



SECV2213 ASAS GRAFIK BERKOMPUTER  
(FUNDAMENTAL OF COMPUTER GRAPHICS)

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ASSIGNMENT 1

SECTION: 01

GROUP 3 - PHEE

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VIDEO LINK :

<https://drive.google.com/drive/folders/1IGbhGynk9vFelSRI-50BTi6krYXVnmi8>

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## 1.0 Introduction

Virtual Reality (VR), the use of computer modeling and simulation that enables a person to interact with an artificial three-dimensional (3-D) visual or other sensory environment [1]. It combines fields like computer graphics, artificial intelligence, human-computer interaction, and real-time rendering to produce realistic experiences. VR is widely used in gaming, healthcare, education, training simulation, and digital collaboration, transforming the way people engage with virtual content and remotely interact.

One of the most significant applications of VR in virtual collaboration is Meta Horizon Workrooms, a virtual workspace developed by Meta. It enables teams to meet, collaborate, and work together in a shared 3D environment regardless of their locations. Through the application of computer graphics, spatial audio, hand tracking, and real-time rendering, Workrooms offers a highly interactive and immersive remote working experience. The technology transforms virtual meetings into something more natural and productive than traditional video conferencing software.



Figure 1: Meta Horizon Workrooms [2]

## 2.0 Company Background - Meta

Meta, parent company of the social network Facebook, the popular photo- and video-sharing network Instagram, and the instant-messaging services WhatsApp and Messenger [3]. It is a tech company focused on social networking and social interaction in virtual spaces. Founded by Mark Zuckerberg in 2004, it renamed itself in 2021 to prioritize its vision of the metaverse, a virtual world in which users can interact, work, and socialize through the use of VR and AR technologies.

Meta has also led the way in VR innovation through its Meta Reality Labs subsidiary, which heavily invested in VR software and hardware. Its 2014 Oculus VR acquisition led to the creation of Oculus Rift, Quest, and Quest Pro headsets, enabling immersive experiences in gaming, social interaction, and remote work.

### 3.0 Application & Graphics Usage

People may work together using virtual reality (VR) in Meta Horizon Workrooms, a virtual meeting space. Although teams are separated physically, it helps them experience like they are in one room. [4] Users are able to engage in meetings as avatars, which are actually graphical representations of themselves. Meetings become more engaging because these avatars move, gesture, and interact.

The application uses advanced computer graphics technologies to help create interactive virtual offices, workspaces, and meeting rooms. Users can access their real computers in a VR environment using the Meta Quest Remote Desktop app.[5] It also features spatial audio, which represents the speaker's direction to make conversations feel more natural.

Also, the Meta Horizon Workrooms offer an infinite amount of whiteboard space for brainstorming via virtual reality controllers, like pens. Motion sickness decreases and lag-free animation is achieved with real-time rendering. This combination of features has made working in Meta Horizon Workspace more efficient and engaging.

