

Day 2 - Wednesday 19th April 2023

09:00-1030 Session 5: Development Tools for Virtual Reality Training

*Interactive 360-degree videos as an alternative to CBT
in pilot and maintenance personnel training*



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Disclaimer: Unless clearly cited and referenced, all views presented in the following slides are my opinion and not necessarily reflect the views of any of the organisations I am involved in or associated with or work for.

CONCEPTS - 'Virtual Reality', 'Augmented Reality', 'Mixed Reality'

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The impact of virtual, augmented and mixed reality technologies on the customer experience



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Presence
Interactivity
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ABSTRACT

The arrival of Virtual-Reality, Augmented-Reality, and Mixed-Reality technologies is shaping a new environment where physical and virtual objects are integrated at different levels. Due to the development of portable and embodied devices, together with highly interactive, physical-virtual connections, the customer experience landscape is evolving into new types of hybrid experiences. However, the boundaries between these new realities, technologies and experiences have not yet been clearly established by researchers and practitioners. This paper aims to offer a better understanding of these concepts and integrate technological (embodiment), psychological (presence), and behavioral (interactivity) perspectives to propose a new taxonomy of technologies, namely the “EPI Cube”. The cube allows academics and managers to classify all technologies, current and potential, which might support or empower customer experiences, but can also produce new experiences along the customer journey. The paper concludes with theoretical and managerial implications, as well as a future research agenda.

CONCEPTS - 'Virtual Reality', 'Augmented Reality', 'Mixed Reality'

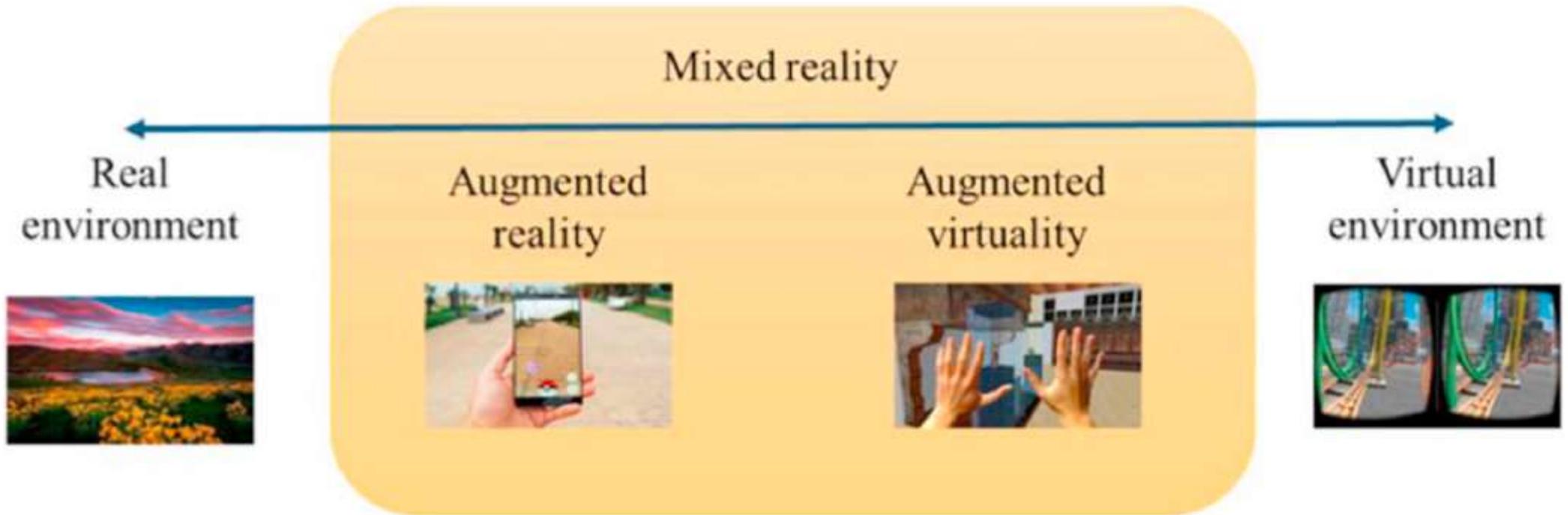


Fig. 1. Reality-virtuality continuum (Milgram & Kishino, 1994).

