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EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS - EMERALD

Multiplier Event on the Experiencing of e-Learning Platform for Biomechatronics,

hosted by Bizzcom s.r.o. company, in Bucany, Slovakia
13th September 2023

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EMERALD: European network for 3D printing of biomimetic mechatronic systems
EEA & Norway Grant - Contract No. 21-COP-0019

MULTIPLIER EVENT on Experiencing of e-learning platform for bio-mechatronics

organized by BIZZCOM s.r.o. company, Slovakia

– Event agenda- 13th of September 2023

	Session 1 – EMERALD e-learning platform for bio-mechatronics
8:30	Registration of participants to the Multiplier Event
9:00	Opening and Welcome ceremony: Branislav Rabara – Director of BIZZCOM s.r.o. company (Slovakia)
9:15	EMERALD project overall presentation – progress, actions, KPIs, perspectives / details about the event – Associate Prof. Răzvan Păcurar (Technical University of Cluj-Napoca, Romania)
9:30	EMERALD main concept of the EMERALD e-learning platform for bio-mechatronics - Associate Prof. Răzvan Păcurar (Technical University of Cluj-Napoca, Romania)
9:45	EMERALD – e-learning platform for bio-mechatronics – presenting of CAD / CAE virtual laboratory room e-learning facilities - (Associate Prof. Răzvan Păcurar – Technical University of Cluj-Napoca - Romania)
10:15	EMERALD – e-learning platform for bio-mechatronics – presenting of 3D scanning and 3D printing virtual laboratory rooms e-learning facilities - (Associate Prof. Filip Gorski – Poznan University of Technology - Poland)
10:30	EMERALD – e-learning platform for bio-mechatronics – presenting of Testing and Materials characteristics virtual laboratory room e-learning facilities - (Associate Prof. Diana Băilă – University Politehnica Bucharest - Romania)
10:45	EMERALD – e-learning platform for bio-mechatronics – presenting of Sensoring, Programming and Assembling virtual laboratory rooms e-learning facilities - (Prof. Filippo Sanfilippo – University of Agder - Norway)
11:00	EMERALD – e-learning platform for bio-mechatronics – presenting of VR / AR virtual laboratory room e-learning facilities - (Martin Zelenay – BIZZCOM - Slovakia)
11:15	Conclusions about the content and future perspectives on improving the use of the EMERALD – e-learning platform for bio-mechatronics/ realizing of bio-mechatronics systems to support people with special needs (amputated arms) (Technical University of Cluj-Napoca, Romania)
11:30	Coffee break / Press conference

AGENDA

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	Session 2 – Experiencing the – EMERALD e-learning platform for bio-mechatronics / VR / AR / MR experience
12:00	Opening of the session and organizing aspects related to the EMERALD e-learning platform for bio-mechatronics experiencing / dividing in groups (Martin Zelenay – BIZZCOM (Slovakia)
12:15	Experiencing the virtual rooms of the EMERALD e-learning platform for bio-mechatronics (testing on the computer) / Experiencing of VR applications using VR googles / Experiencing AR applications using tablets /collection of feedbacks (all partners + participants to the Multiplier Event)
13:15	Conclusions about the experiencing of the EMERALD e-learning platform for bio-mechatronics and discussions related to feedbacks /aspects that are still necessary to be improved in the e-learning platform / round table discussions (Martin Zelenay – BIZZCOM (Slovakia)
13:45	Comments and discussions on the possibility of joining different projects / consortium / EU Networks - Branislav Rabara – Director of BIZZCOM s.r.o. company (Slovakia)
14:15	Closing words / ending of Multiplier Event
14:30	Lunch break

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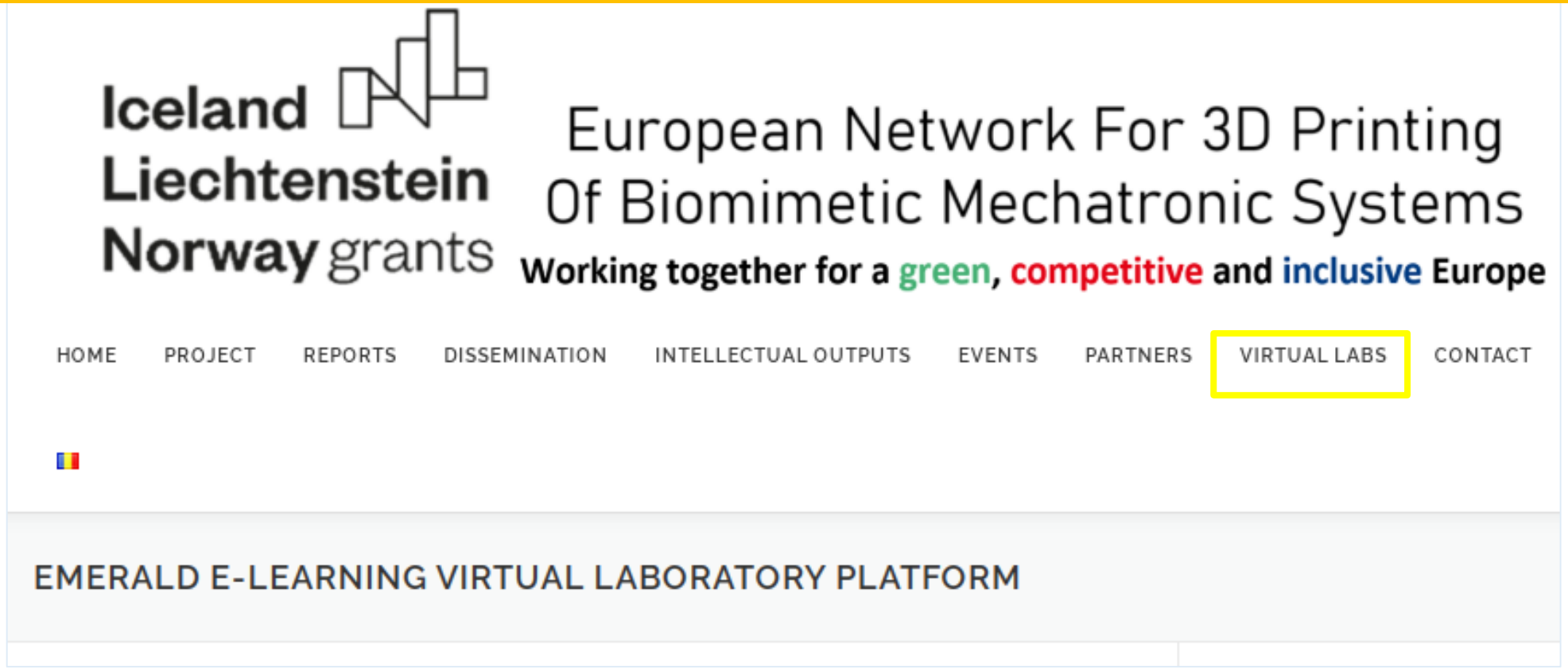
EMERALD – e-learning platform of VR / AR virtual laboratory room e-learning facilities



