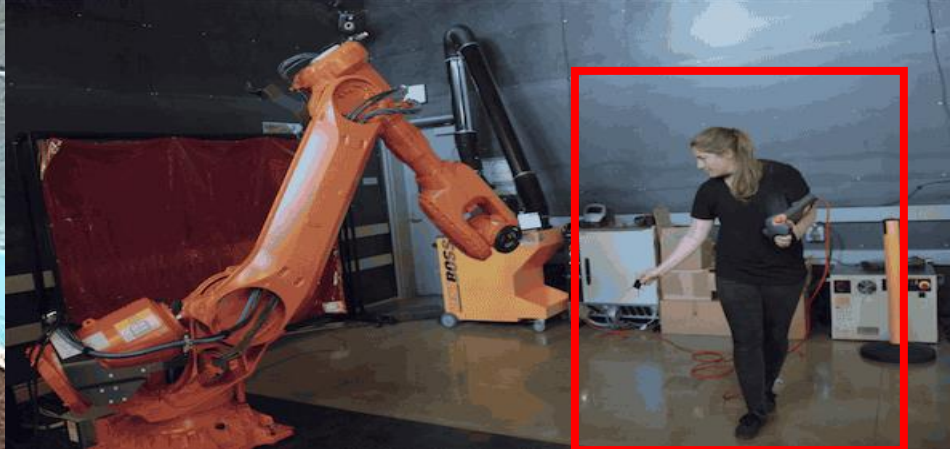
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SafeCrobot | Background

- The construction robot market is expected to be worth USD 166.4 million by 2023, growing at a CAGR of 16.8% between 2018 and 2023 1 (MarketsandMarkets.com)
- Greatest occupational safety risks in next decade will emanate from Machine-Human-Interactions (MHI) (EU-OSHA, 2016).
- More than 20% of fatal accidents is attributable to machine-human-interaction (MIA) on site within Europe (Eurostat 2014).
- Traditional construction safety training not focussed on automation and robotics





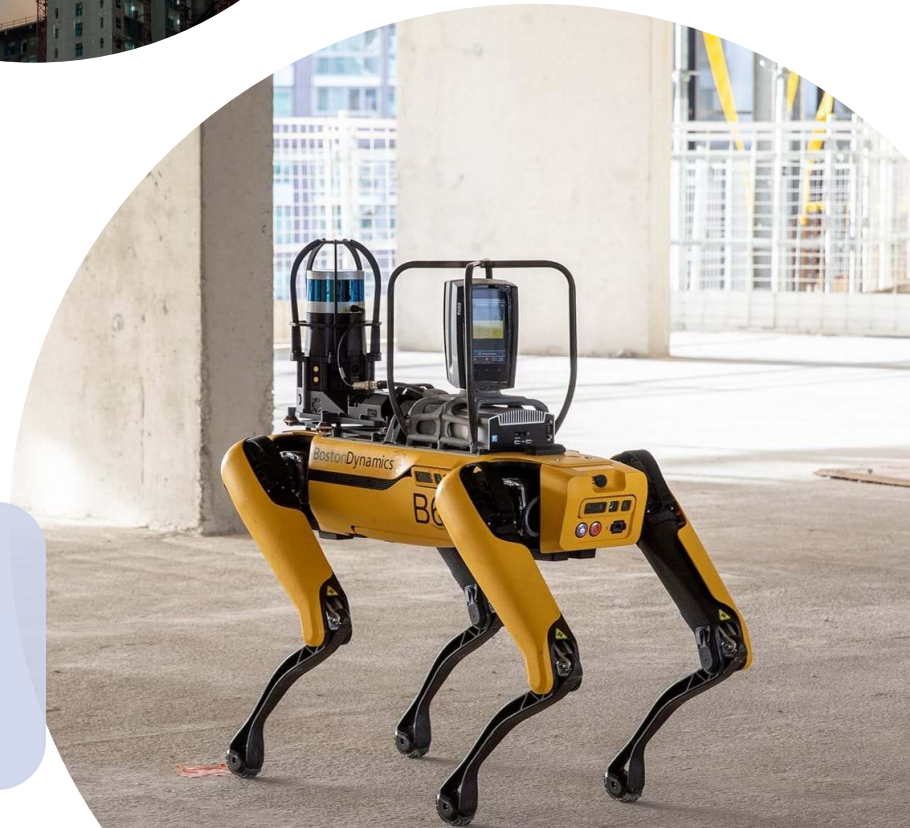
SafeCrobot | Objectives

Investigate the risks associated with robotics and autonomous machinery use in construction environments