CONCEPTS - 'Virtual Reality', 'Augmented Reality', 'Mixed Reality'

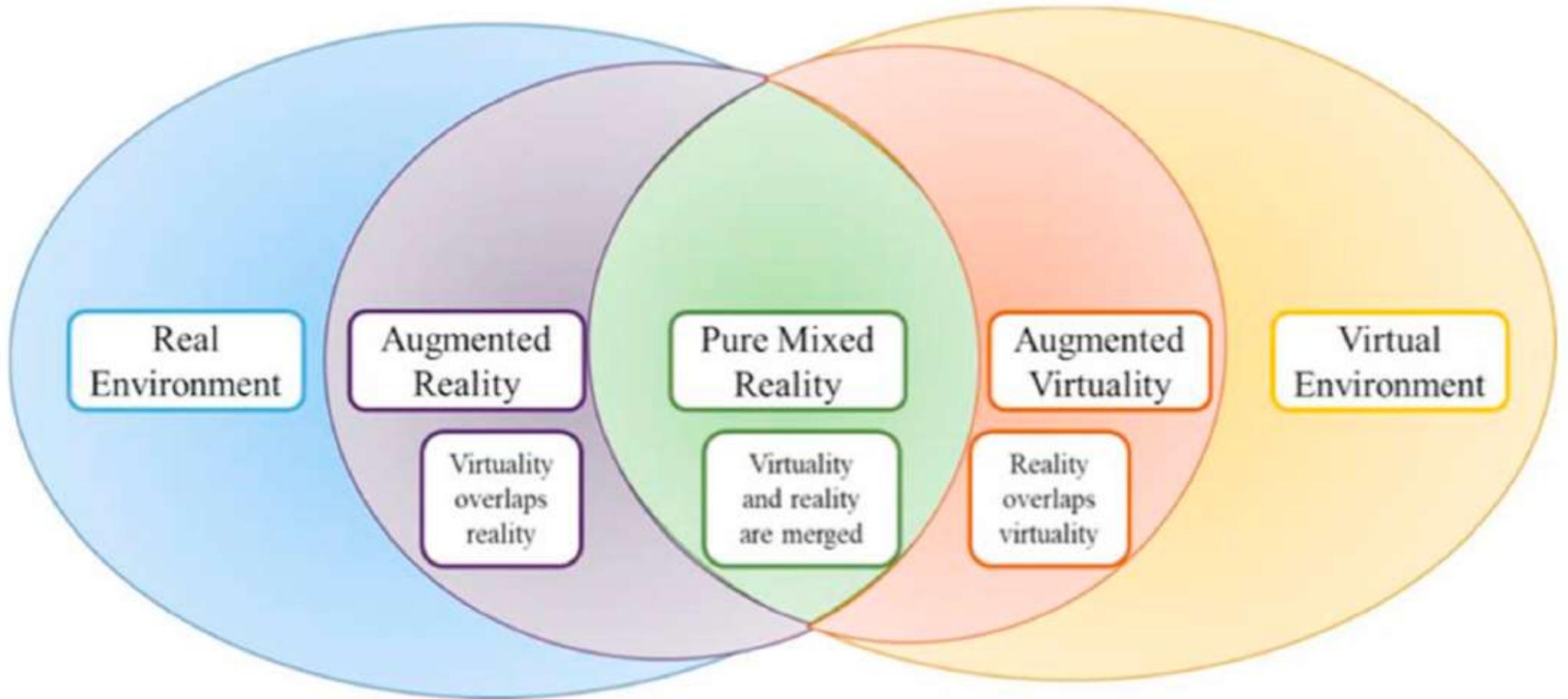


Fig. 2. Proposed reality-virtuality continuum.

CONCEPTS - 'Virtual Reality', 'Augmented Reality', 'Mixed Reality'

