



Réalité Virtuelle

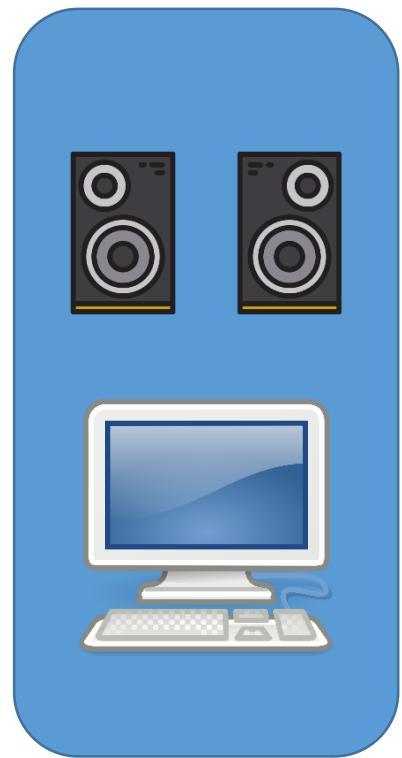
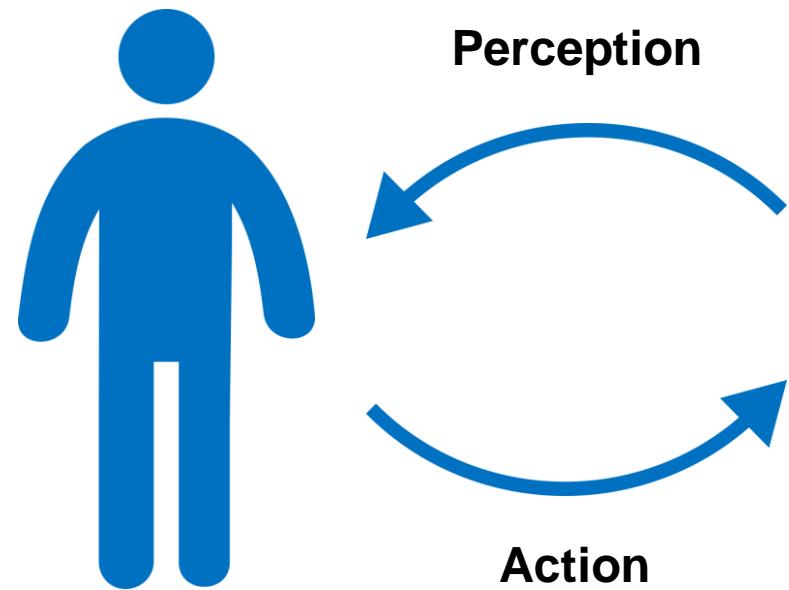
Introduction à la Réalité Virtuelle

Année 2019-2020

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Réalité Virtuelle

Réalité virtuelle



Environnement virtuel



Réalité Virtuelle

Terme introduit par Jaron Lanier en 1988

« Maybe we should go over what Virtual Reality is. We are speaking about a technology that uses computerized clothing to synthesize shared reality. It recreates our relationship with the physical world in a new plane, no more, no less. It doesn't affect the subjective world; it doesn't have anything to do directly with what's going on inside your brain. **It only has to do with what your sense organs perceive.** The physical world, the thing on the other side of your sense organs, is received through these five holes, the eyes, and the ears, and the nose, and the mouth, and the skin. They're not holes, actually, and there are many more senses than five but that's the old model, so we'll just stick with it for now. »

Une définition

« La réalité virtuelle est un domaine scientifique et technique exploitant *l'informatique* et des *interfaces comportementales* en vue de simuler dans un *monde virtuel* le comportement d'entités 3D, qui sont en *interaction en temps réel* entre elles et avec un ou des utilisateurs en *immersion pseudo-naturelle* par l'intermédiaire de canaux sensori-moteurs. »

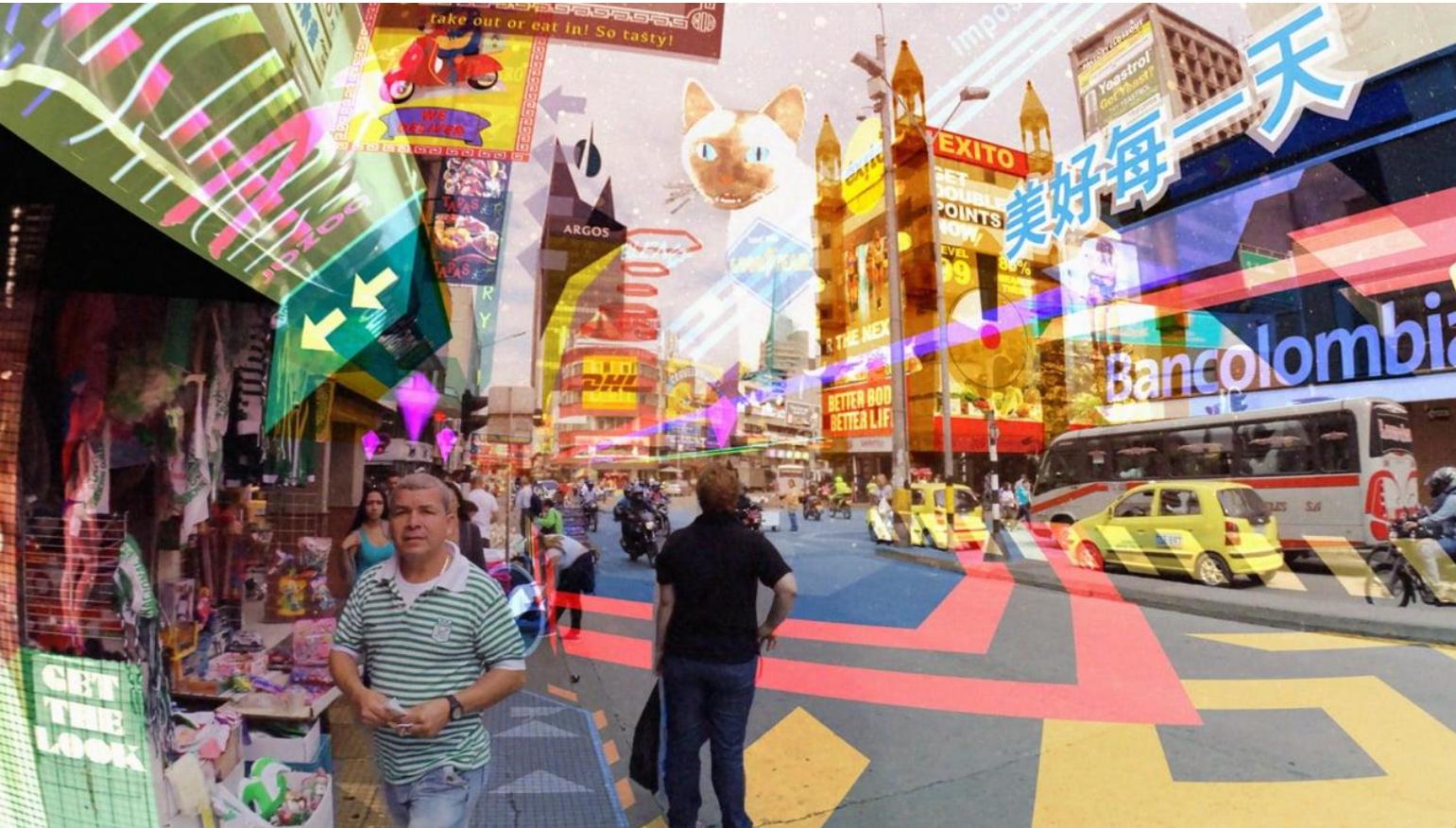
P. Fuchs, Le traité de la réalité virtuelle, Volume 1

Réalité virtuelle



Univers 100% virtuel

Réalité augmentée



Ajout d'informations au monde réel

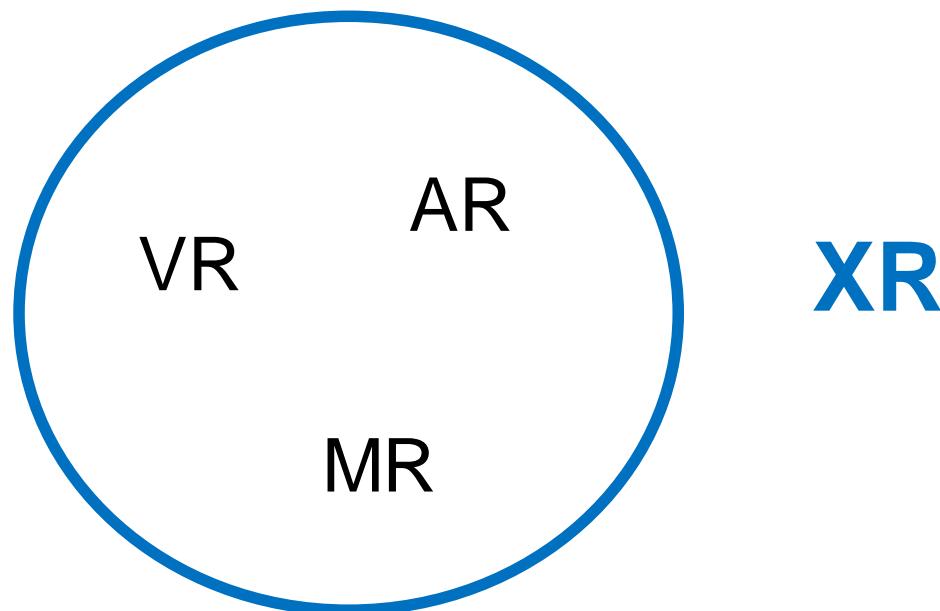
Réalité mixte

Un continuum d'expériences sensorielles...