Ascertain the sources of risks and identify scenarios specific to construction

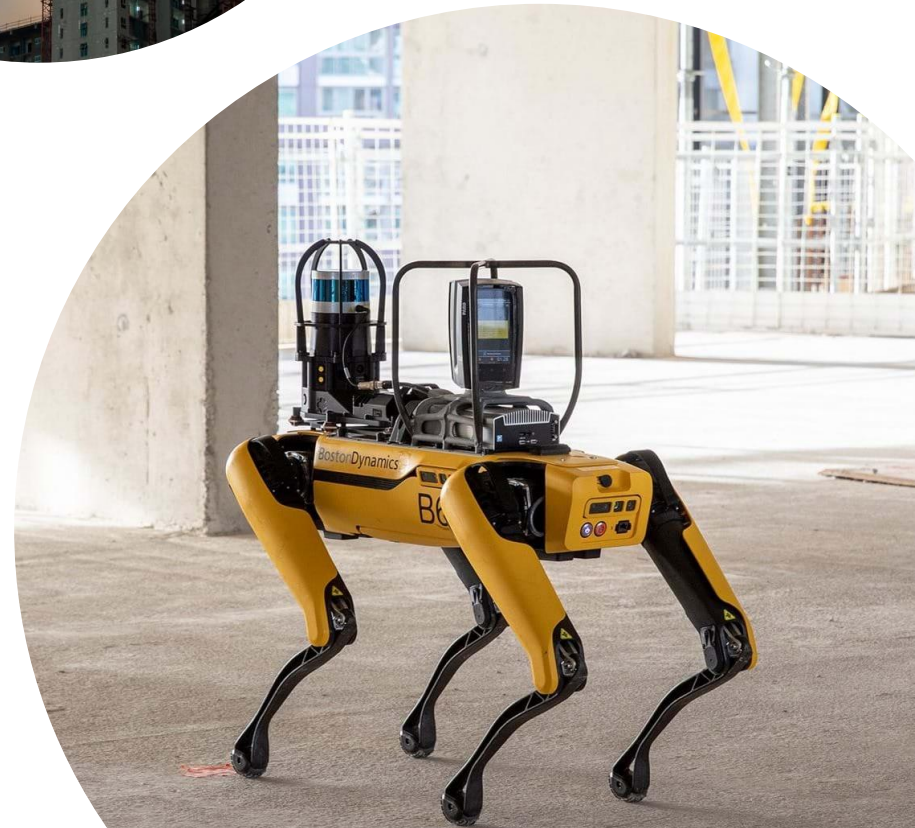
Develop innovative Virtual Reality (VR) application for simulating the risks scenarios in robotics and autonomous machinery use in construction

- Develop safety training based on VR applications
- Future work - Explore role of VR in effective safety planning for use of robotics and autonomous machinery in construction



SafeCrobot | Goals

- Provide construction workers and managers with a better understanding of risk and safety at workplace and contribute to their knowledge and use of related preventive measures and working procedures.
- Promoting an ecological approach to working methods using these new technologies (automation).
- Production of training materials in order to support to initial and continuous training of VET teachers, trainers, tutors and institution managers