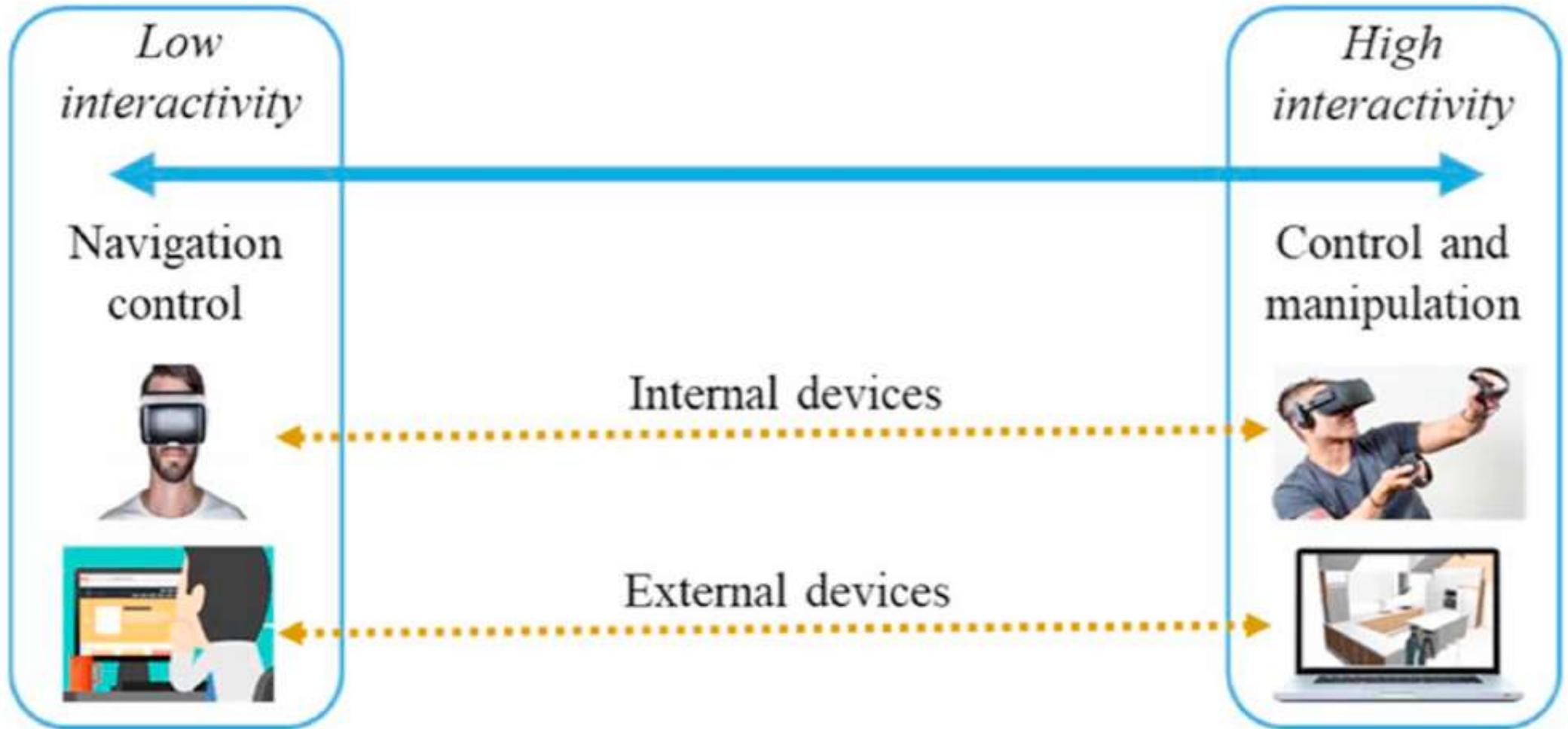


Fig. 5. Behavioral interactivity continuum.

USE CASES – ‘Training’, ‘Accessing Information’, ‘Remote Expert’

TRAINING

- Use of recorded sessions
- 360 Degree Videos
- Holograms

Japan Airlines demo at WPC 2016

<https://youtu.be/veI9hax0s5s>



Brain Surgery 360 Video (Caution!)

<https://youtu.be/1H9qNaP0W9o>

ACCESSING INFORMATION

2017 – Google Glass – Wiring Production

<https://youtu.be/qTbIKUJTadQ>



2018 – MS Hololens - Final Assembly Line

<https://www.boeing.com/features/2018/01/augmented-reality-01-18.page>

Boeing tests augmented reality in the factory

Boeing is testing augmented reality in the factory with 3D hands-free, in...



REMOTE EXPERT

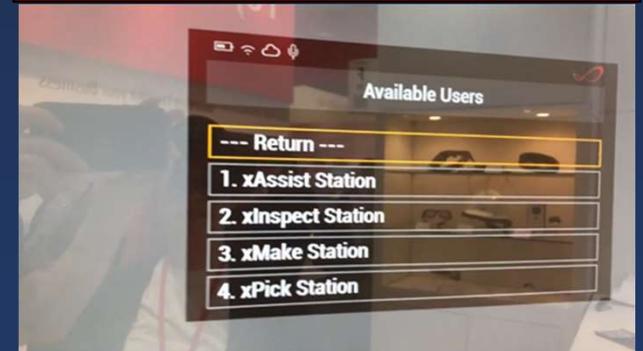
MS Hololens

<https://youtu.be/EJUM9xNg9xs>



Realware HMT-1 (Zoom or MTeams Calls)

