

Day 2 - Wednesday 19th April 2023

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

25
YEARS
1998 - 2023

***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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Embodiment
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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'

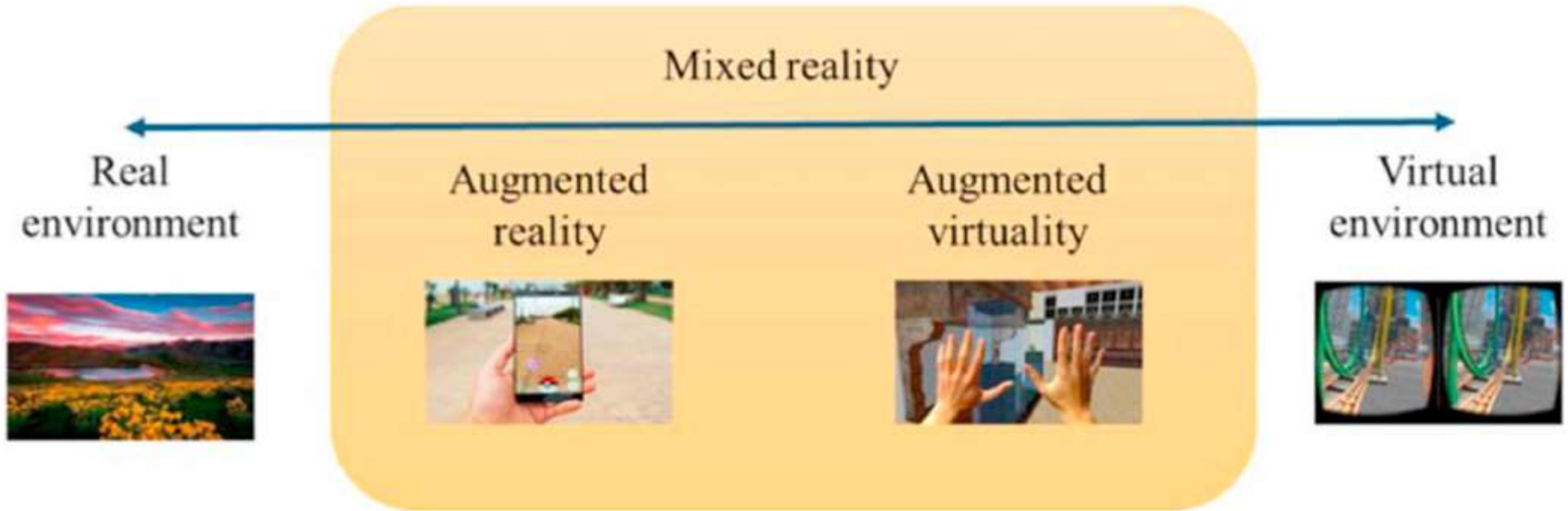


Fig. 1. Reality-virtuality continuum (Milgram & Kishino, 1994).