SafeCrobot | Methodology

Research

Desk Studies

Expert Consultation and Workshops

Common Construction Robots Key Risk Scenarios

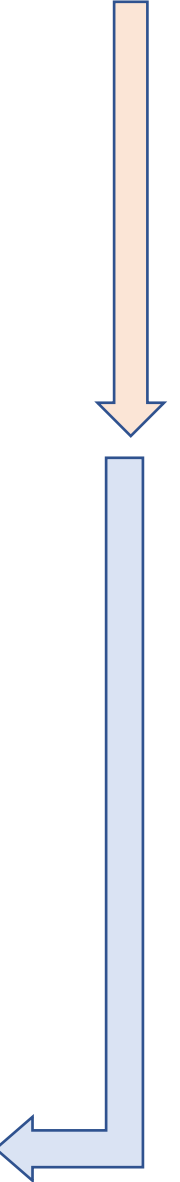
Technical Development

Virtual Reality Requirements and Approach

Static Virtual Site
Development - BIM

Dynamic Site Simulations
Gamification – Unity 3D

Sacefecrobot Virtual Reality Application



SafeCrobot | Findings



Sources of Robotics Safety Risks in Construction

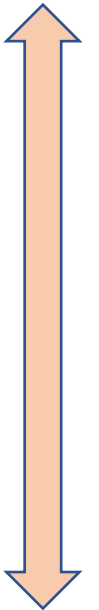
Control issues
Mechanical failure
Robot Design Failure

Robot Installation failure

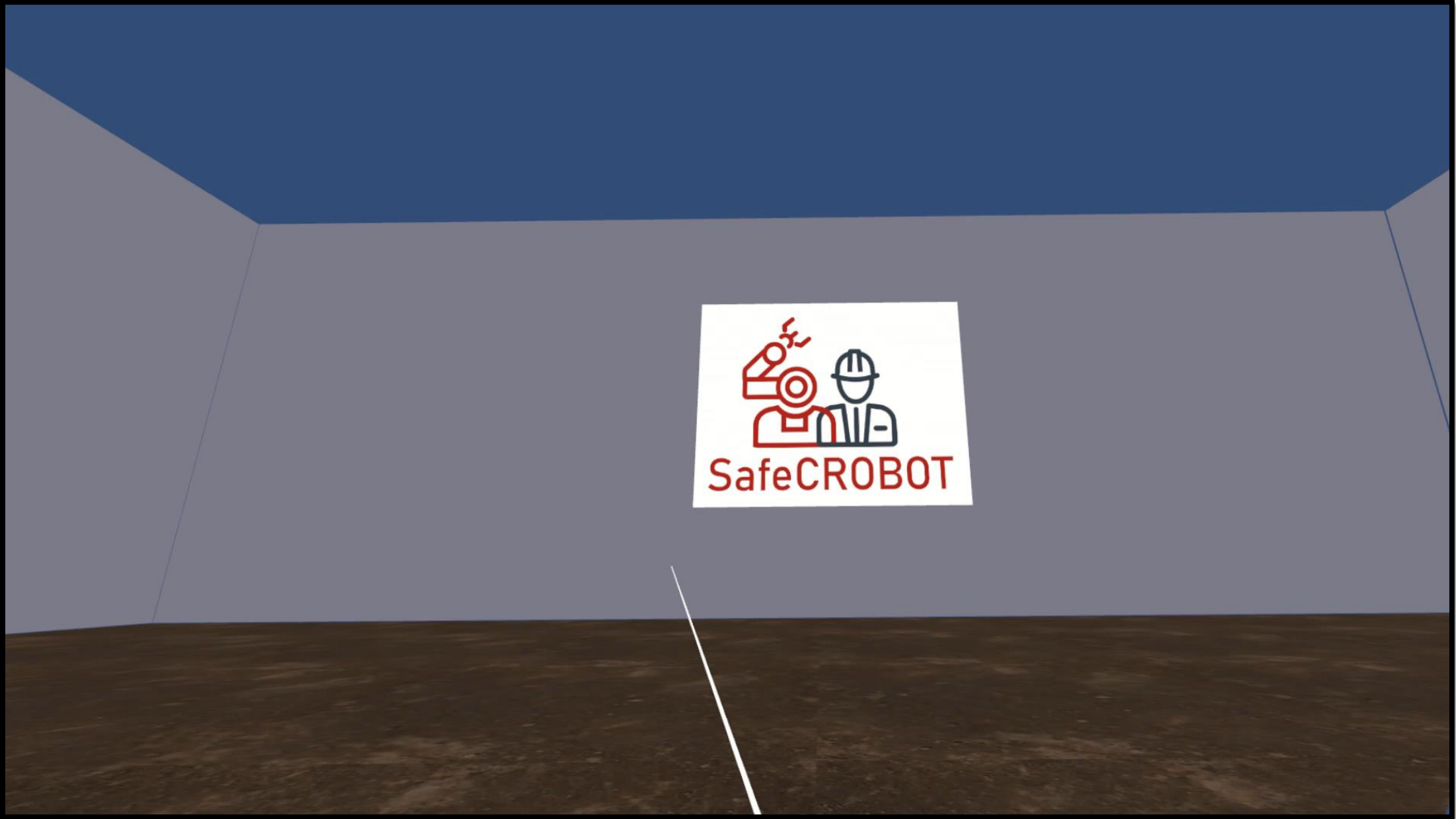
Human Error
Work design Failure
Procedural Failure
Environmental Issues