Réalité mixte

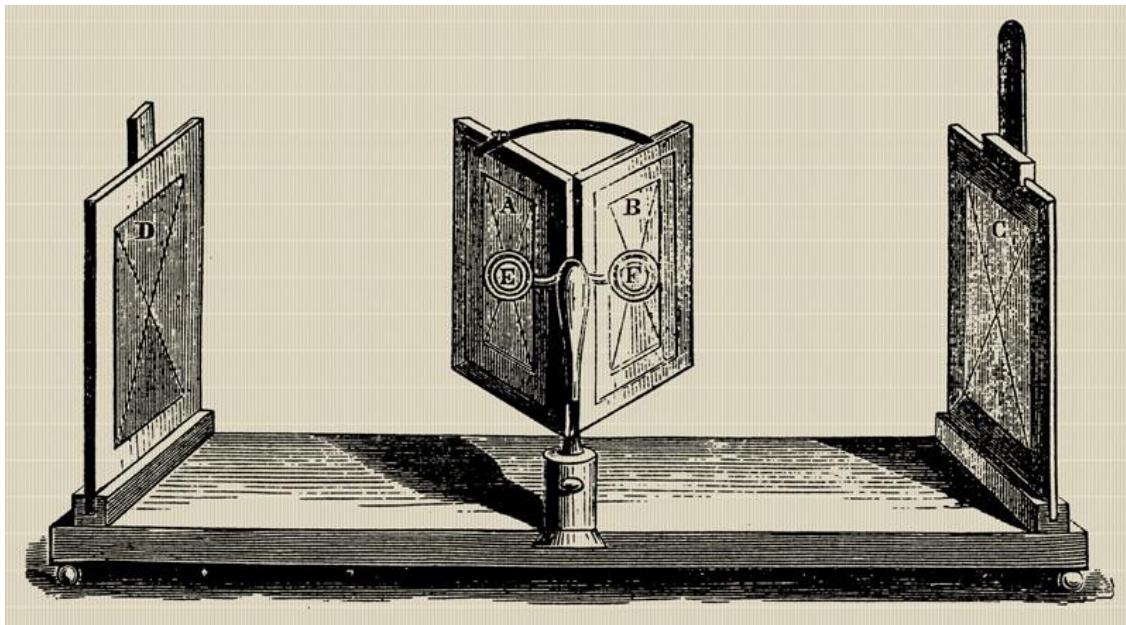
Un continuum d'expériences sensorielles...



Historique

Historique

- Stéréoscope



Charles Wheatstone, 1838



David Brewster, 1870

Historique

- Sensorama
(1962)

Aug. 28, 1962

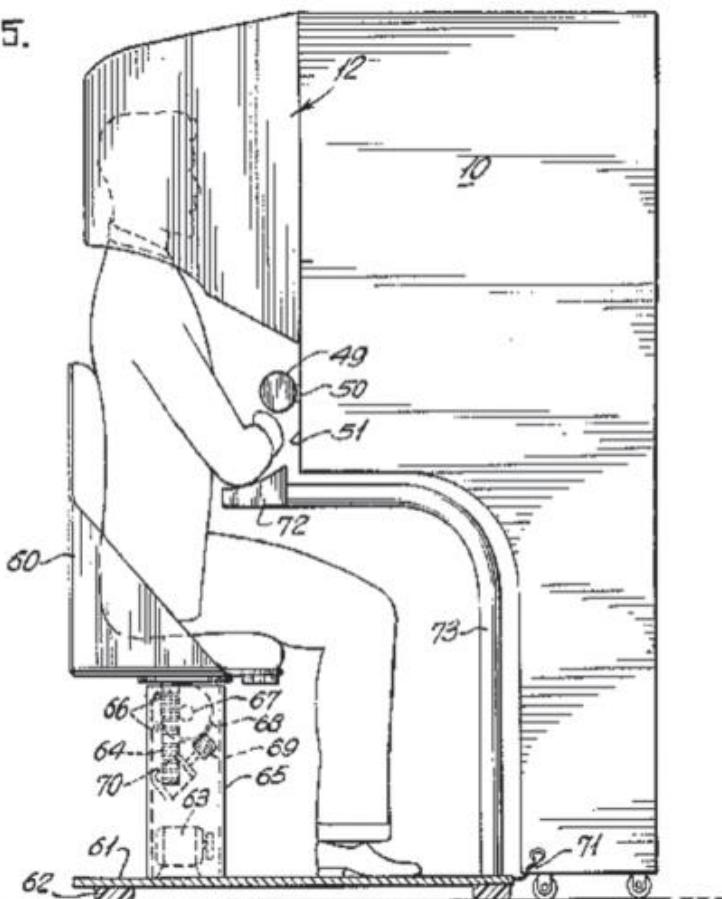
M. L. HEILIG
SENSORAMA SIMULATOR

3,050,870

Filed Jan. 10, 1961

8 Sheets-Sheet 3

T19.5.



Introducing . . .

Sensorama

The Revolutionary Motion Picture System
that takes you into another world
with

- 3-D
- WIDE VISION
- MOTION
- COLOR
- STEREO-SOUND
- AROMAS
- WIND
- VIBRATIONS

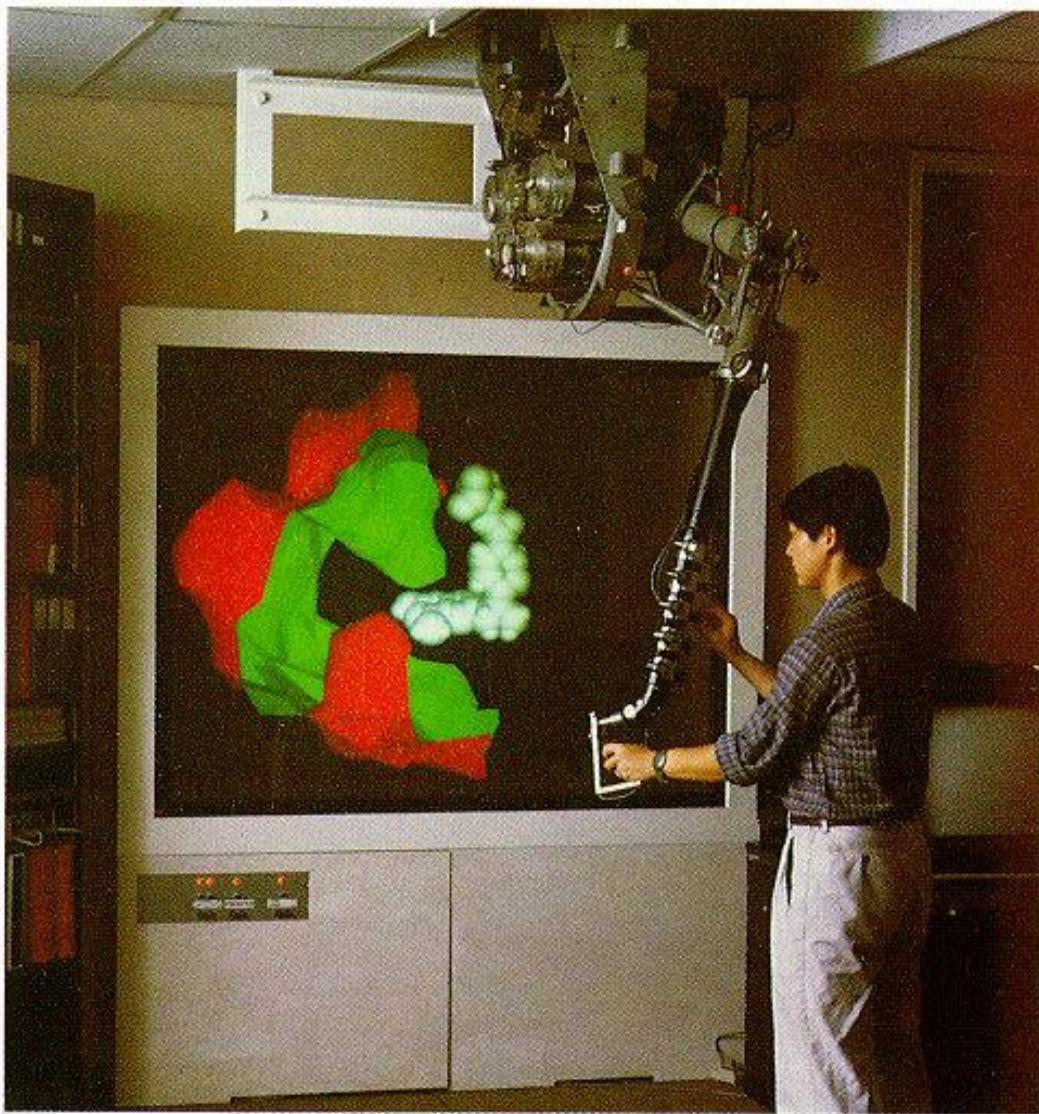


SENSORAMA, INC., 855 GALLOWAY ST., PACIFIC PALISADES, CALIF. 90272

TEL. (213) 459-2162

Historique

- Haptic Display Grope (1967)