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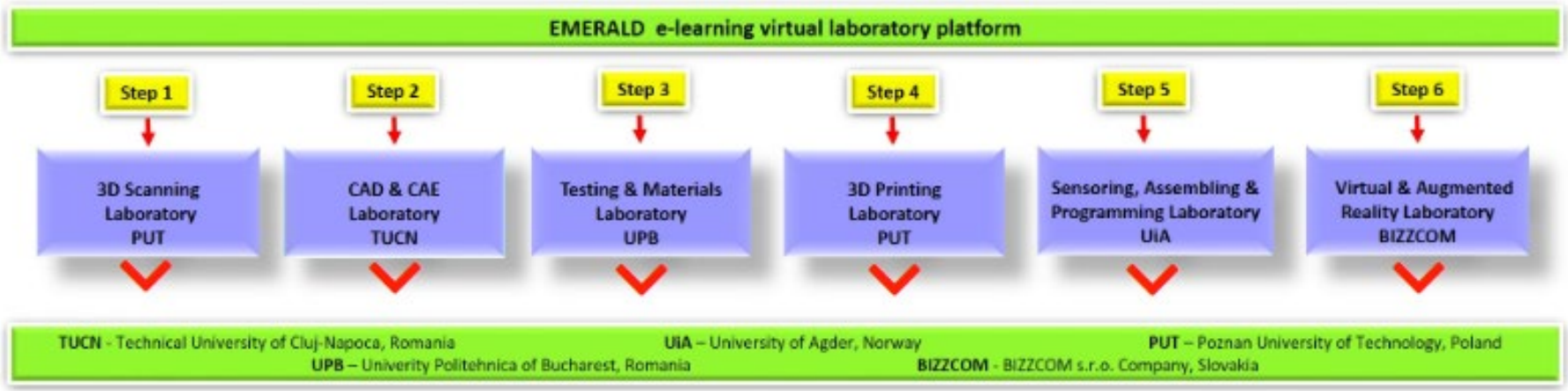
HOME | PROJECT | REPORTS | DISSEMINATION | INTELLECTUAL OUTPUTS | EVENTS | PARTNERS | VIRTUAL LABS | CONTACT

Please click on the tooltips on the diagram bellow to virtually visit our laboratories.

For a better understanding of the EMERALD e-learning virtual laboratory platform, which includes 3D scanning, CAD, CAE, testing and material characterization, 3D printing, sensorizing, assembly, programming, AR & VR, it is advisable to access the virtual laboratories by following the steps that are outlined in the diagram given below. By following the steps in the indicated order, this will lead to a more comprehensive understanding of the logical process involved in conceiving and developing of new biomimetic mechatronic systems to be realized utilizing 3D printing technologies.



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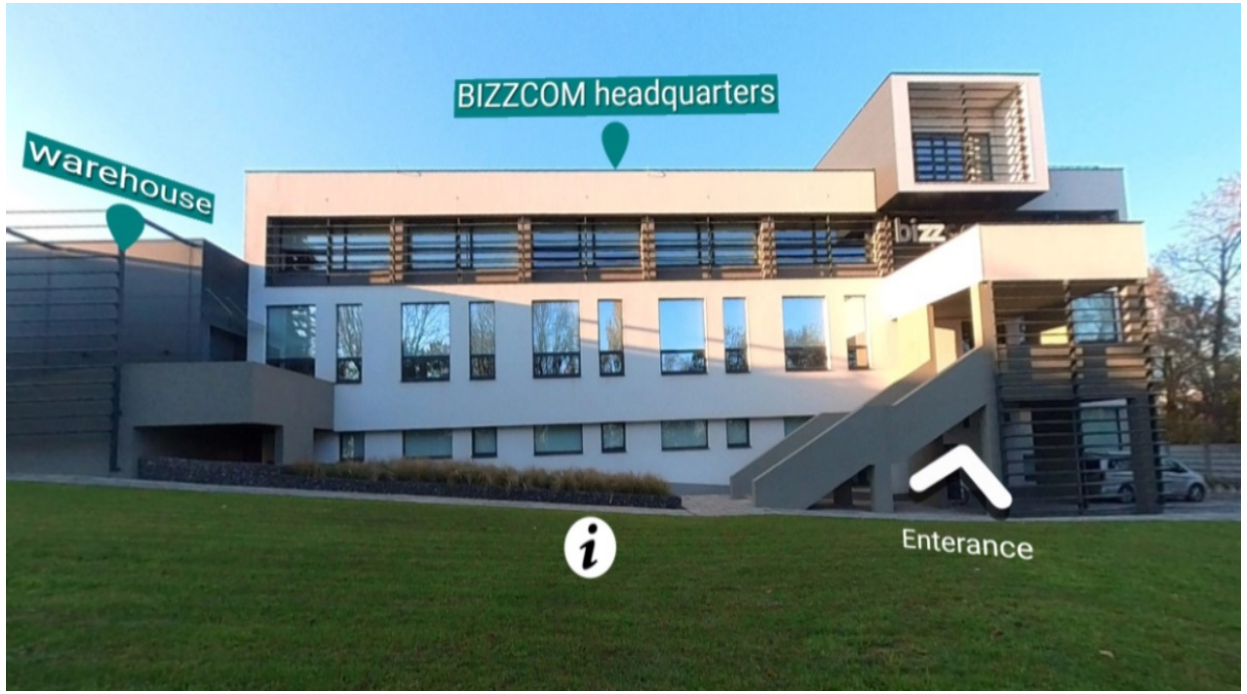
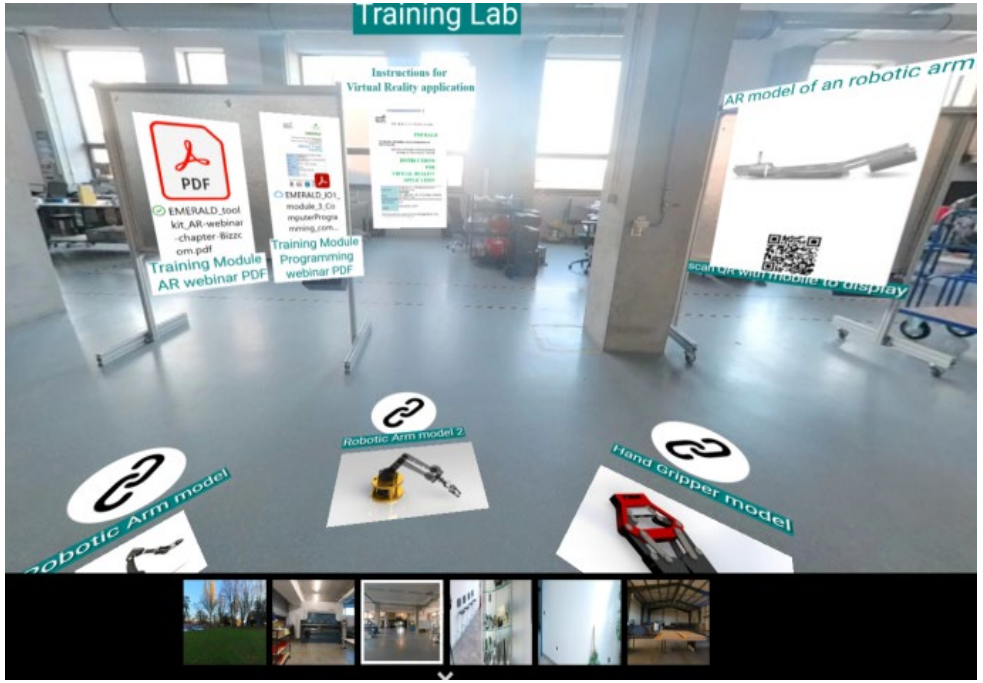
EMERALD VIRTUAL E-LEARNING PLATFORM – BIZZCOM ROOMS