Dynamic Complex

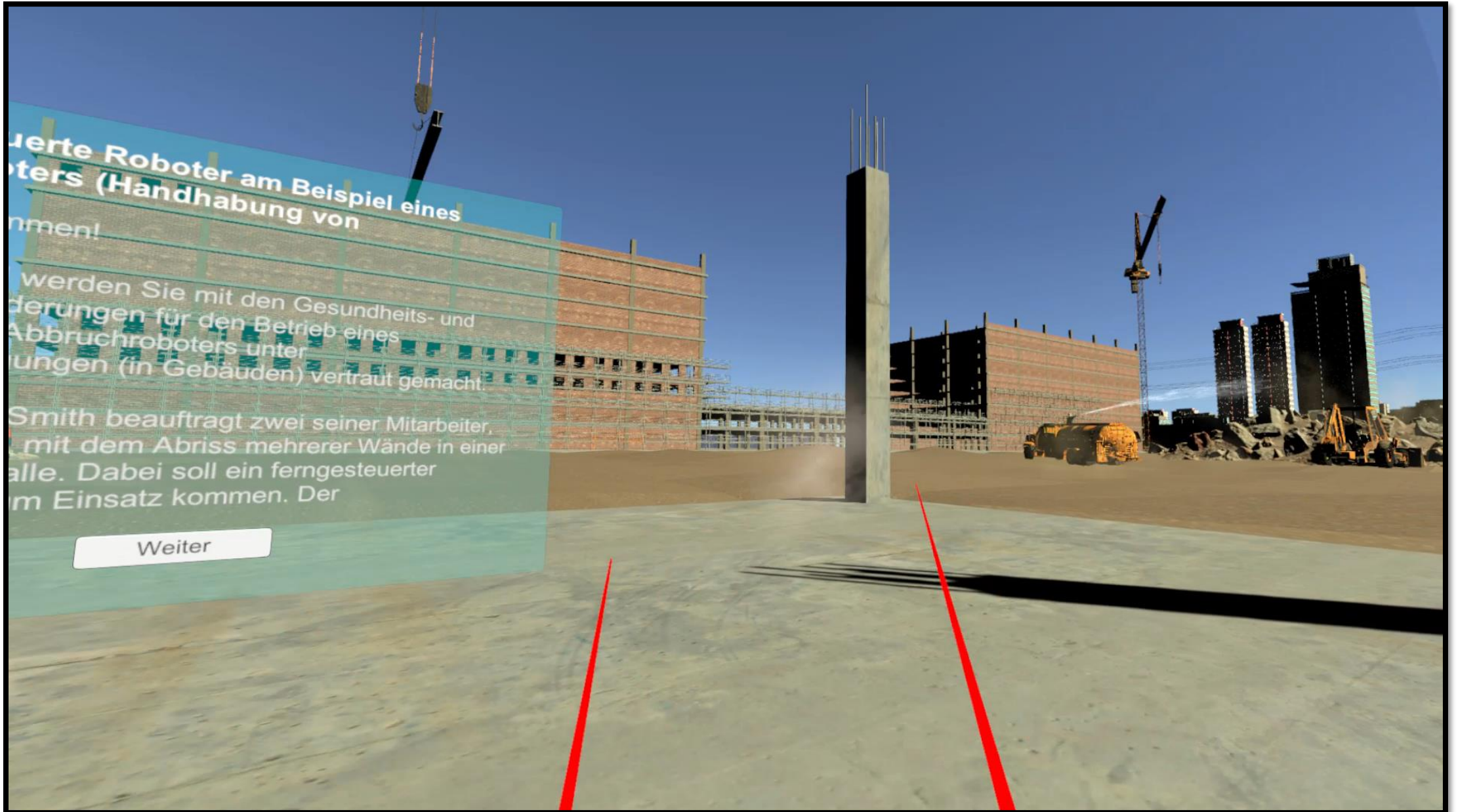
Physical Risks | Psychological Risks | Trust



