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Designing a VR Application

VR Systems and Tools

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Minimum requirements



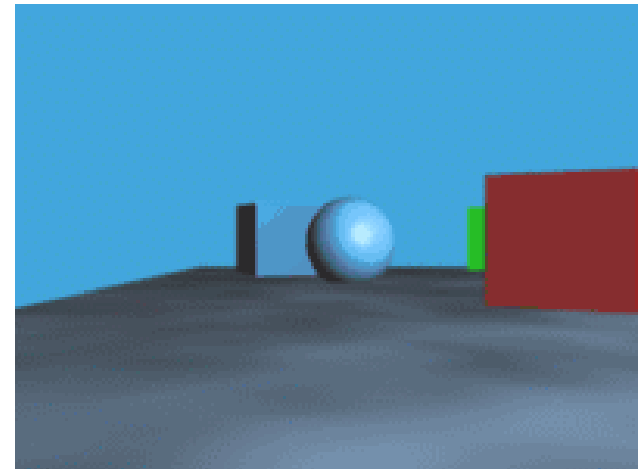
Minimum requirements

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- Make the brain believe that the Virtual World is the Real World

- Required (Parallax)

- » Stereoscopic vision
- » Head motion tracking



Nathaniel Domek

- Facultative (Other informations)

- » Spatial sound
- » Body tracking

<https://commons.wikimedia.org/wiki/File:Parallax.gif#/media/File:Parallax.gif>



Projector based systems

- CAVE
- 

Projector based systems

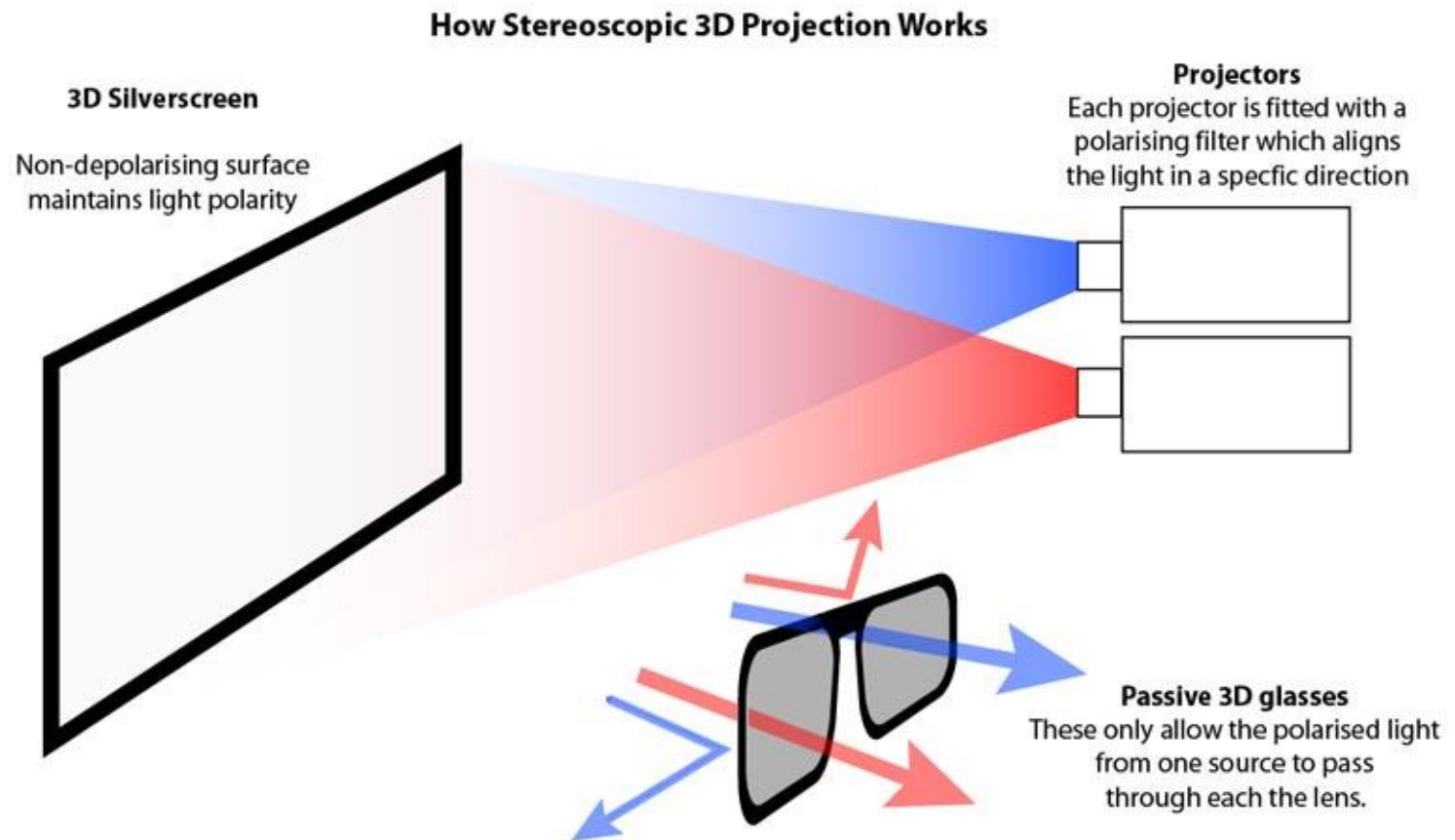
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- Most used systems before new VR helmets
- Still in use in some big companies and laboratories
- Projectors and special glasses