EMERALD – e-learning platform for bio-mechatronics – presenting of VR / AR virtual laboratory room e-learning facilities





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EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS

MODULE 4 - VR/AR

Project Title	**European Network for 3D Printing of Biomimetic Mechatronic Systems 21-COP-0019**
Output	**IO1 - EMERALD e-book for developing of biomimetic mechatronic systems**
Module	**Module 4 – Virtual Reality & Augmented Reality**

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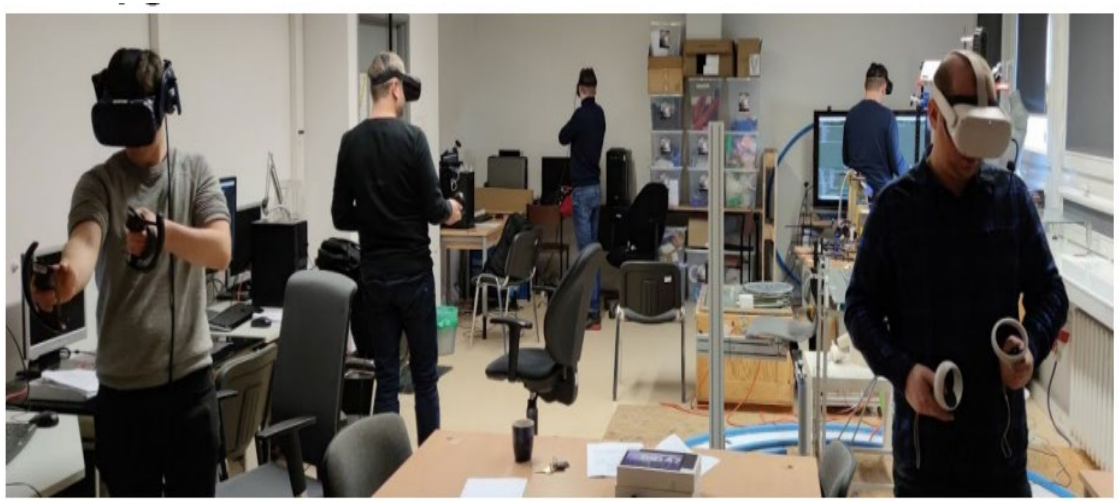
The course starts by providing introduction and additional information about the integrating and use of extended reality (XR) technologies in the biomedical field. In providing a foundational understanding of XR, in the beginning there are needed to be clarified few of the most important key concepts of XR, such as:

-Virtual Reality (VR): This technology creates a completely artificial digital environment that users can experience and interact with as if it were real.

-Augmented Reality (AR): AR overlays digital content on the user's view of the real world, enhancing one’s perception with additional information.

-Mixed Reality (MR): MR merges real and virtual worlds to produce new environments where physical and digital objects coexist and interact in real-time.



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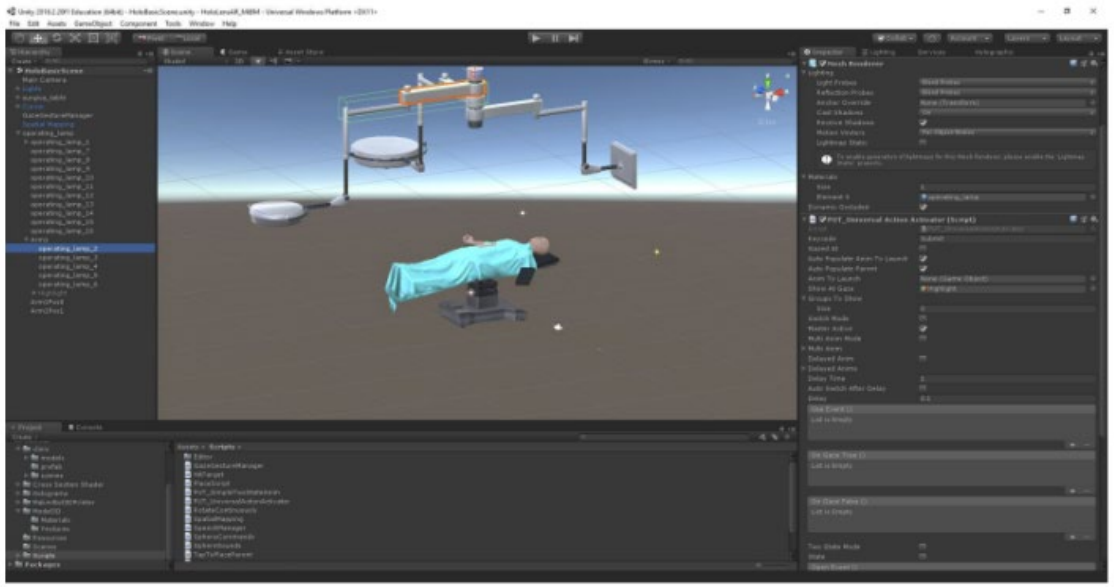
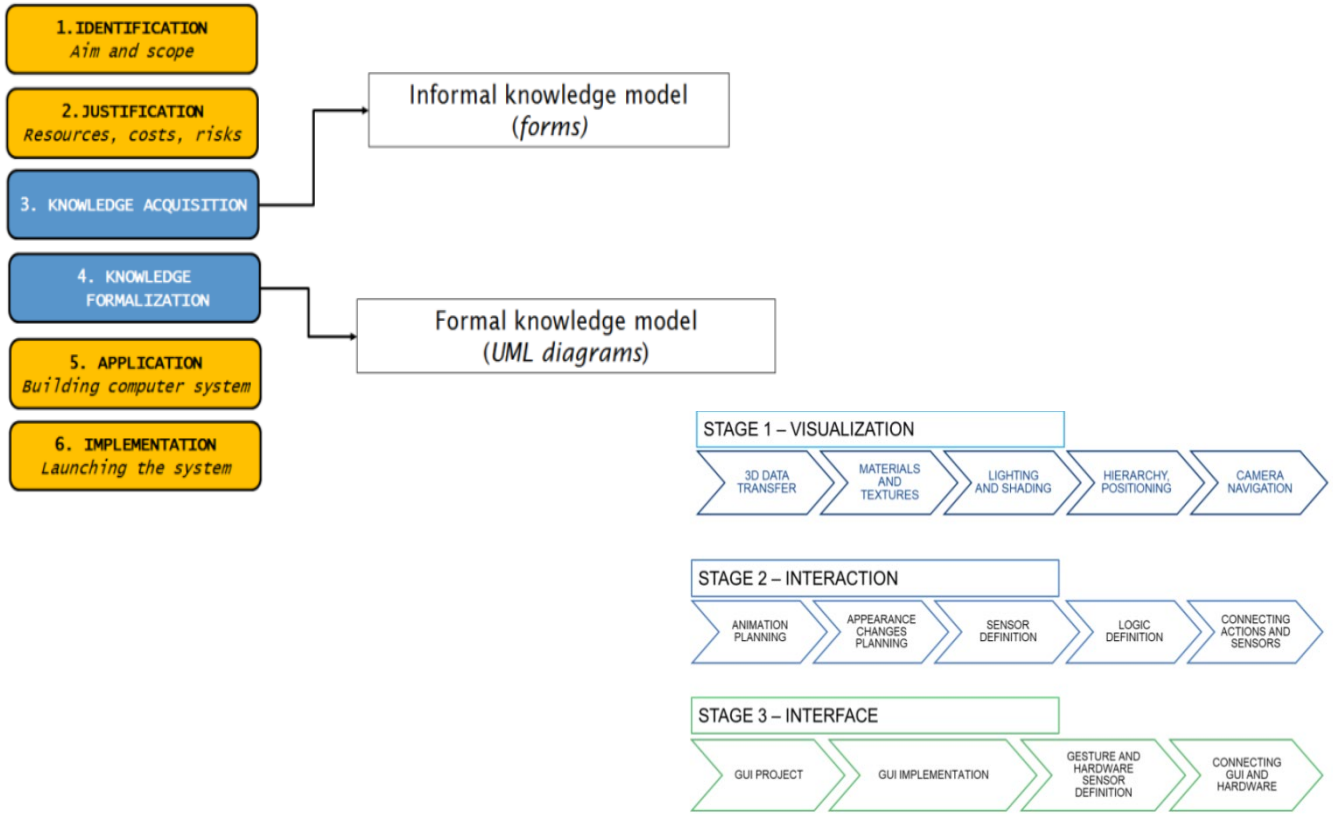
Example of a VR application realized using a dedicated software for VR called Unity