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

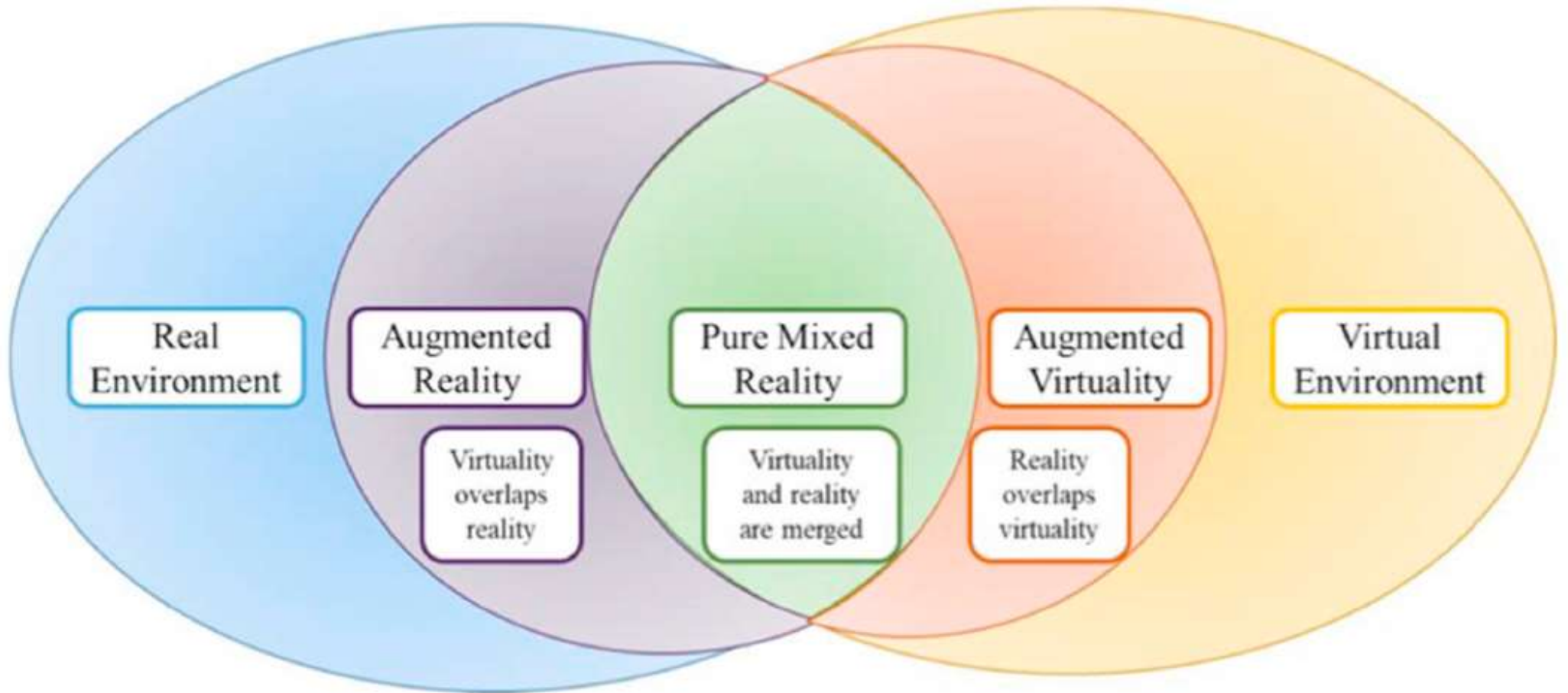


Fig. 2. Proposed reality-virtuality continuum.