Historique

- Ultimate Display (1968)

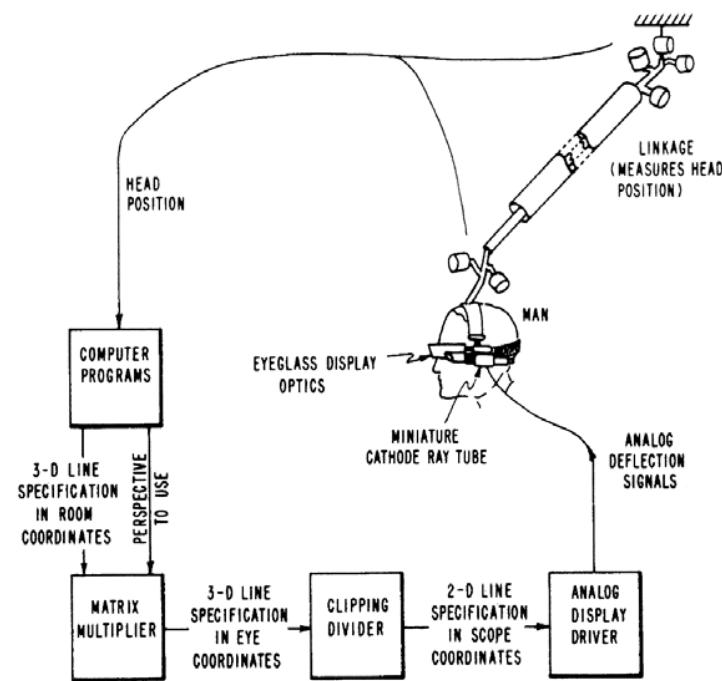
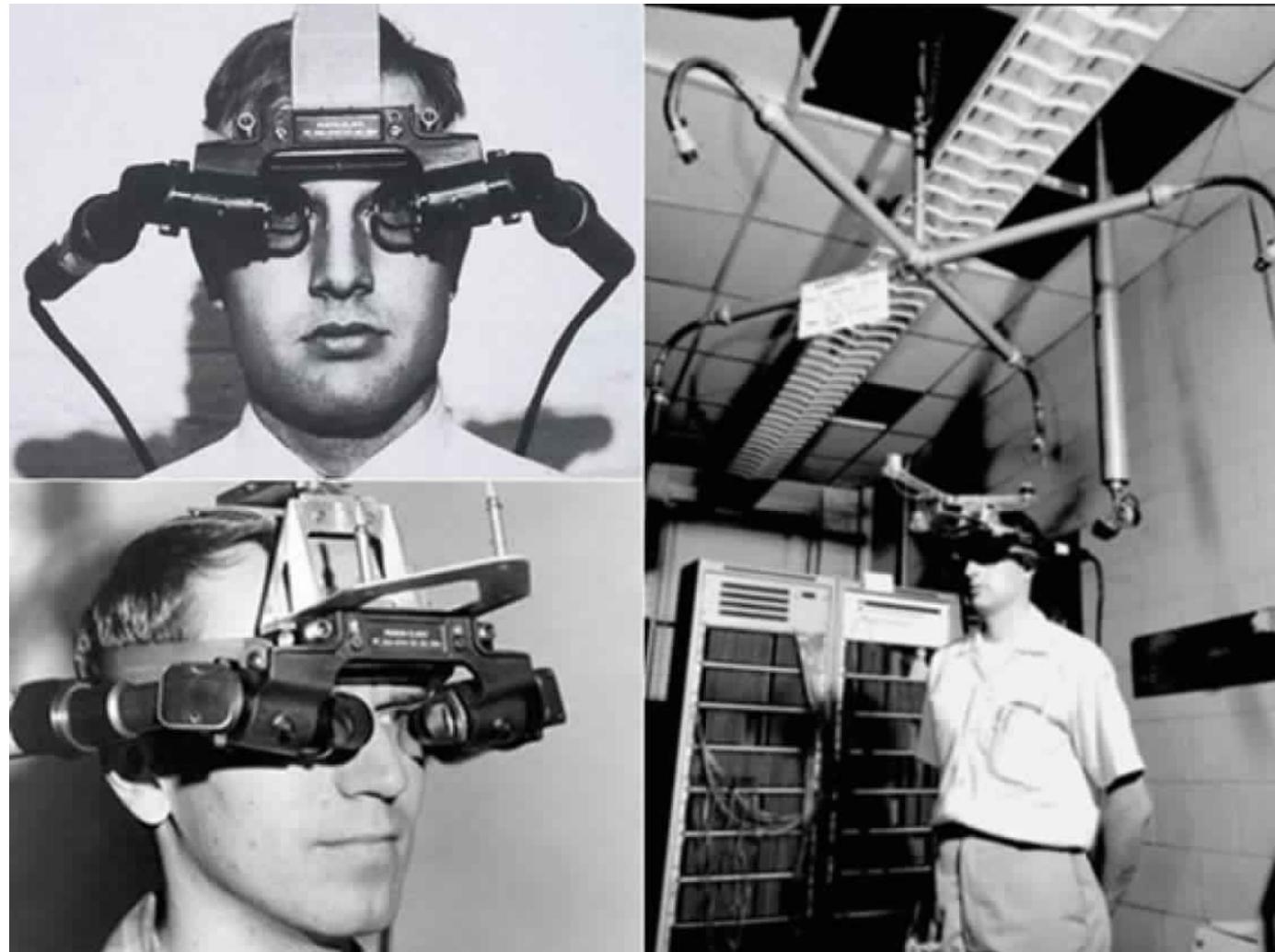


FIGURE 1—The parts of the three-dimensional display system



Historique

- Dataglove (1983)



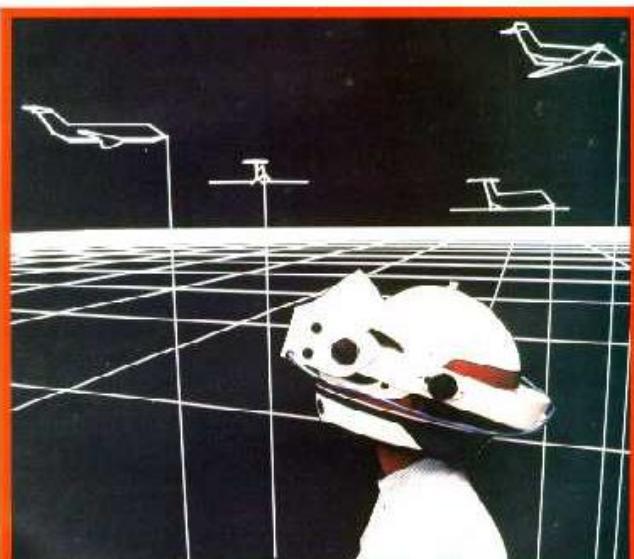
Historique

- Vived (1986)