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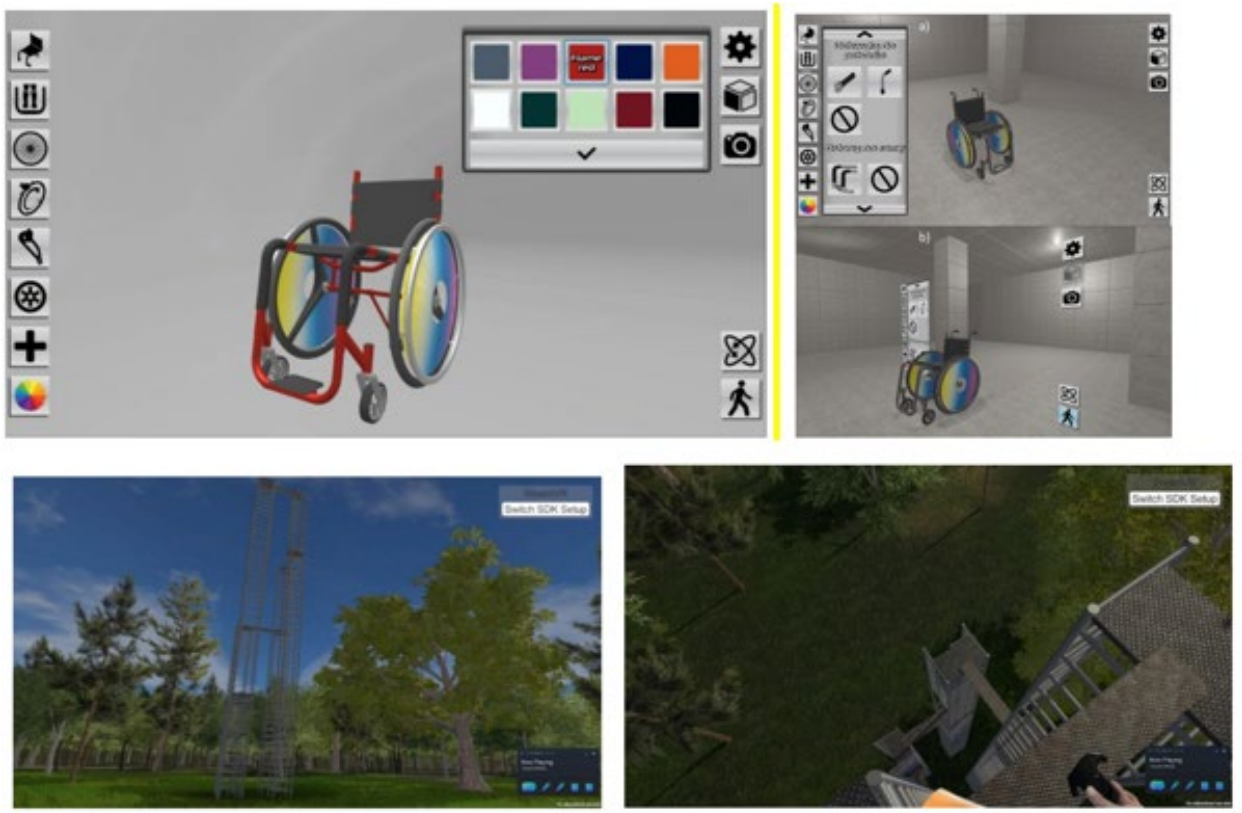
Good practice examples of using VR for medical applications



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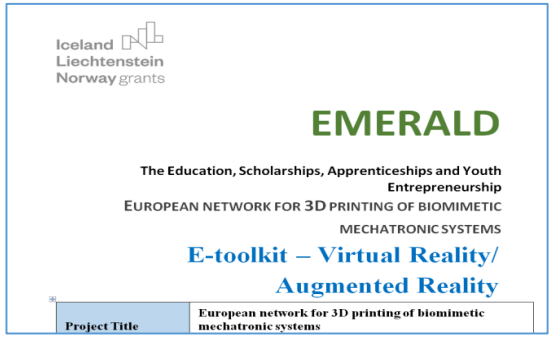