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

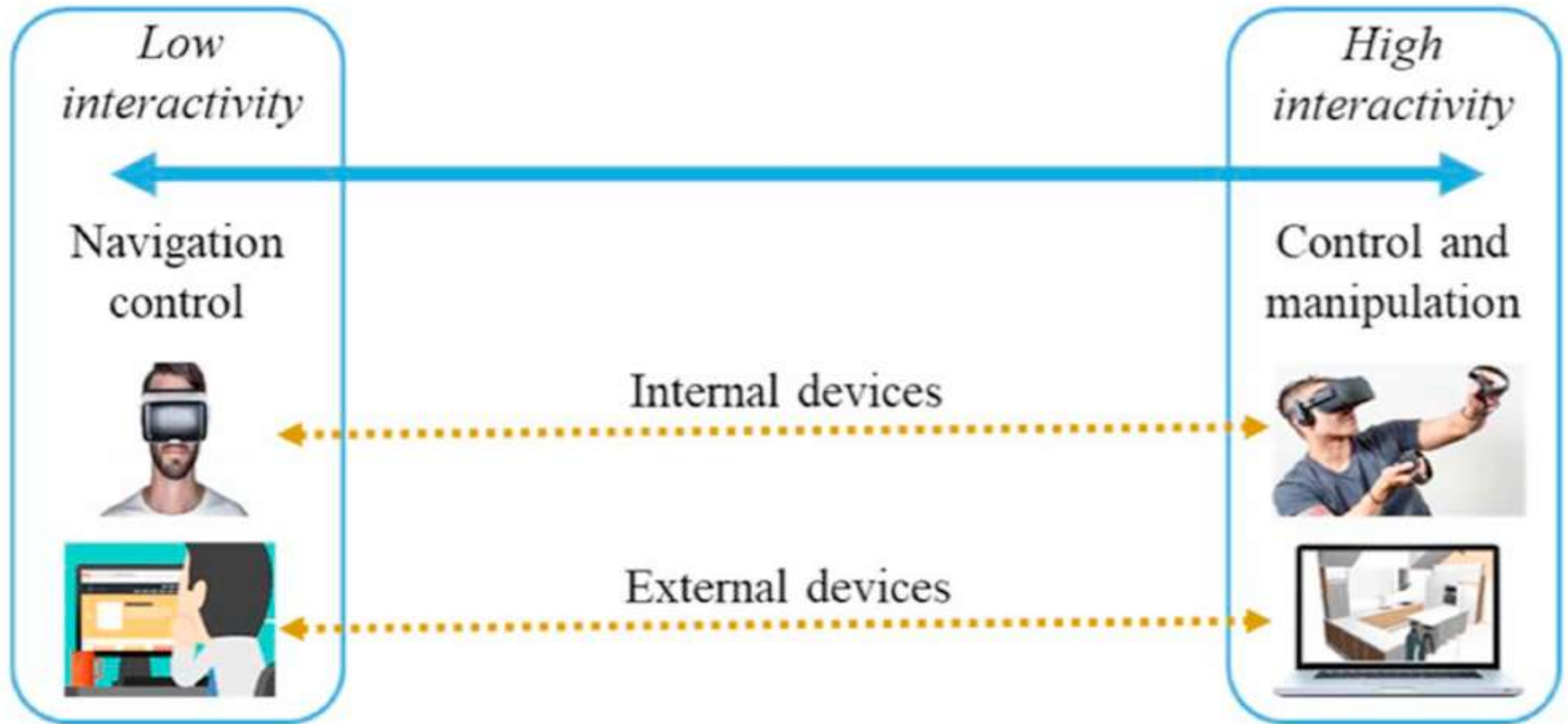


Fig. 5. Behavioral interactivity continuum.

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/vel9hax0s5s>



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

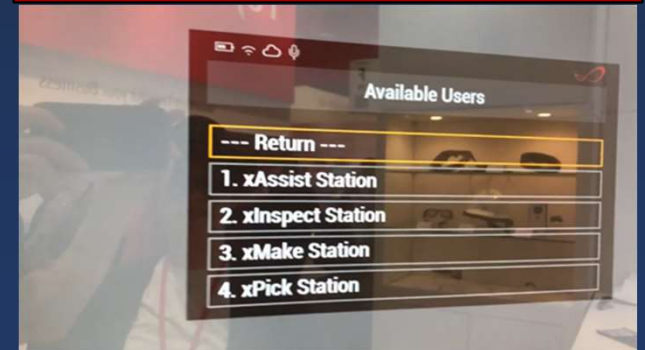
MS Hololens

<https://youtu.be/EJUM9xNg9xs>



Realware HMT-1 (Zoom or MTeams Calls)

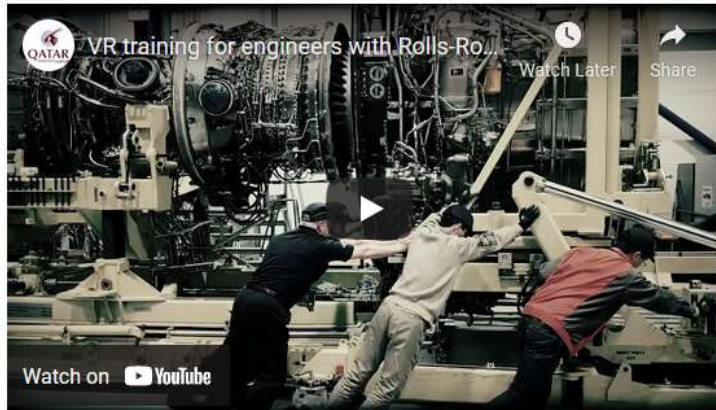
<https://youtu.be/d3YT8j0yYl0>



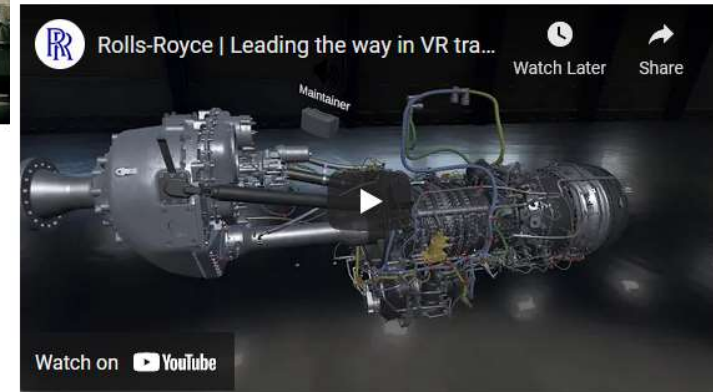
USE CASES – Other Examples from Aviation



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

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



Company

Boeing
www.boeing.com



2018 – MS Hololens – Final Assembly Line



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!

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.

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

It's cool!

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

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

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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





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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)

**EASA**
European Aviation Safety Agency

 **EASA Pro**

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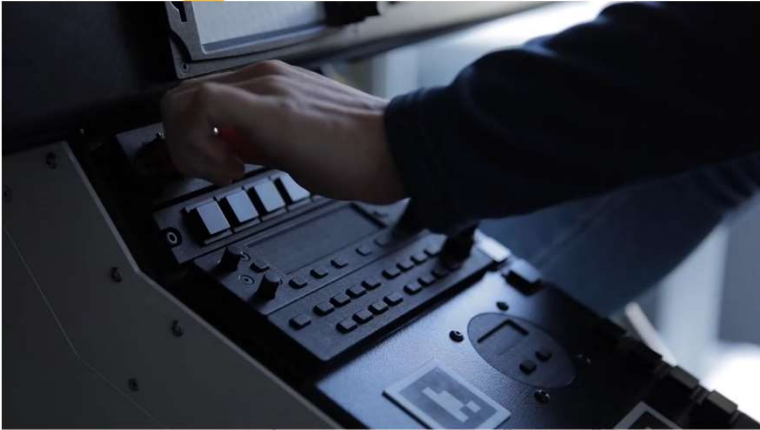
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EASA approves the first Virtual Reality (VR) based Flight Simulation Training Device