Transferring Technology to
American Industry and Government

July/August 1988
Volume 12 Number 7

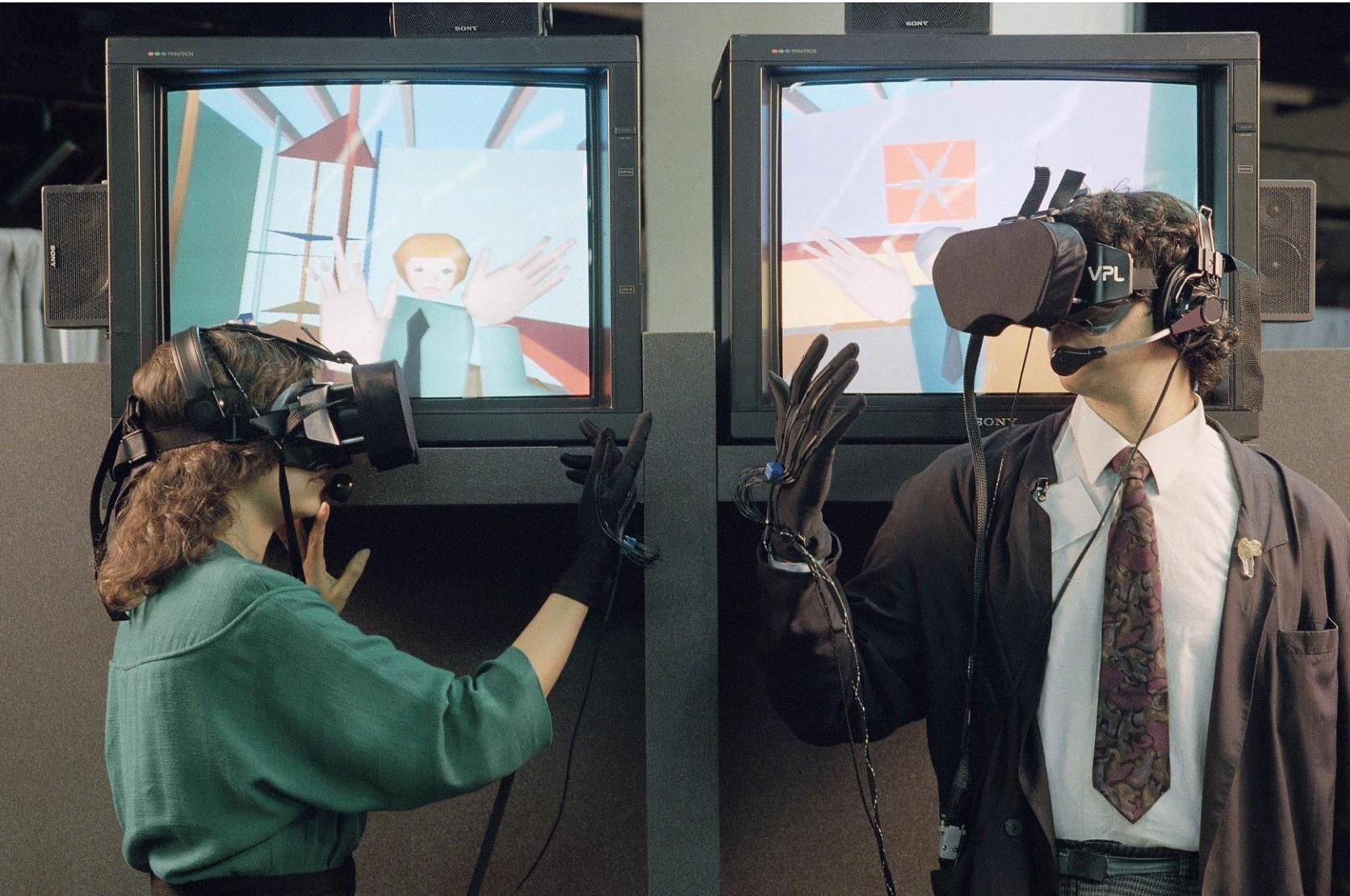


NASA's Virtual Workstation Shapes A VIVED Reality



Historique

- EyePhone (1989)



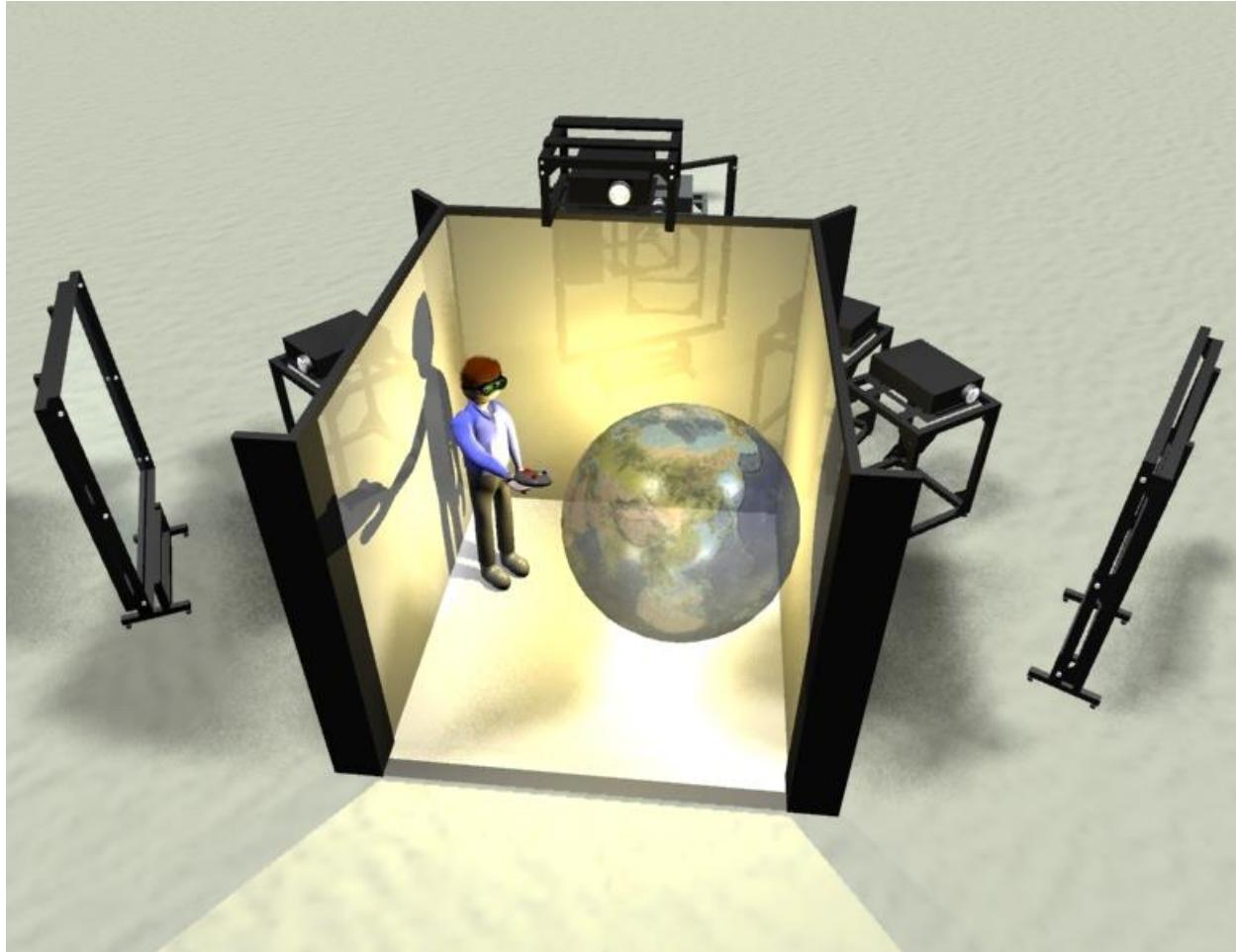
Historique

- View (1990)



Historique

- CAVE (1992)



Historique

- SPIDAR (1992)