### 4.0 Sample of Products

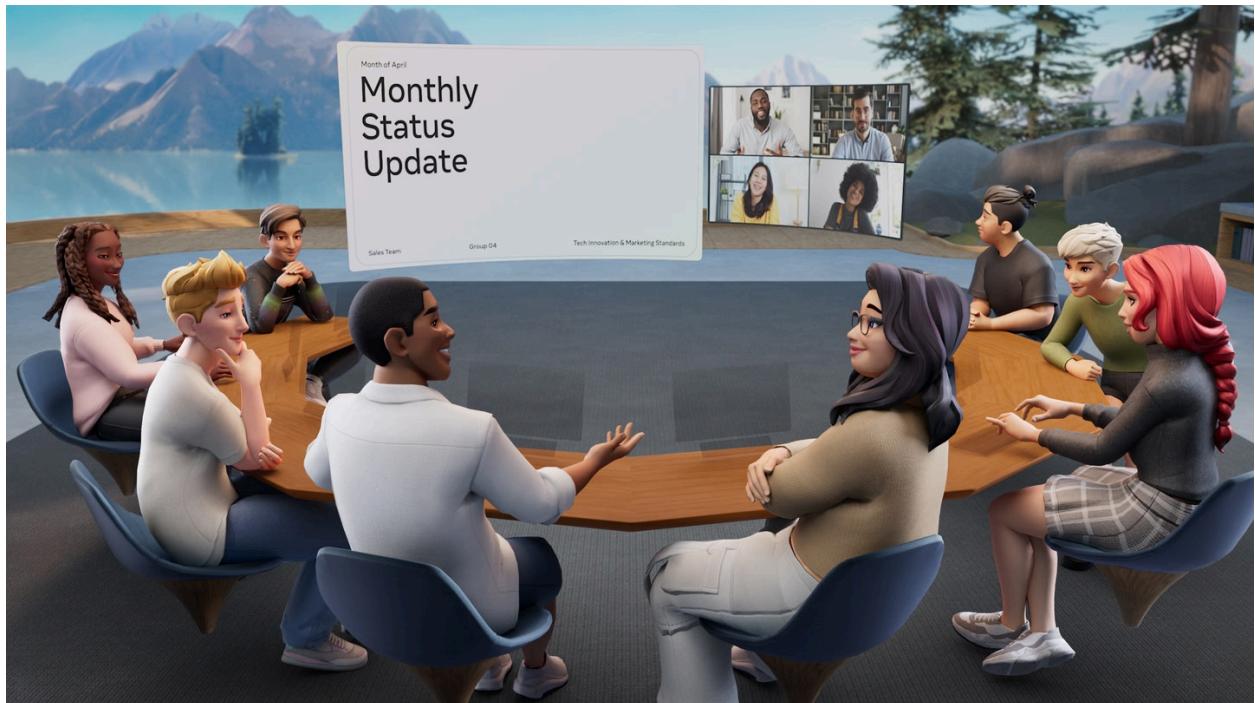


Figure 2: Scenery of Meta Horizon Workrooms [2]

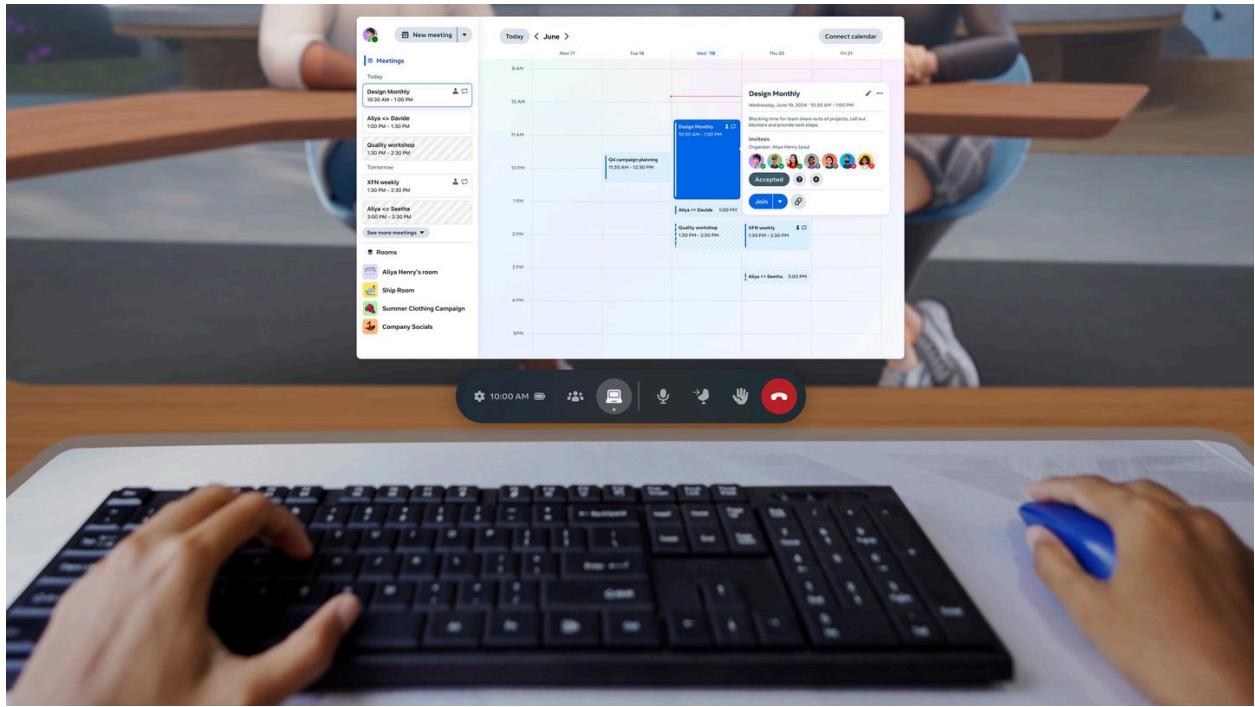


Figure 3: Scenery of Meta Horizon Workrooms [2]