Projector based systems

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■ Passive technology



Projector based systems

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■ Passive technology

https://moodle.utbm.fr/pluginfile.php/262381/mod_folder/content/0/passive_glasses.gif



Projector based systems

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■ Passive technology

■ Advantages

- » Low cost glasses
- » Classic projectors

■ Disadvantages

- » Works well when facing the screen

Projector based systems

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■ Active technology

https://moodle.utbm.fr/pluginfile.php/262381/mod_folder/content/0/active_glasses.gif



Projector based systems

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■ Active technology

■ Advantages

- » No ghost on multi-screens systems

■ Disadvantages

- » More expensive projectors
- » Need of a synchro system for glasses

Projector based systems

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■ SINAPSE platform, Centrale Supélec (2014)



Projector based systems

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■ PREVERCOS platform, UTBM (2005)



■ PREVERCOS platform, UTBM (2005)

[Mosquito 200 - Concept d'avion léger - YouTube](#)





VR helmets

- Oculus, Vive, etc.

VR helmets

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[Réalité Virtuelle : Immersion présentait le simulateur Virtuality SU2000 en 1994 – YouTube](#)



■ 2012: Oculus concept preview



■ 2013: Oculus Rift DK1 (2013)



■ 2013: Oculus Rift DK1 (2013)

- » To connect to a PC
- » 1280x800 pixels screen
- » Internal head's orientation tracking
- » No head's position tracking
- » No sound
- » No interaction system



■ 2014: Oculus Rift DK2



■ 2014: Oculus Rift DK2

- » To connect to a PC
- » 1920x1080 pixels screen
- » Internal head's orientation tracking
- » External head's position tracking
- » No sound
- » No interaction system



■ 2016: Oculus Rift (CV1)



■ 2016: Oculus Rift (CV1)

- » To connect to a PC
- » 2160x1200 pixels screen
- » Internal head's orientation tracking
- » External position tracking (head + hands)
- » Sound
- » Controllers (Oculus Touch)



VR helmets

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■ 2016: HTC Vive



■ 2016: HTC Vive

- » To connect to a PC
- » 2160x1200 pixels screen
- » Internal head's orientation tracking
- » Internal position tracking (head + hands) with external references
- » Controllers
- » Camera
- » No Sound



VR helmets

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■ 2018: Vive Pro



■ 2019: Oculus Rift S



■ 2019: Oculus Rift S

- » To connect to a PC
- » 2560x1440 pixels screen
- » Internal head's orientation tracking
- » Internal position tracking (head + hands)
- » Sound
- » Controllers (Oculus Touch)



■ 2019: Vive Cosmos



■ 2019: Oculus Quest



■ 2019: Oculus Quest

- » Autonomous (Android)
- » 2880x1600 pixels screen
- » Internal head's orientation tracking
- » Internal position tracking (head + hands)
- » Sound
- » Controllers (Oculus Touch)



■ 2019: Vive Focus Plus



■ 2020: Oculus Quest 2



VR helmets - Families

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■ For PC and external tracking systems



■ For PC and internal tracking systems



■ Autonomous





Non VR helmets

- Google Cardboard, etc.
- 

360° viewing systems

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■ Google Cardboard

■ Samsung Gear VR

■ Oculus Go





Tracking systems

- Hands, body, etc.