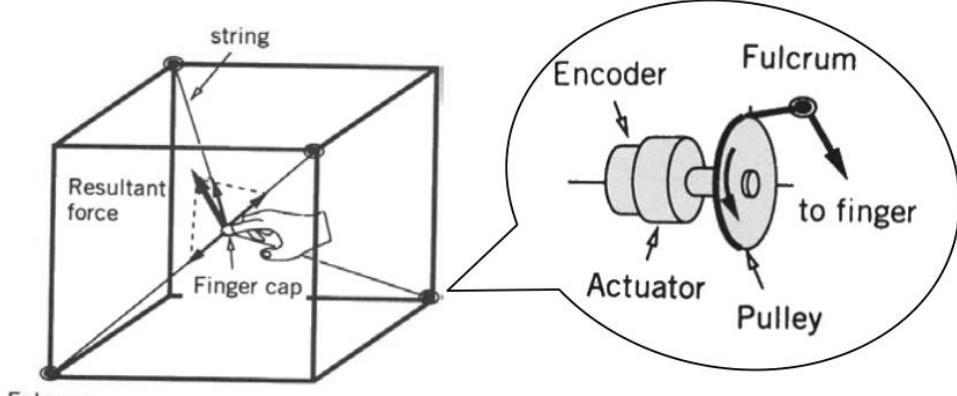
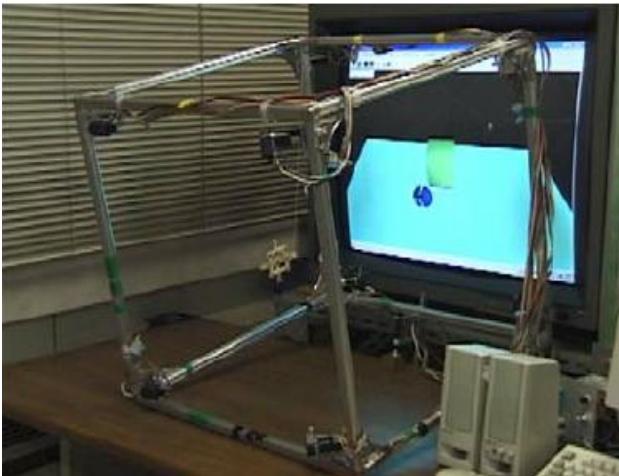
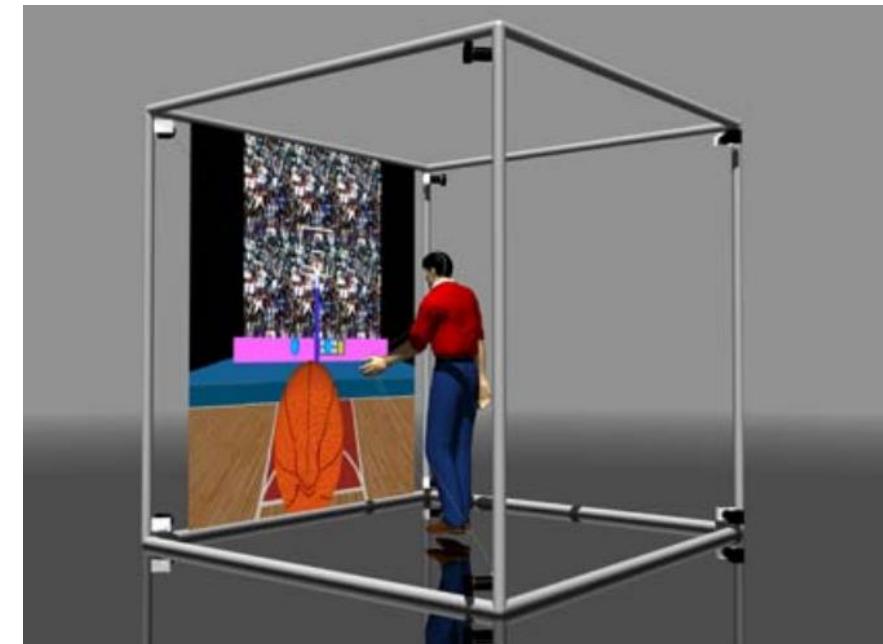


Fig 1. SPIDAR

Fig 2. Actuator



Big SPIDAR (1997)

Historique

- Flock of Birds (1992)



Historique

- Casques pour le jeu vidéo (années 90)



VFX1 Headgear (1995)



Cybermaxx (1995)



Nintendo Virtual Boy (1995)

Historique

- Années 2000-2010



Kaiser ProView (2001)



nVisor SX (2009)



CAVE Renault (2012)

Historique

- Haption
Virtuose 6D
(2001)



Historique

- Depuis 2010

Oculus Rift DK1 (2013)



Oculus Rift DK2 (2014)



HTC Vive (2015)



Samsung Gear VR (2015)

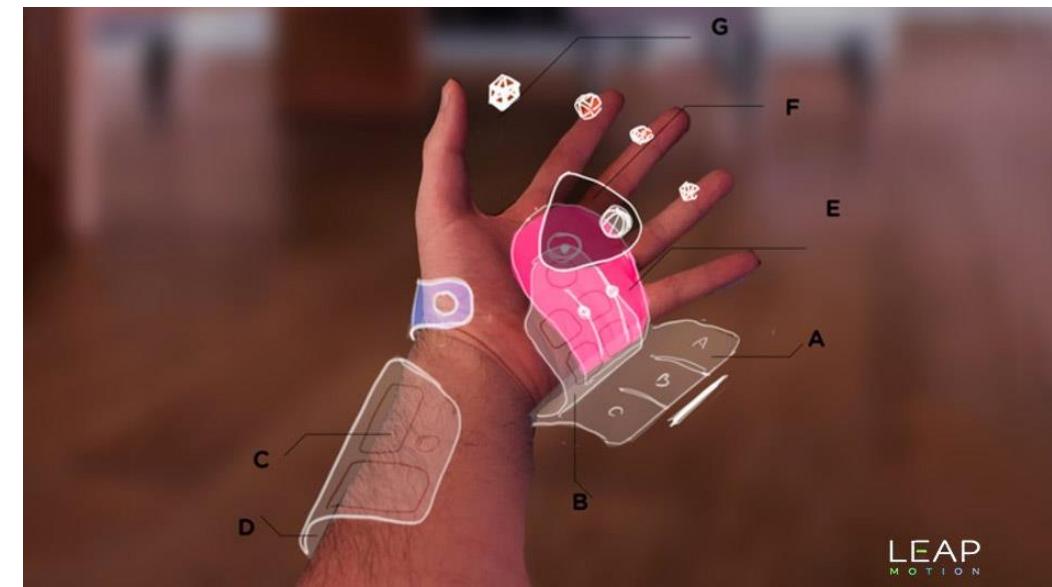


Oculus Quest (2019)



Historique

- Leap Motion (2013)