<https://youtu.be/d3YT8j0yY10>



USE CASES – Other Examples from Aviation



https://youtu.be/T4kFBP_aUDw



https://youtu.be/IGudzK_QzBo



<https://youtu.be/1gkwr9np6bU>

USE CASES – Examples from Aerospace Industry

2017 – Google Glass – Wiring Production



Boeing cuts production time by 25% with smart glasses and Skylight

The aerospace leader turns to Upskill to wire its new planes faster with fewer errors



Company

Boeing
www.boeing.com

An astounding 130 miles of wiring go into every new Boeing 747-8



2018 – MS Hololens – Final Assembly Line

BOEING

Commercial Defense Space Services Safety

BOEING > FEATURES & MULTIMEDIA > INNOVATION > BOEING TESTS AUGMENTED REALITY IN THE FACTORY

Boeing Tests Augmented Reality in the Factory

January 19, 2018 in Innovation, Technology

Boeing tests augmented reality in the factory

Boeing is testing augmented reality in the factory with 3D hands-free, in...

AUGMENTED REALITY IN THE FACTORY



CRANFIELD STUDENT PROJECTS TO DATE

2019 – Realware HMT-1 – Pre-flight Inspection



2021 – Realware HMT-1 – Component Removal Installation



2021 – Oculus – 360 Videos & Computer Based Training



Comparison of using 360 Videos with VR and CBT



Kenneth

STUDENTS' EXPERIENCE ON PREVIOUSLY DEVELOPED CONTENT

30 MSc 'Air Transport Management' Students



25 MSc 'Safety and Human Factors in Aviation' Students



STUDENTS' EXPERIENCE ON PREVIOUSLY DEVELOPED CONTENT

What do you think about the VR goggles?

It's great!
This is the future!

This can be used for additional training or refresher but I am not sure this will ever replace the real thing, the real experience.

I can really imagine this being used for training!

I am not sure how this can be used as it's more like fun rather than learning.

It is much more interactive than your computer-based training!

It's cool!

How do you feel after trying the VR goggles?

It's tiring for my eyes!

It is heavy on the head and tiring on the eyes!

I really had to concentrate a lot!

Everything was blurred – I wear glasses and with this I can't.

I feel motion sick!

I don't like it!

I am pleased I tried it – it was a great experience.

I feel dizzy!

Wider Implementation of These Technologies Across the Industry In the Future

CHALLENGES

ERGONOMICS

(HUMAN DIVERSITY – VISION etc.)

CULTURAL

(RESISTANCE TO CHANGE/NEW TECHNOLOGY)

UNKNOWN UNKNOWNNS

(e.g. Potential harm to users) 

OPPORTUNITIES

TRAINING

(Training Next Generation of Aviation Professionals)

FOLLOWING SOPs

(Improvement only for certain tasks)
(Task familiarity, Complex Tasks, Safety Critical Tasks)

REMOTE EXPERT

(Potential use case only for certain circumstances)

Potential Challenges about Wider Implementation of These Technologies

BBC

Sign in



Home

News

Sport

Weather

iPlayer

Sounds

NEWS

[Home](#) | [War in Ukraine](#) | [Coronavirus](#) | [Climate](#) | [UK](#) | [World](#) | [Business](#) | [Politics](#) | [Tech](#) | [Science](#) | [Health](#)

[Technology](#)

Developer warns VR headset damaged eyesight

© 10 June 2020



GETTY IMAGES

Oculus has sold around half a million of its PC-tethered headsets

A software developer has tweeted about how wearing a VR headset for hours a day has damaged his eyesight.

MailOnline

Sci

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Drivers could be BANNED from using Google Glass in the UK before the device even launches

- Department of Transport said to be taking steps to make using Google Glass while driving illegal in the UK
- It is working with police to extend the scope of existing driving offences
- The headmounted device is not expected to launch in the UK until 2014
- Google has just begun rolling out the gadget to more people in the U.S

OTHER POTENTIAL FUTURE APPLICATIONS (SIMULATOR TRAINING)