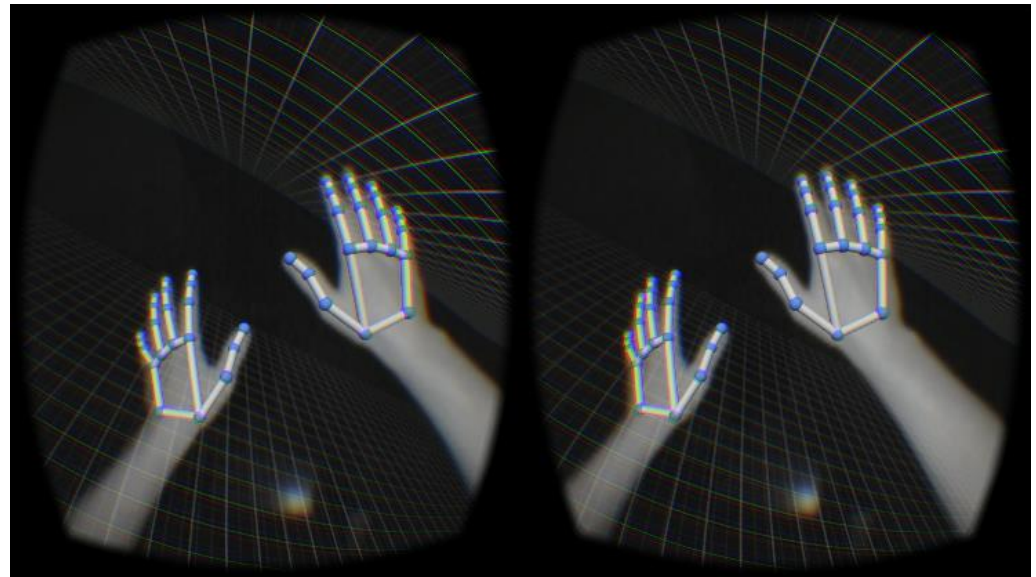
Tracking systems

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■ For hands

» LEAP Motion

» Razer Hydra



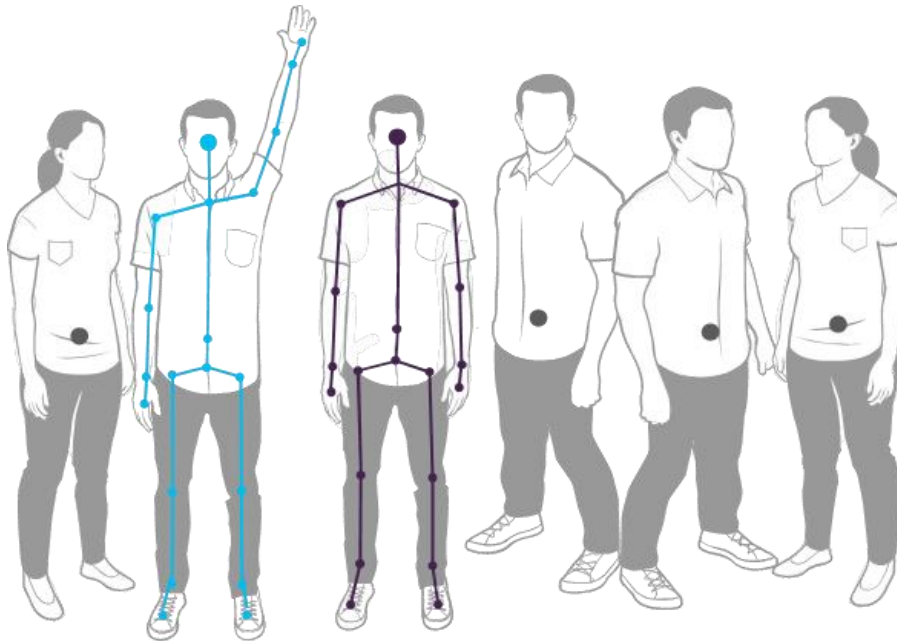
Tracking systems

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■ Full body without markers

» Microsoft Kinect

» Orbbec Astra



Tracking systems

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■ For body parts with sensors



Tracking systems

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■ For body parts with markers

» Infrared systems



Tracking systems

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■ For HTC Vive

» Tracker HTC Vive





Moving systems



Moving systems

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■ Walk

[Robot Tile デモ2\(2016/08/11\) – YouTube](#)



Moving systems

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■ Walk

[Virtusphere - YouTube](#)



Moving systems

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■ Walk

[Virtuix Omni - Omniverse Trailer – YouTube](#)



Moving systems

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■ Fly

[Flying the Birdly Virtual Reality Simulator - YouTube](#)





Authoring softwares

- Unity 3D, Unreal Engine, etc.

■ Unity 3D

Universal Render Pipeline

XR Interaction Toolkit

Visual Scripting

Advanced performance

Plastic SCM

Unity Asset Store

Accelerate Solutions



XR Interaction Toolkit

The XR Interaction (XRI) Toolkit package is a high-level, component-based, interaction system for creating VR and AR experiences. It provides a framework that makes 3D and UI interactions available from input events, cross platform XR controller inputs, haptics, visual feedback, basic canvas UI, and more.

■ Unreal Engine

[How Animech Designed a Volkswagen VR Experience that Sells | Project Spotlight | Unreal Engine - YouTube](#)





Utilities

- Middle VR, Steam VR, etc.