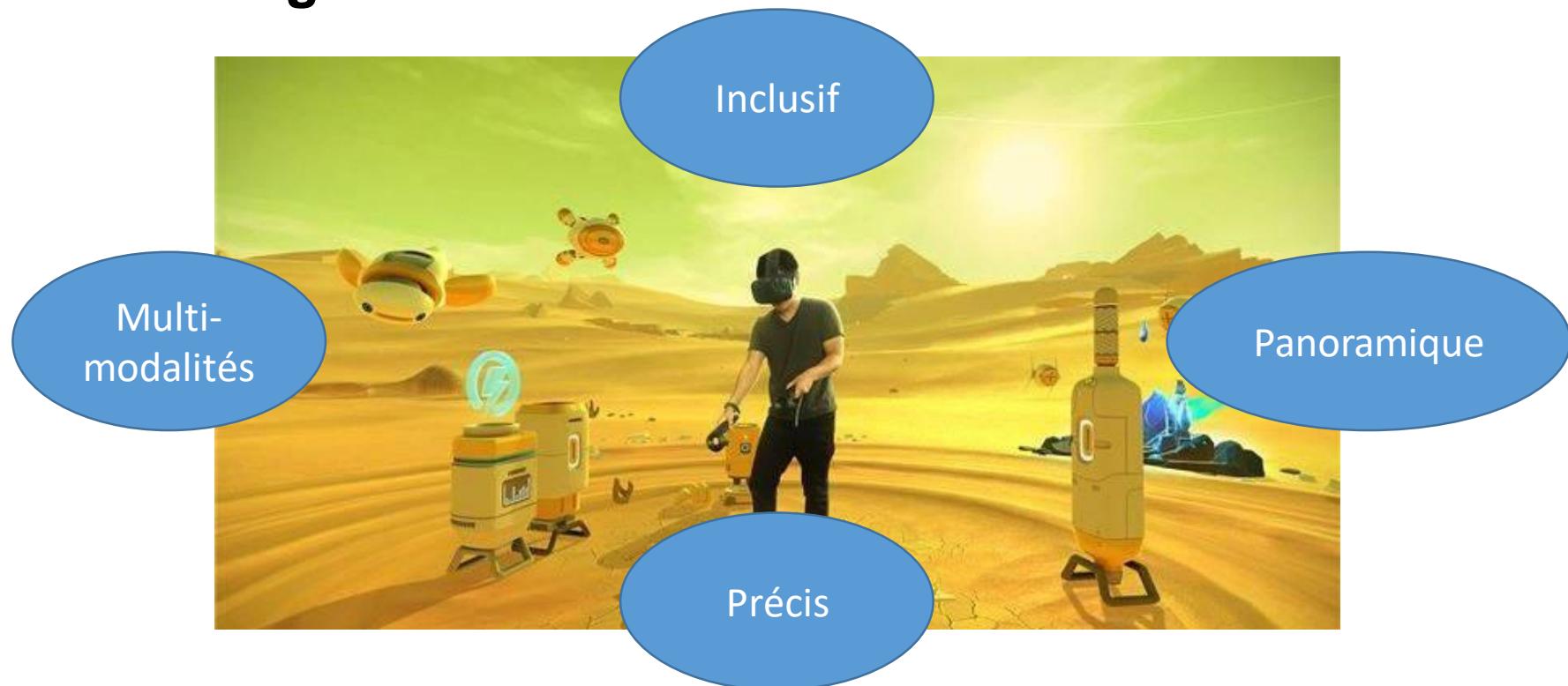
LEAP

MOTION

Caractéristiques d'un système de RV

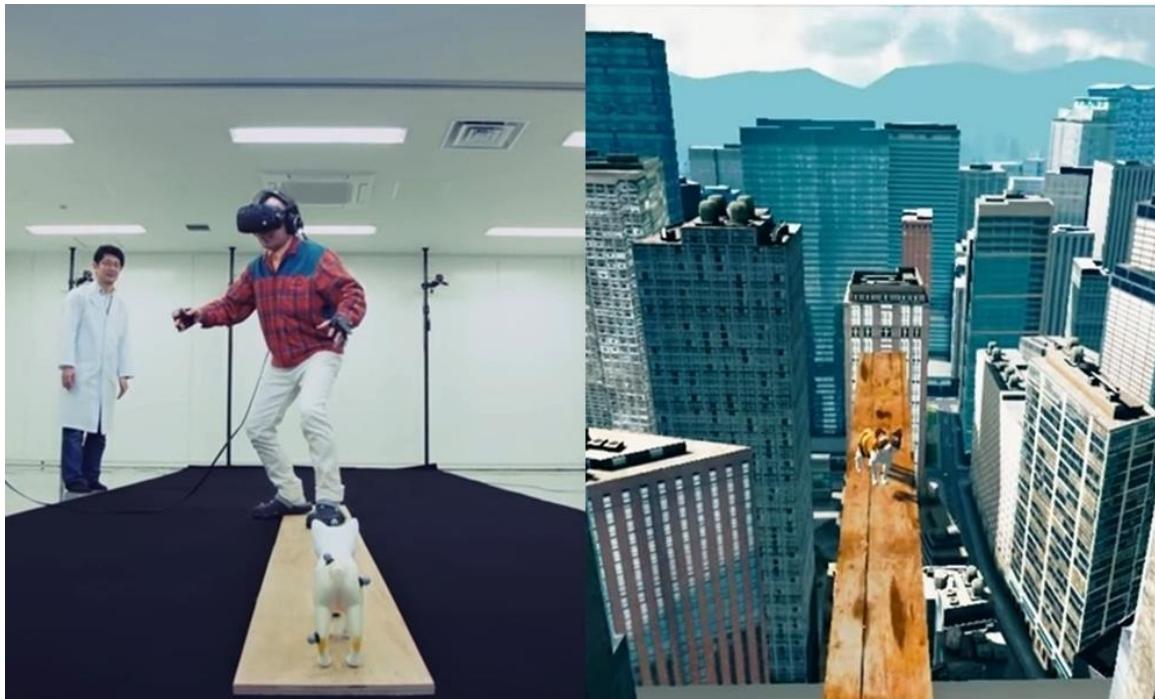
Immersion

- Mesure selon laquelle un **dispositif technologique** est capable de remplacer des stimulations sensorielles en provenance du **monde réel** par des stimulations **générées artificiellement**.



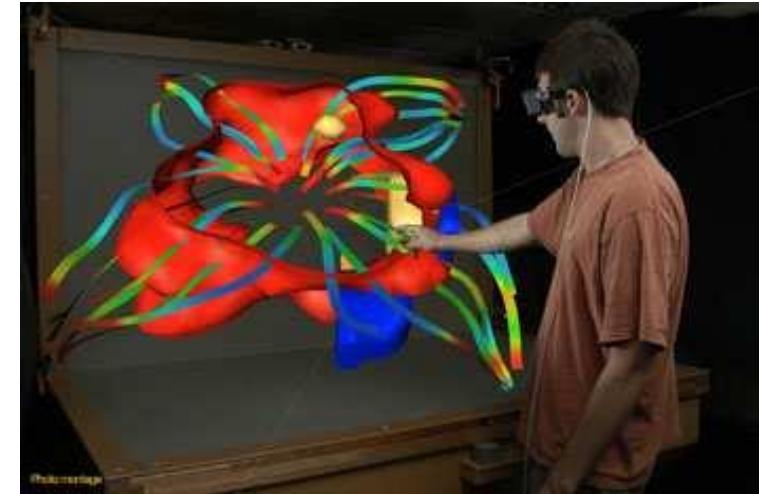
Présence

- Sentiment d'être **présent** dans l'environnement virtuel.