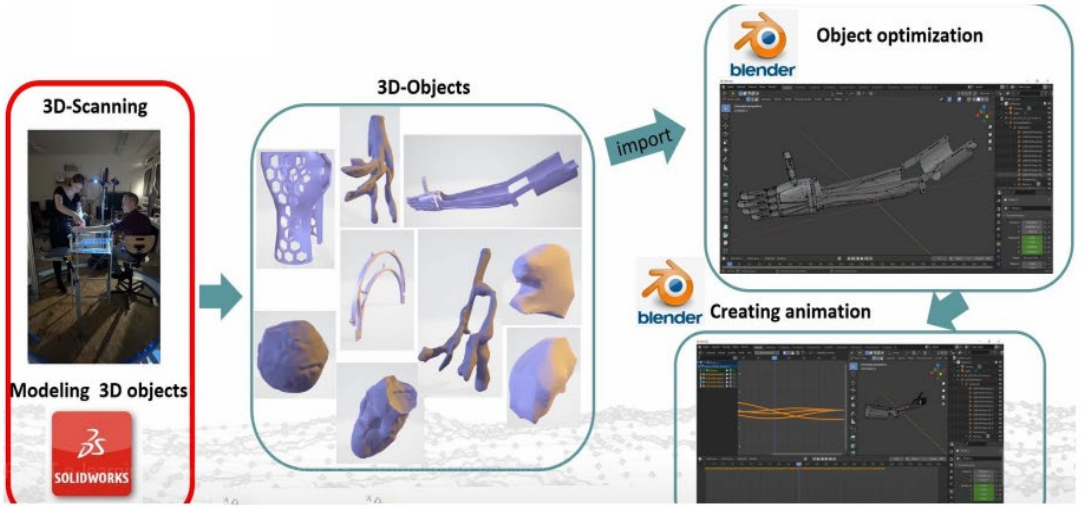

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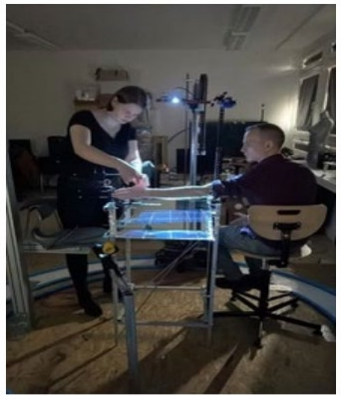
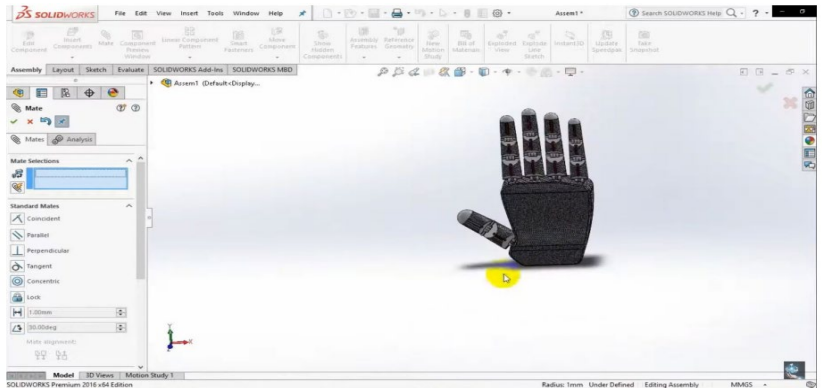
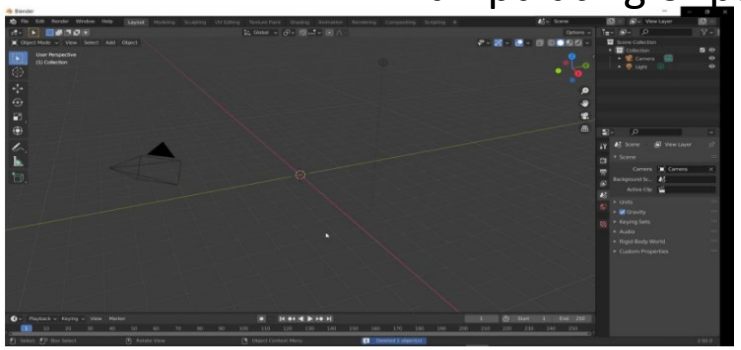
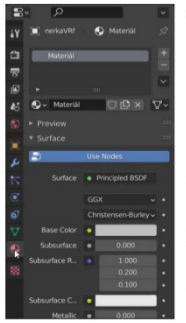
3D scanning or 3D part realized by modeling in CAD software

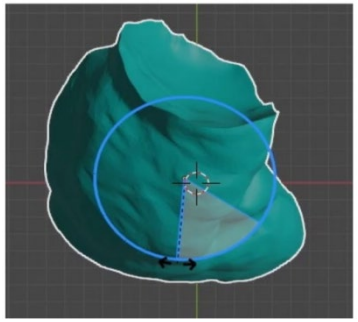


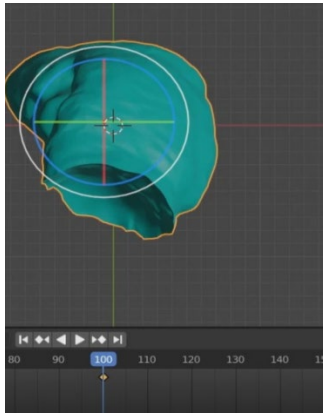


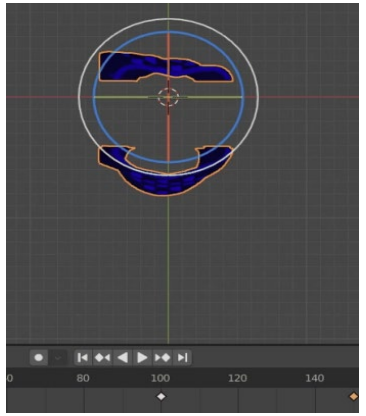
Importing the model, assigning materials / colors and manipulating of parts in Blender

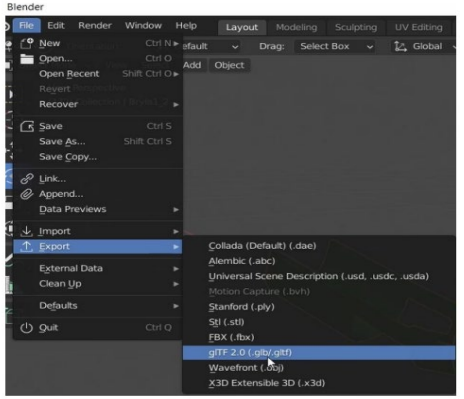












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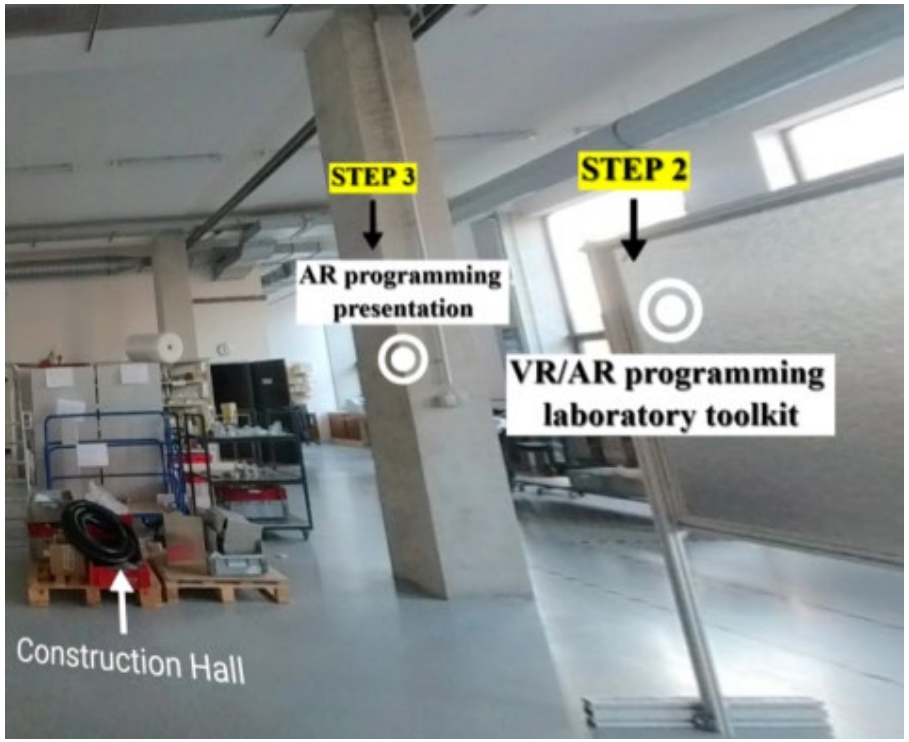