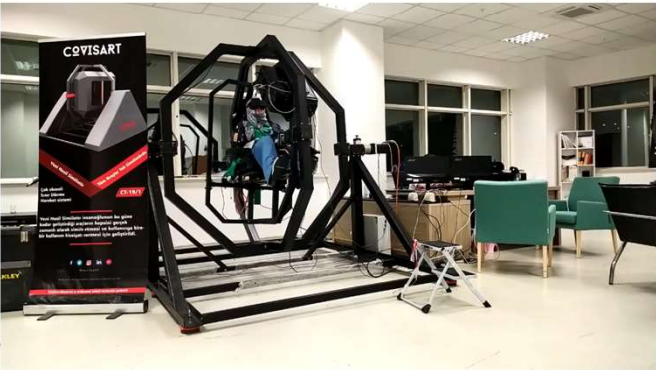


EASA has granted the first certificate for a Virtual Reality (VR) based Flight Simulation Training Device (FSTD) for the training of pilots on Vertical Take Off & Landing (VTOL) aircraft.


The VR-based FSTD, developed by VRMotion Ltd., allows pilots to practise risky manoeuvres in a virtual environment. Statistics show that around 20% of accidents occur during VTOL operations.

"This is a significant milestone," said Jesper Rasmussen, EASA Flight Safety Director. "The VR-based FSTD provides a cost-effective training device available to all pilots, enabling them to review the most critical training scenarios."



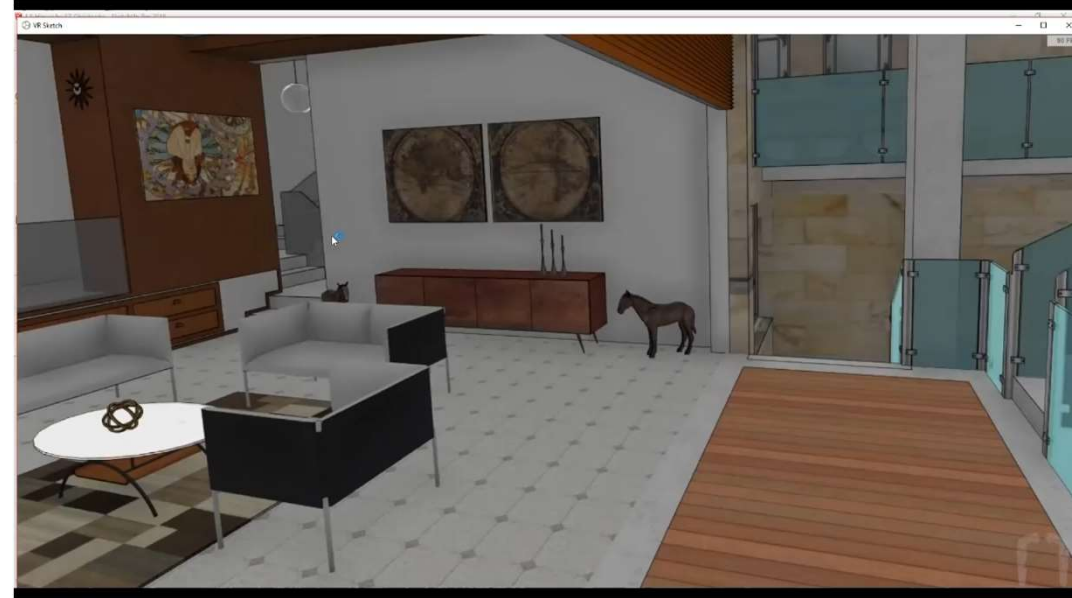


The simulator is a large, black, hexagonal frame with a person seated inside, wearing a VR headset. A sign next to it reads "COVISART" and "VR-based FSTD".



The logo features a large 'E' inside a circle, with the word 'NOVA' below it, set against a metallic, diamond-plate background.

OTHER POTENTIAL FUTURE APPLICATIONS (DESIGNING BY VR)



COWS WEARING VR GOGGLES PRODUCED MORE MILK?



<https://youtu.be/e3Vvvk-rjY>

THANK YOU FOR YOUR ATTENTION