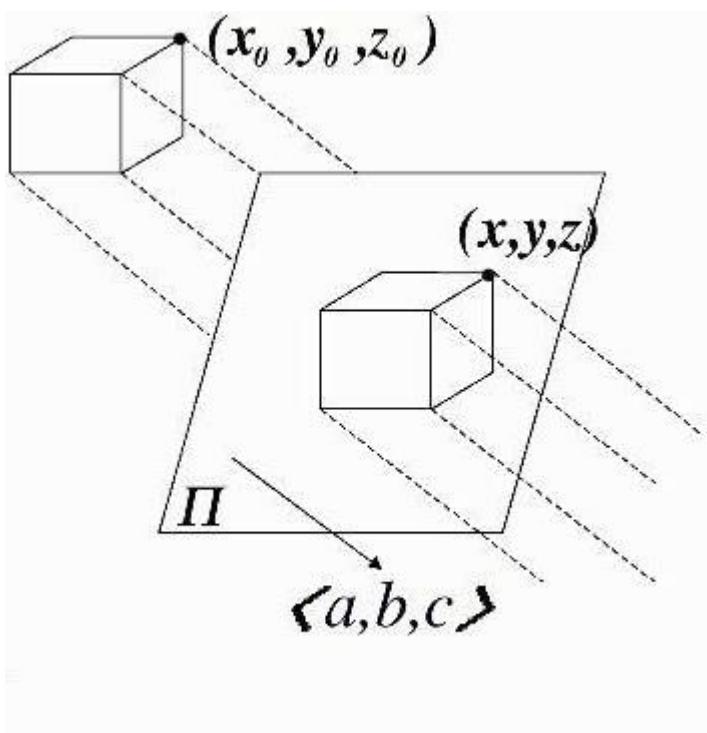
Affichage pour la réalité virtuelle

Périphériques d'affichage

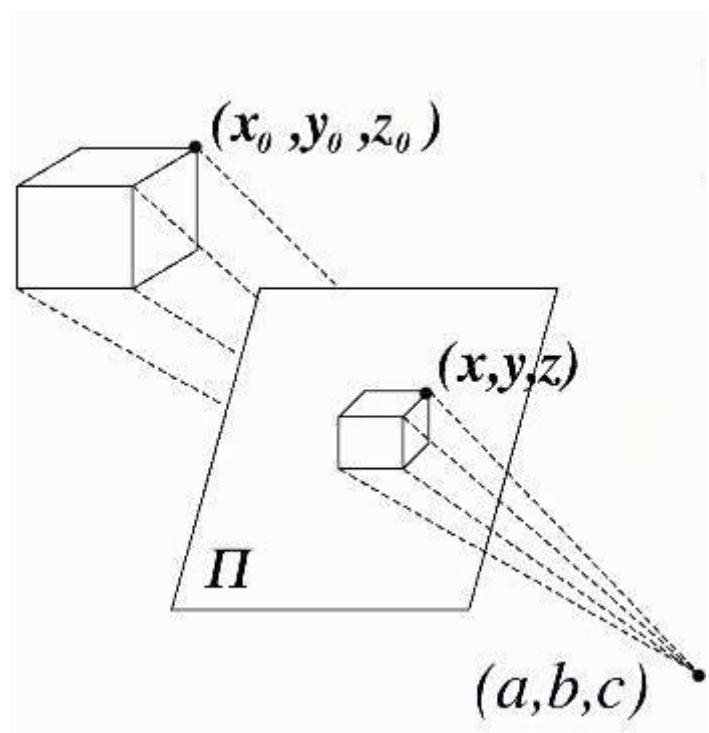


Projection

Parallèle

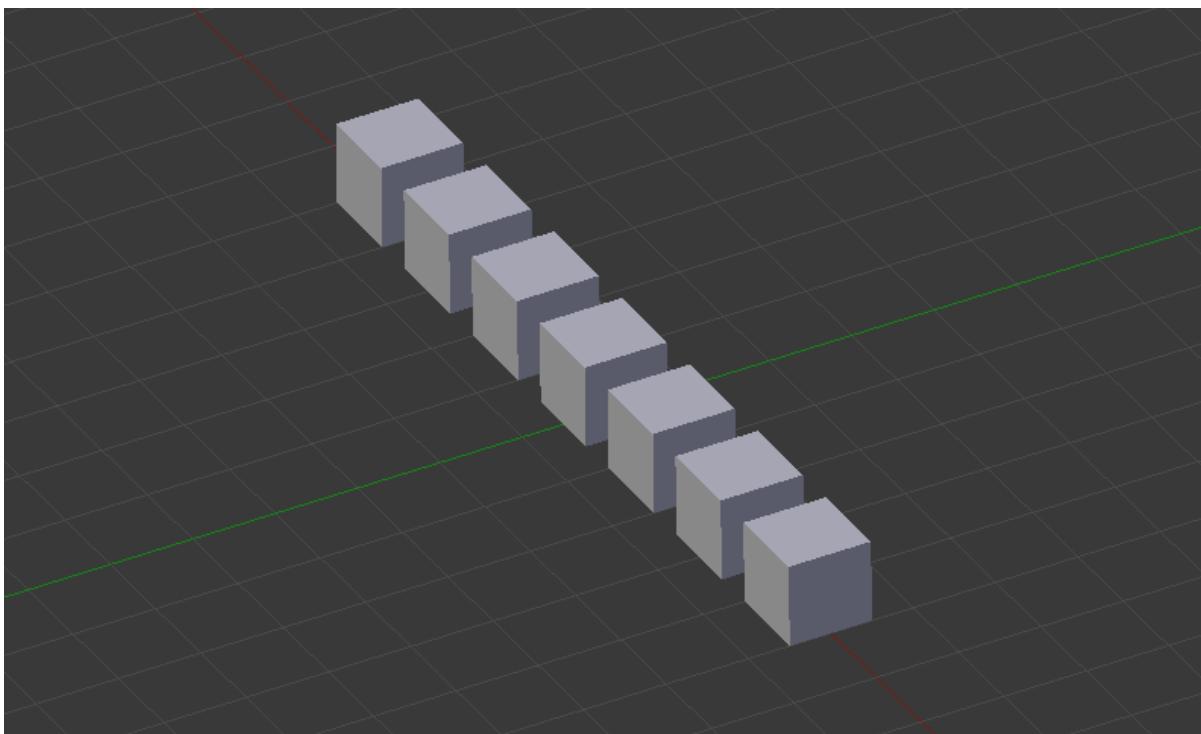


Perspective

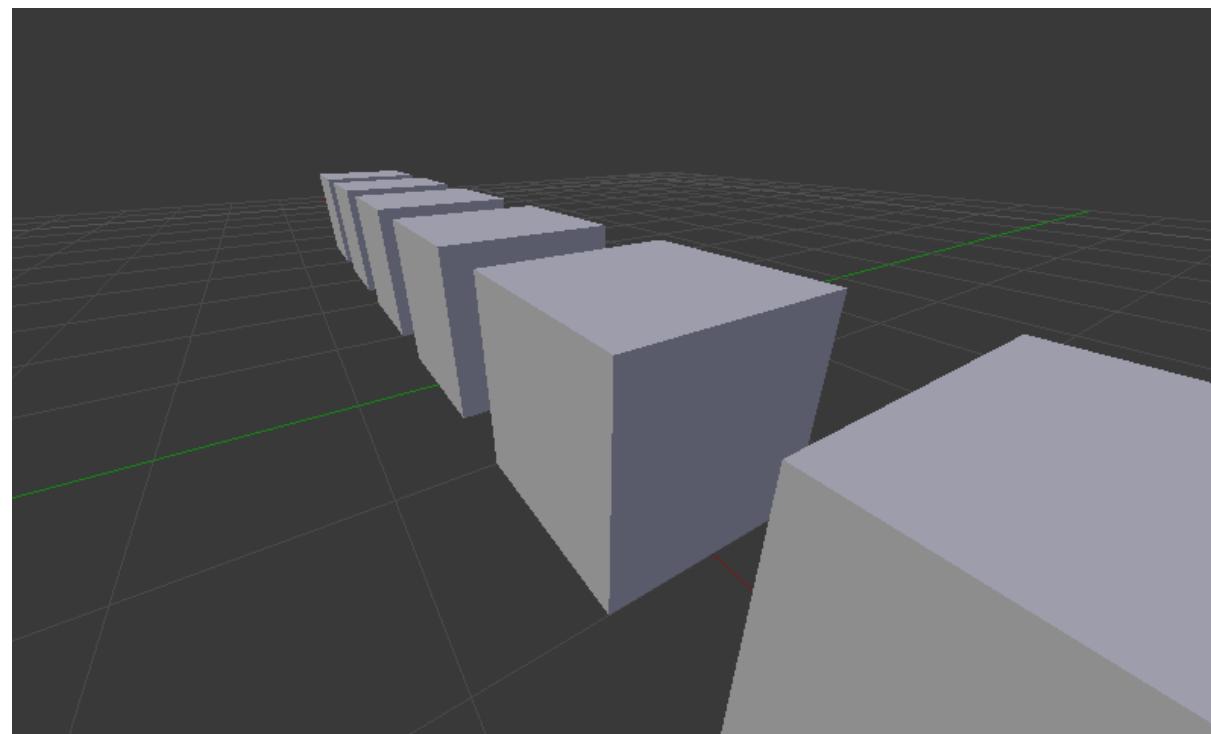


Projection

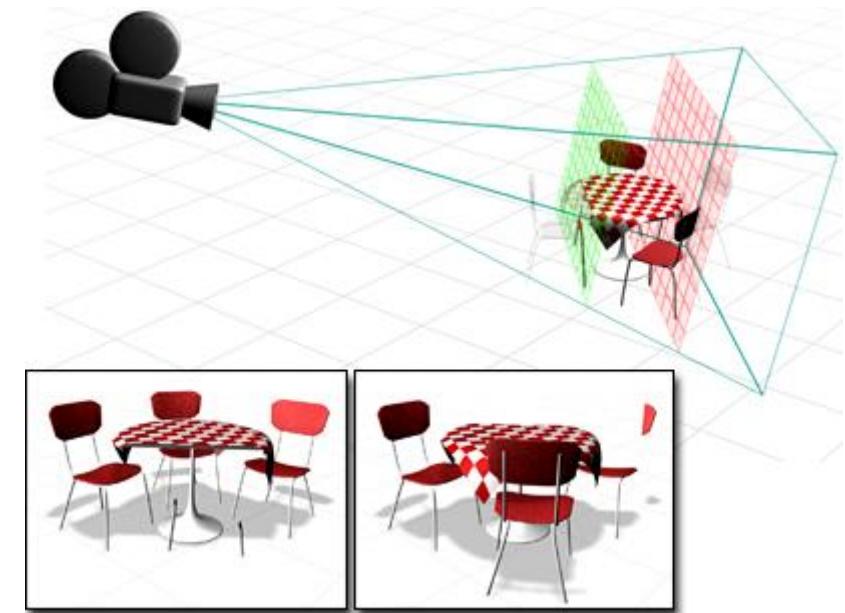
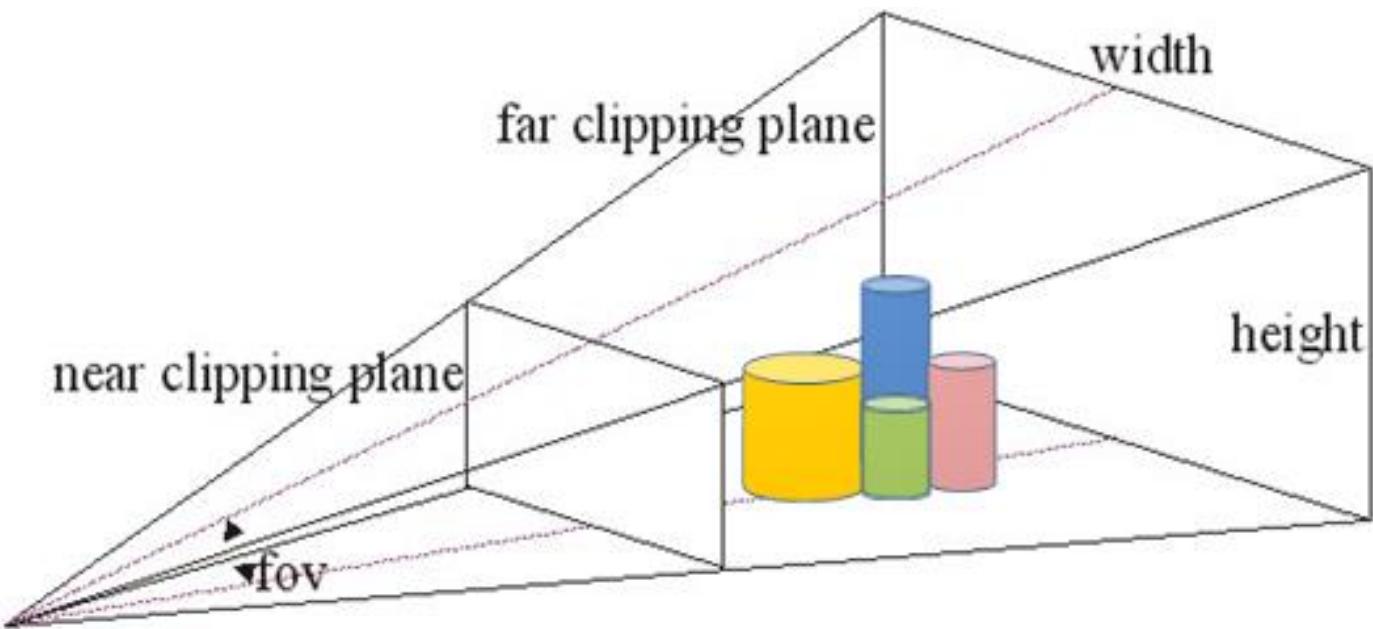
Parallèle