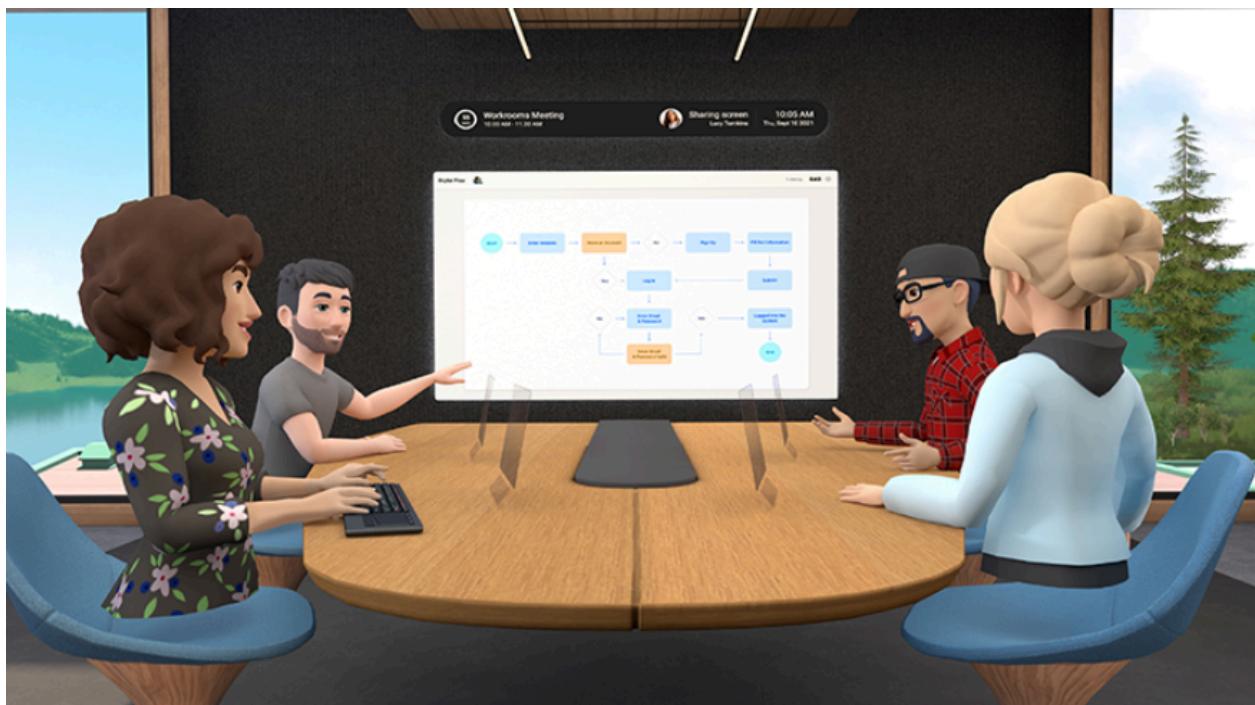


Figure 4: Avatars and Objects in The Virtual Meeting Room [4]



Figure 5: Virtual Whiteboard [4]

## **5.0 Graphics Term - Transform & Lighting (T&L)**

Meta Horizon Workrooms uses Transform & Lighting(T&L) technology to optimize the rendering of 3D scenes and enhance the interactive experiences. T&L technology is a video technology that takes 3D information handled by the computer processor and sends it to the GPU (Graphics Processing Unit) [6]. The T in T&L stands for Transform, which converts a 3D model's coordinates into a different coordinate system, and L stands for Lighting, which represents the effect of light on 3D objects.

T&L is used in Meta Horizon Workrooms for avatars and objects in the meeting room. 3D transformations are used to render avatars and objects in the virtual meeting room and dynamically adjust according to the user's perspective so that objects maintain a real sense of space in the VR world [4]. By using lighting calculations, avatars' and objects' shadows and reflections look more realistic, increasing immersion.

Not only that, virtual whiteboards also use T&L technology. 3D transformations are used to ensure that the content is always clearly visible, no matter where the user stands [4]. Then, lighting calculations are used to optimize the lighting of the whiteboard so that handwriting and drawings can be presented naturally at different angles to avoid unreality in the VR environment.

## **6.0 Conclusion**

Meta developed a graphic development tool called Meta Horizon Workrooms, bringing virtual reality to life with its awesome computer graphics. Working remotely feels much more natural and enjoyable because of these realistic 3D environments and avatars. Teams can work together more easily because of features like hand tracking and smooth visuals. As Meta develops its virtual reality technology, we can expect even cooler graphics in the future that will make our virtual workspaces feel even more lifelike and interactive. It's changing the game for how we connect and team up online.

## 7.0 Reference

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