■ Middle VR (for Unity 3D)

[MiddleVR - YouTube](#)

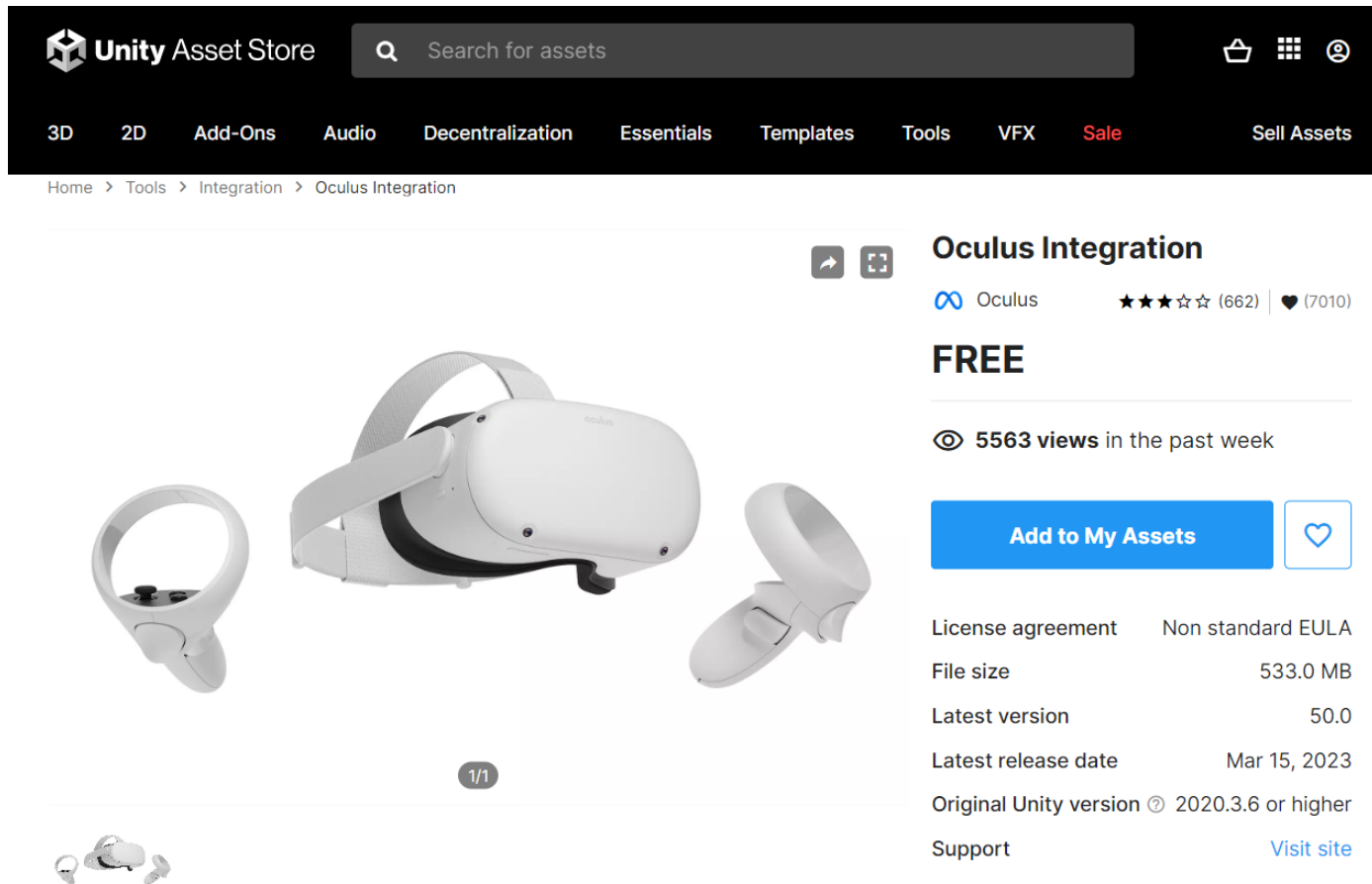


■ Steam VR (for Unity 3D)

[SteamVR Unity Plugin v2.2.0 - YouTube](#)



Oculus integration (for Unity 3D)



The screenshot shows the Unity Asset Store interface. At the top, there's a search bar and navigation links. The main content area displays the 'Oculus Integration' asset, which is free and has 5563 views in the past week. The asset is shown in a 3D render of the Oculus VR headset and controllers. The right sidebar contains details about the asset, including its license agreement, file size, latest version, and release date.

Unity Asset Store Search for assets

3D 2D Add-Ons Audio Decentralization Essentials Templates Tools VFX **Sale** Sell Assets

Home > Tools > Integration > Oculus Integration

Oculus Integration

Oculus ★★★★★ (662) | ❤️ (7010)

FREE

👁 5563 views in the past week

Add to My Assets ❤️

License agreement Non standard EULA

File size 533.0 MB

Latest version 50.0

Latest release date Mar 15, 2023

Original Unity version 2020.3.6 or higher

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