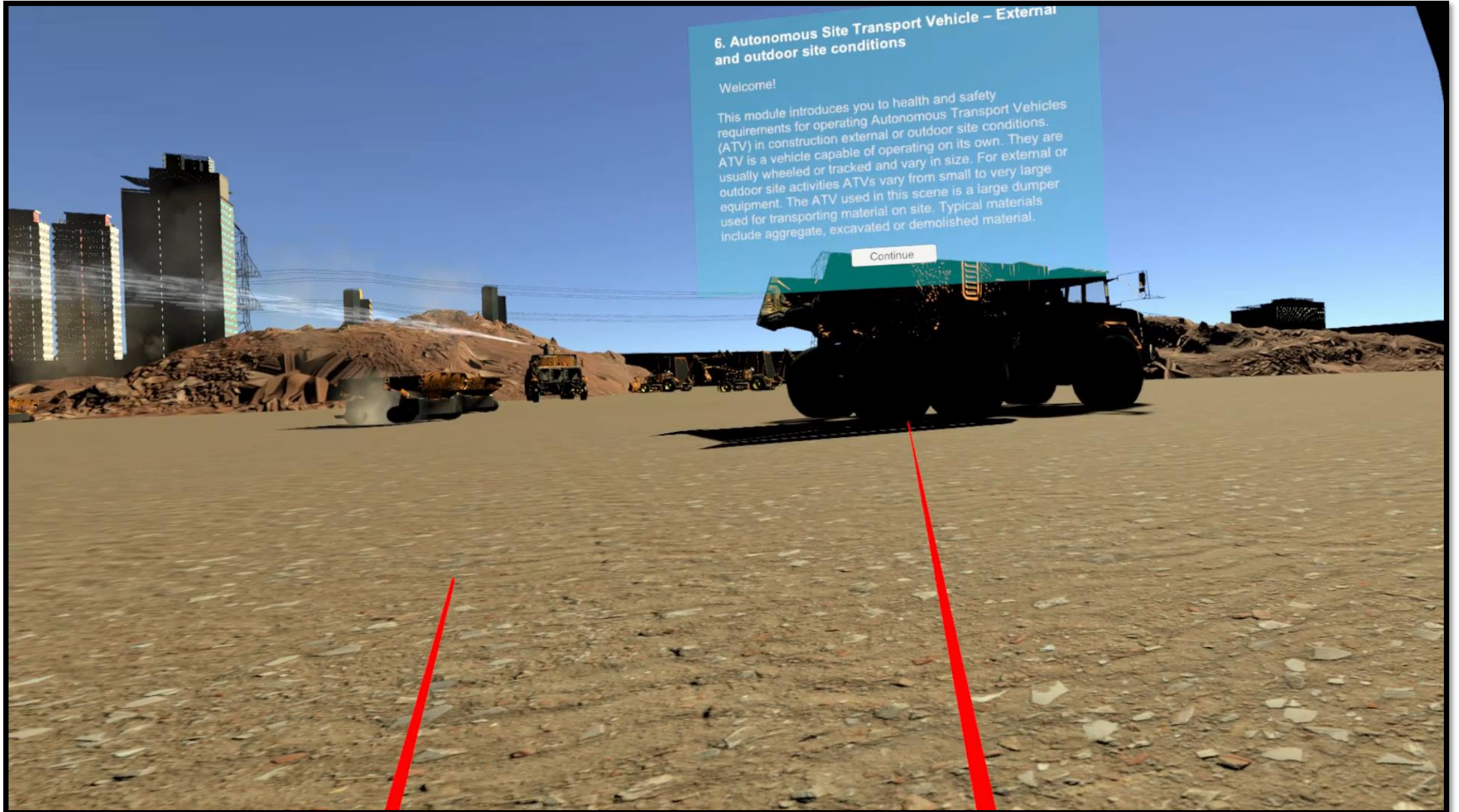
SafeCrobot | VR Demonstration



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