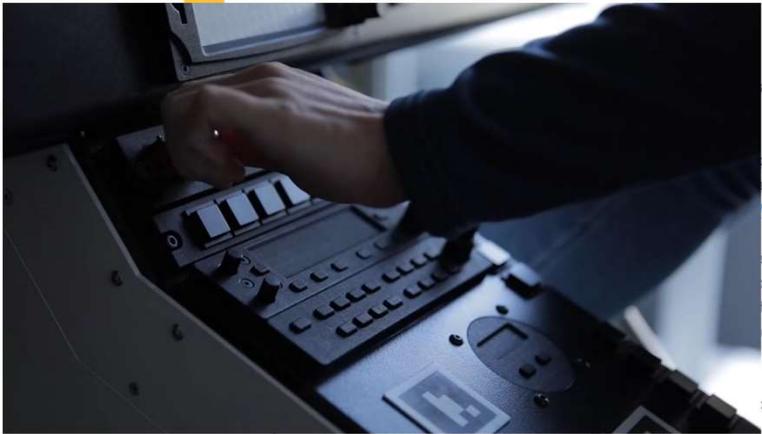
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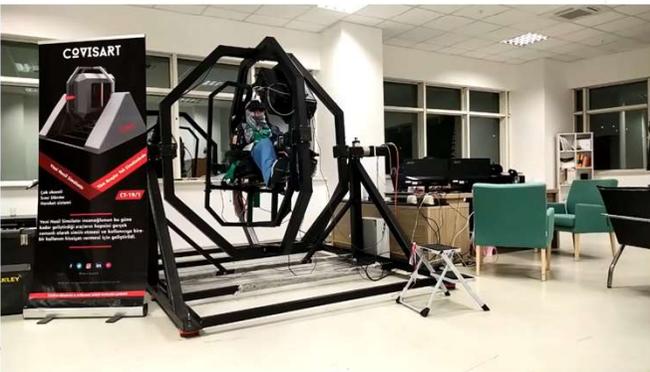


...granted the first certificate for a Virtual Reality

...practising risky manoeuvres in a virtual... statistics show that around 20% of accidents occur... (VRMotion Ltd.)

...es," said Jesper Rasmussen, EASA Flight... or training devices to reflect their actual... of cost-effective training devices available to... or new Vertical Take Off & Landing (VTOL)

...to review the most critical training scenarios



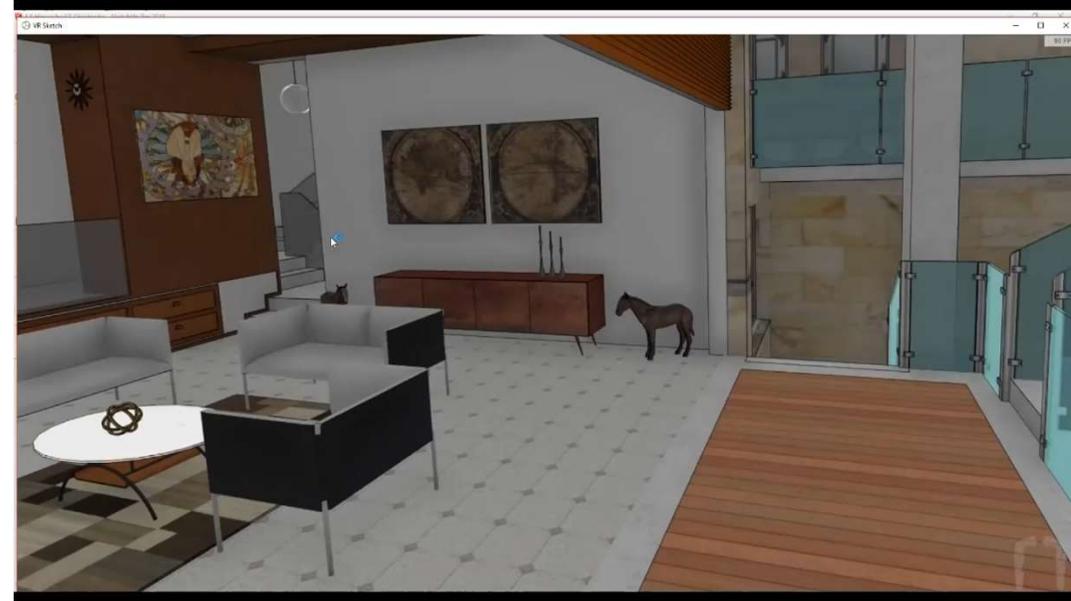
...suitability of the VR concept was... priorities, including helicopter flight... ing purposes, particularly for cas... field of view are required.

...veloping a new technology that re... VRM Switzerland. "We were delig... a benchmark which meets the h... esting for all of us!"

...is the first VR based FSTD qua... compliant with the FSTD certific... unt of the specificities of the nev



OTHER POTENTIAL FUTURE APPLICATIONS (DESIGNING BY VR)



COWS WEARING VR GOGGLES PRODUCED MORE MILK?



THANK YOU FOR YOUR ATTENTION