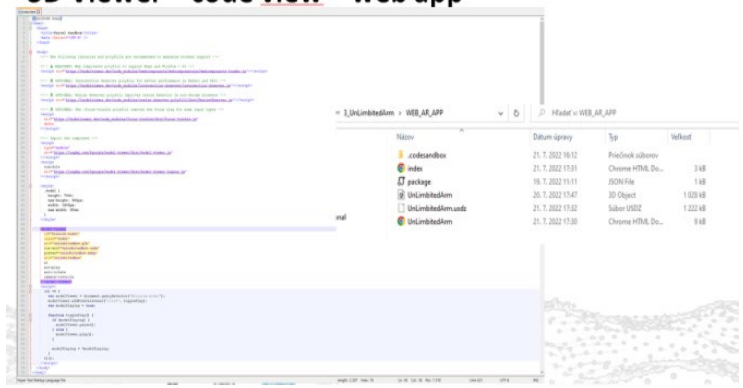

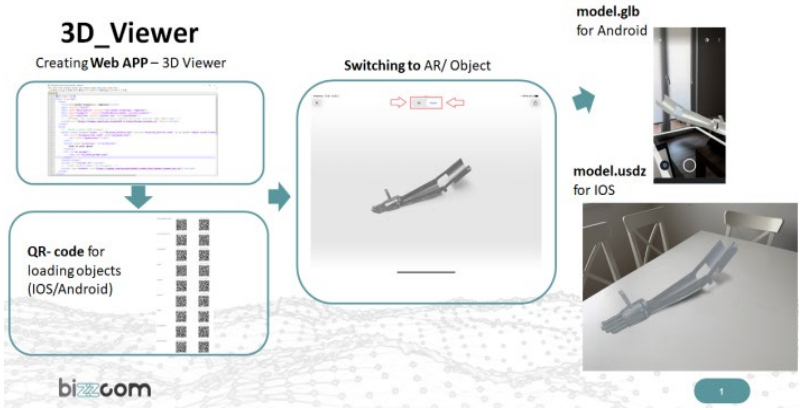

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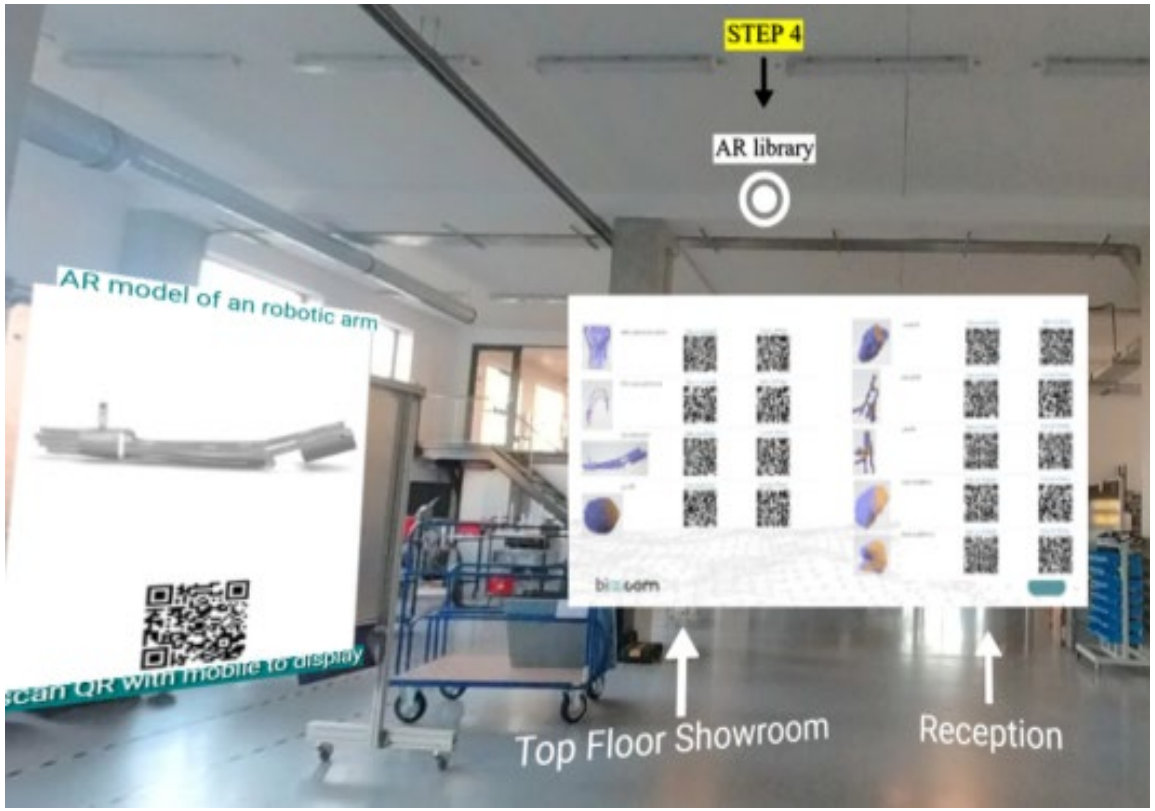
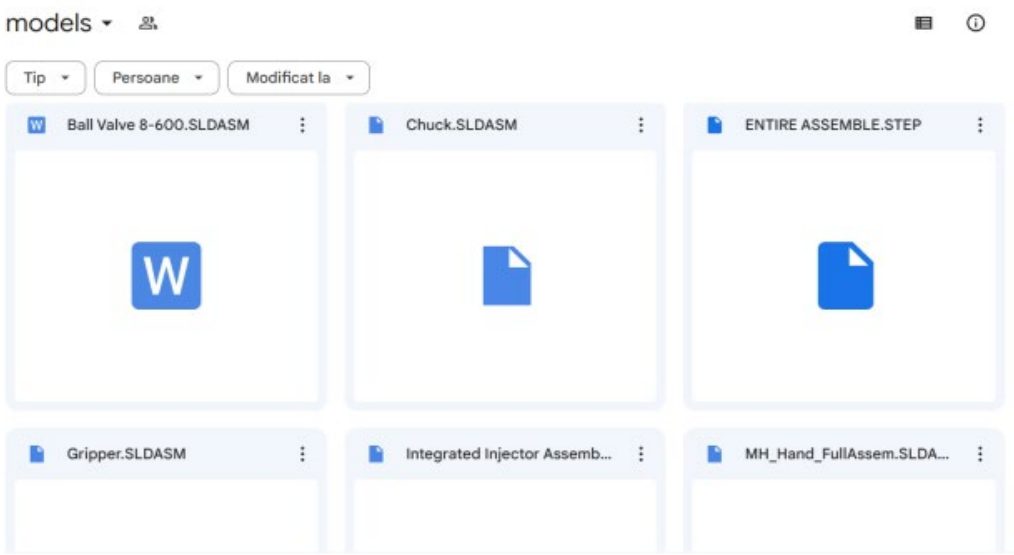
AR applications and AR library





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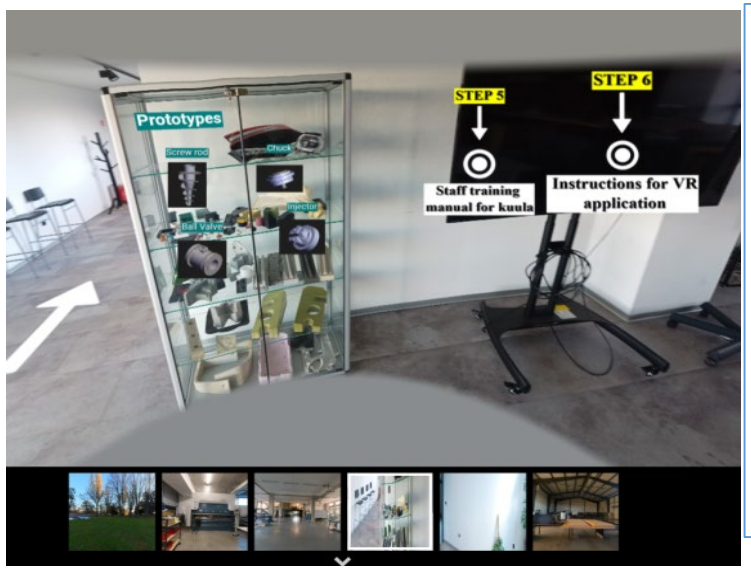

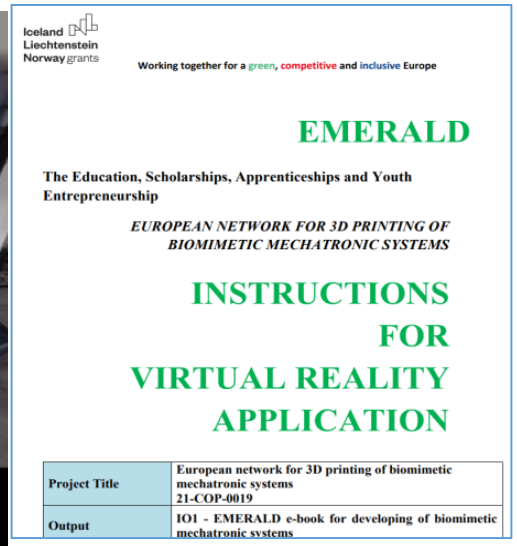
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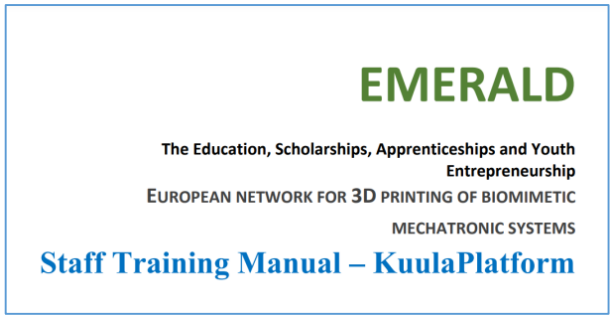
EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS

INSTRUCTIONS FOR VIRTUAL REALITY APPLICATION

Project Title	European network for 3D printing of biomimetic mechatronic systems 21-COP-0019
Output	IO1 - EMERALD e-book for developing of biomimetic mechatronic systems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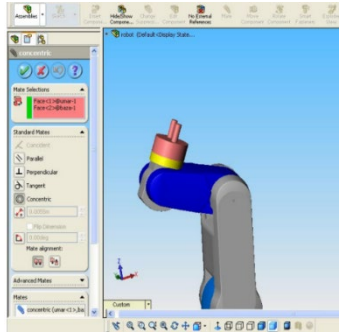
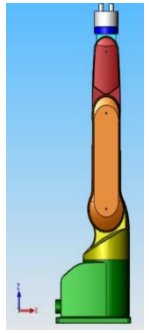
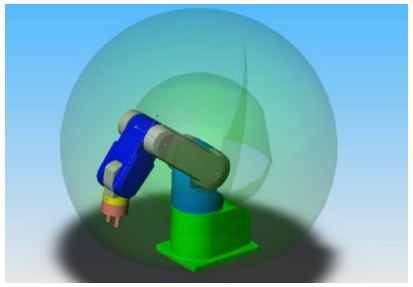
EUROPEAN NETWORK FOR 3D PRINTING OF BIOMIMETIC MECHATRONIC SYSTEMS

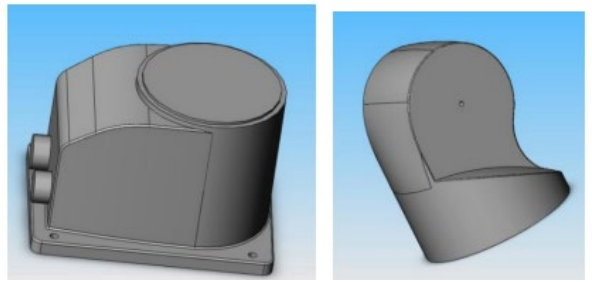
Staff Training Manual – KuulaPlatform

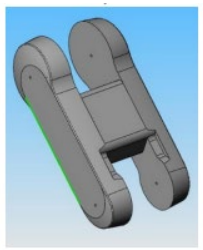


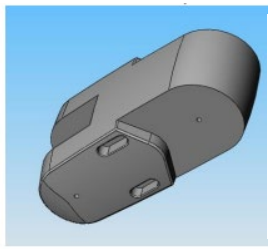


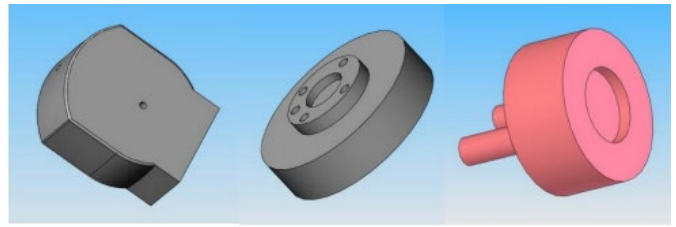
CAD modeling of the components of a robotic arm using SolidWorks program











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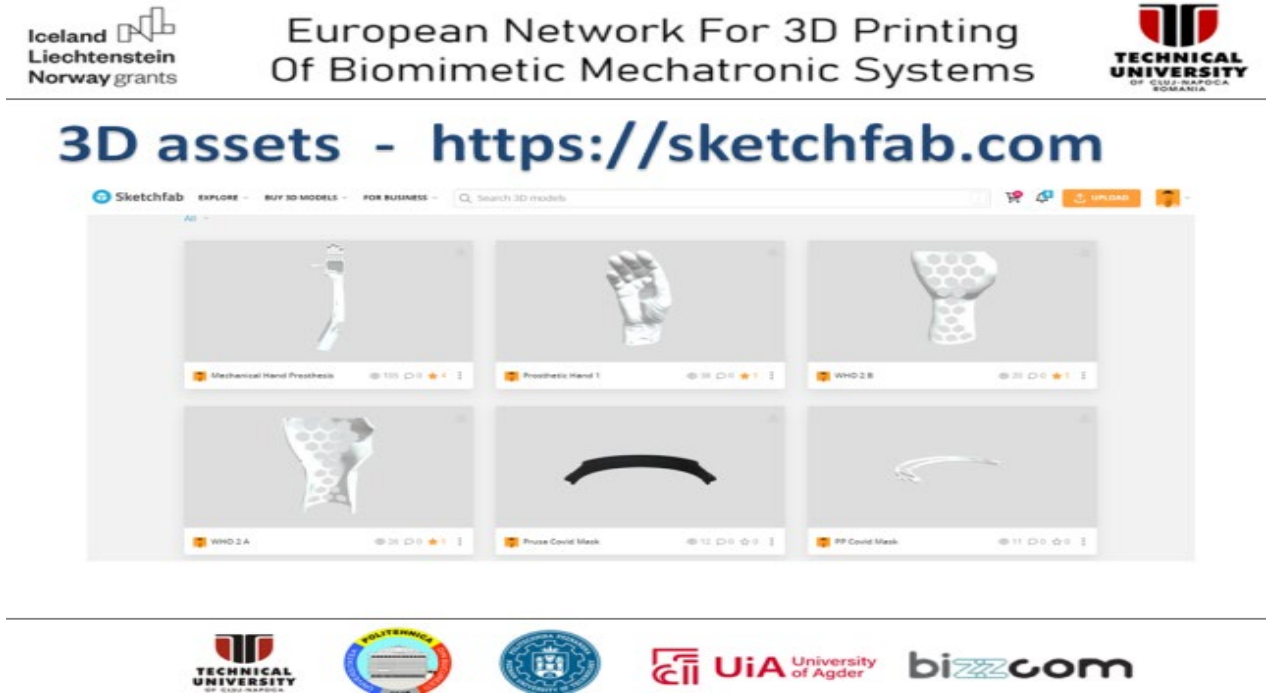
Application realized for visualizing models in VR using GLTF mode



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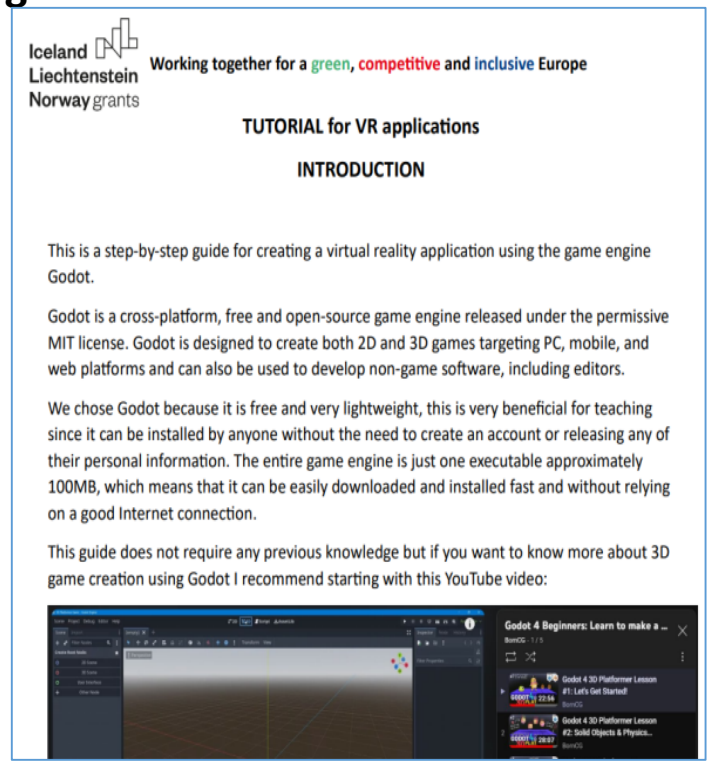
VR library integrated in VR / AR laboratory of e-learning platform

Good practice application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TUTORIAL for VR applications

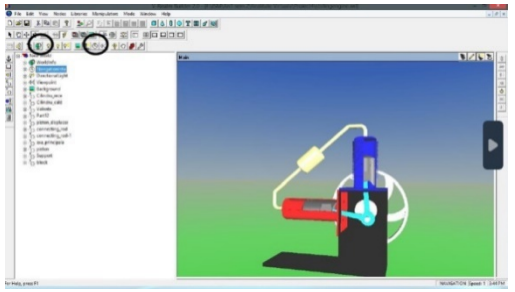
INTRODUCTION

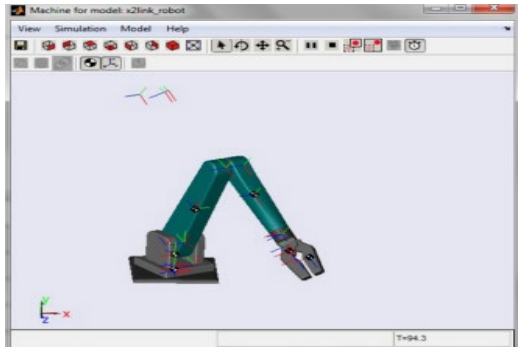
This is a step-by-step guide for creating a virtual reality application using the game engine Godot.

Godot is a cross-platform, free and open-source game engine released under the permissive MIT license. Godot is designed to create both 2D and 3D games targeting PC, mobile, and web platforms and can also be used to develop non-game software, including editors.

We chose Godot because it is free and very lightweight, this is very beneficial for teaching since it can be installed by anyone without the need to create an account or releasing any of their personal information. The entire game engine is just one executable approximately 100MB, which means that it can be easily downloaded and installed fast and without relying on a good Internet connection.

This guide does not require any previous knowledge but if you want to know more about 3D game creation using Godot I recommend starting with this YouTube video:





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CONCLUSIONS

The materials contained in the Virtual Platform regarding XR present a unique opportunity for any student to get familiarized with the newest possibilities in building Virtual, Mixed and Augmented Reality applications concerning development of customized biomechatronic orthopedic and prosthetic devices. The comprehensive, detailed instruction tutorials presented allow the students to get a grip on the programming methods and possible use Great expertise of authors of the materials (coming from Poznan University of Technology) brings possibilities to learn a great deal about the VR mostly by practicing building software in well-known, industry standard Unity Engine. Such a course is unprecedented and unavailable at any other e-learning platform. It is also well complemented with the basic VR/AR course contained in the Bizzcom Virtual Laboratory, altogether presenting a wide spectrum of possibilities of building applications and using these cutting-edge technologies.

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