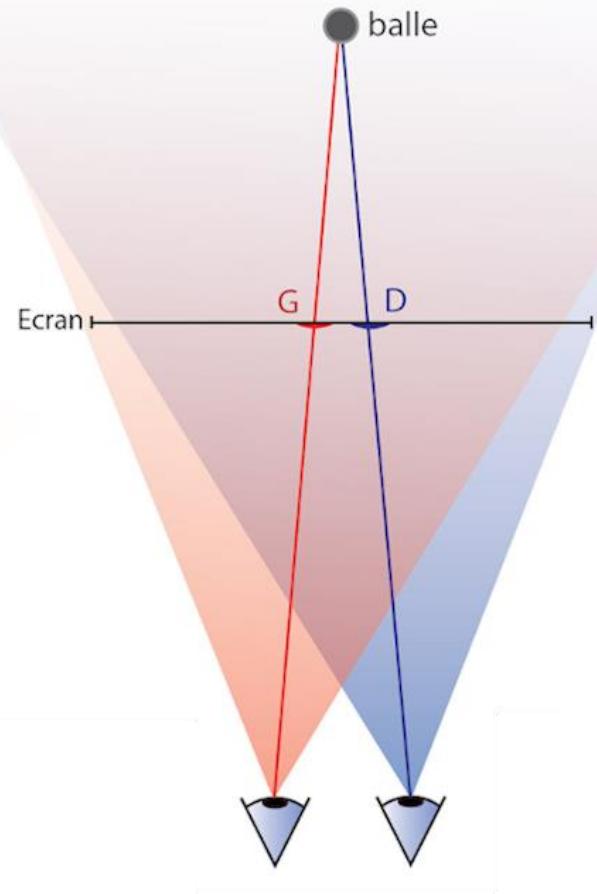
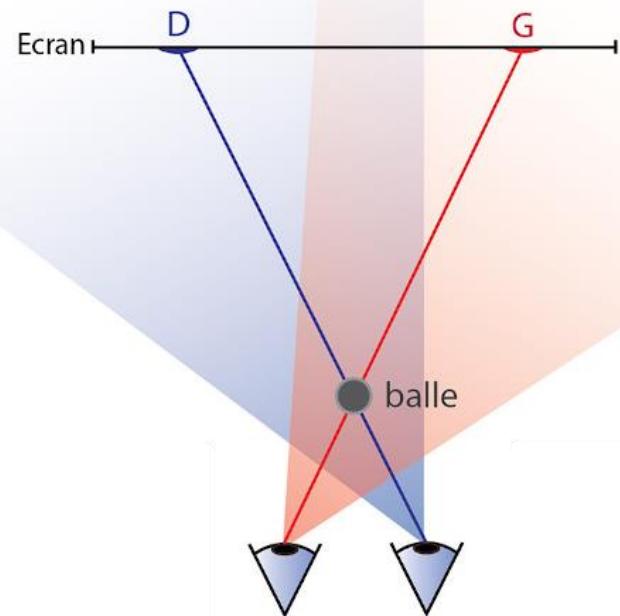
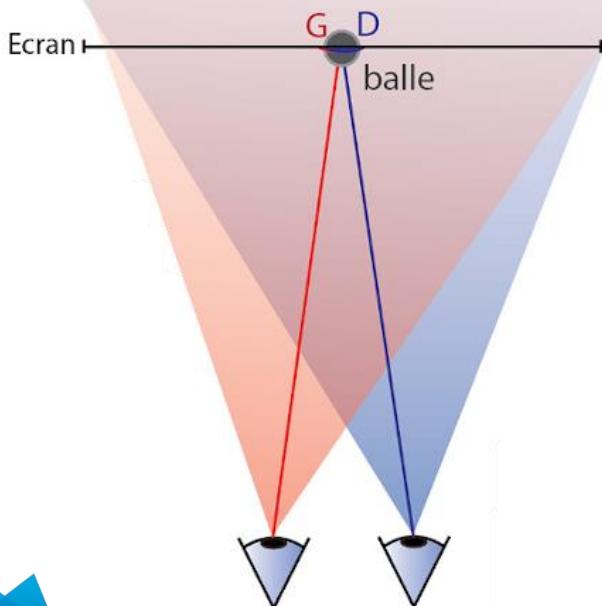
Perspective



Pyramide de vue

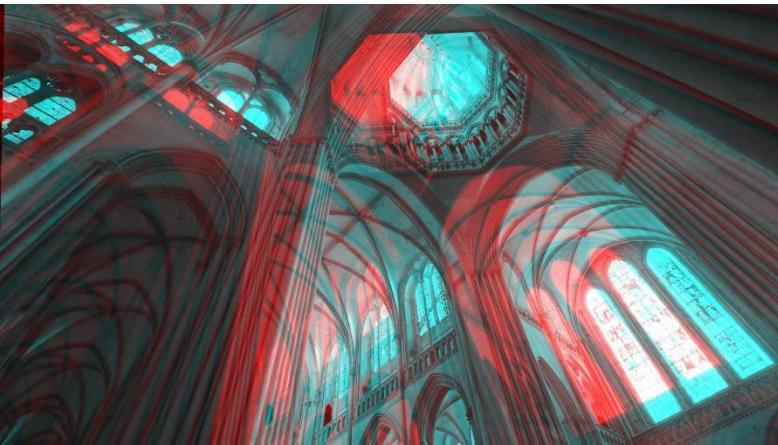


Stéréoscopie



Stéréoscopie

Anaglyphe



Stéréoscopie active

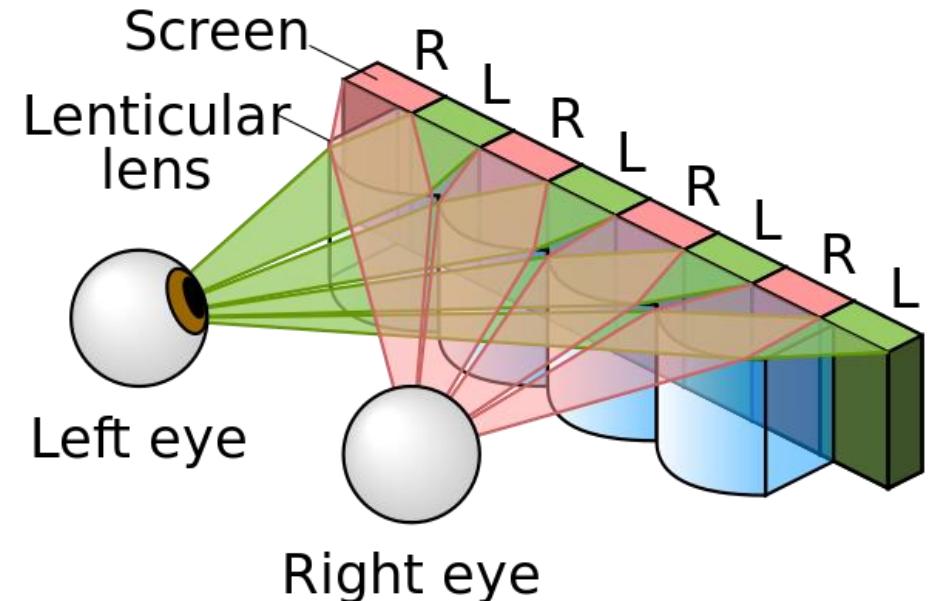
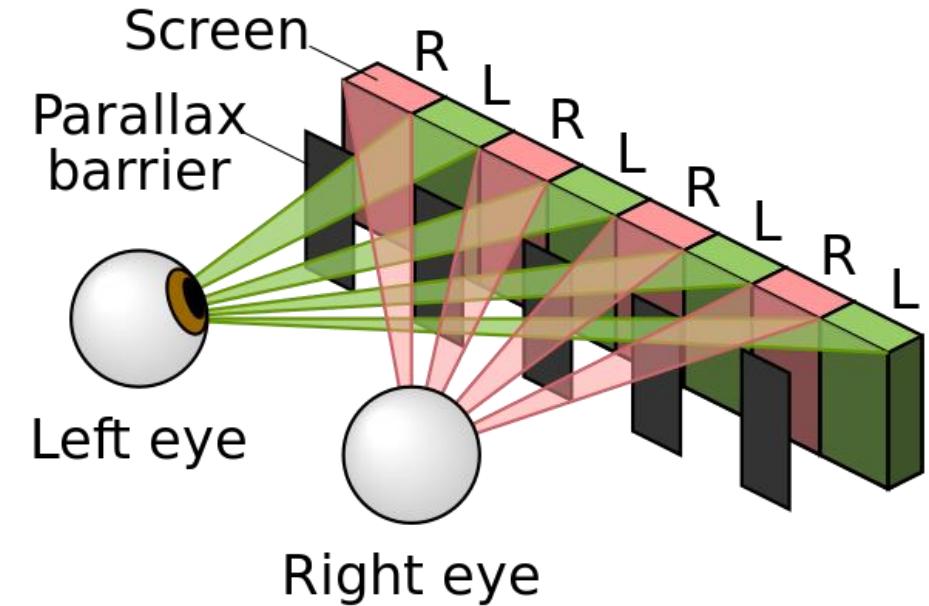


Stéréoscopie passive



Stéréoscopie

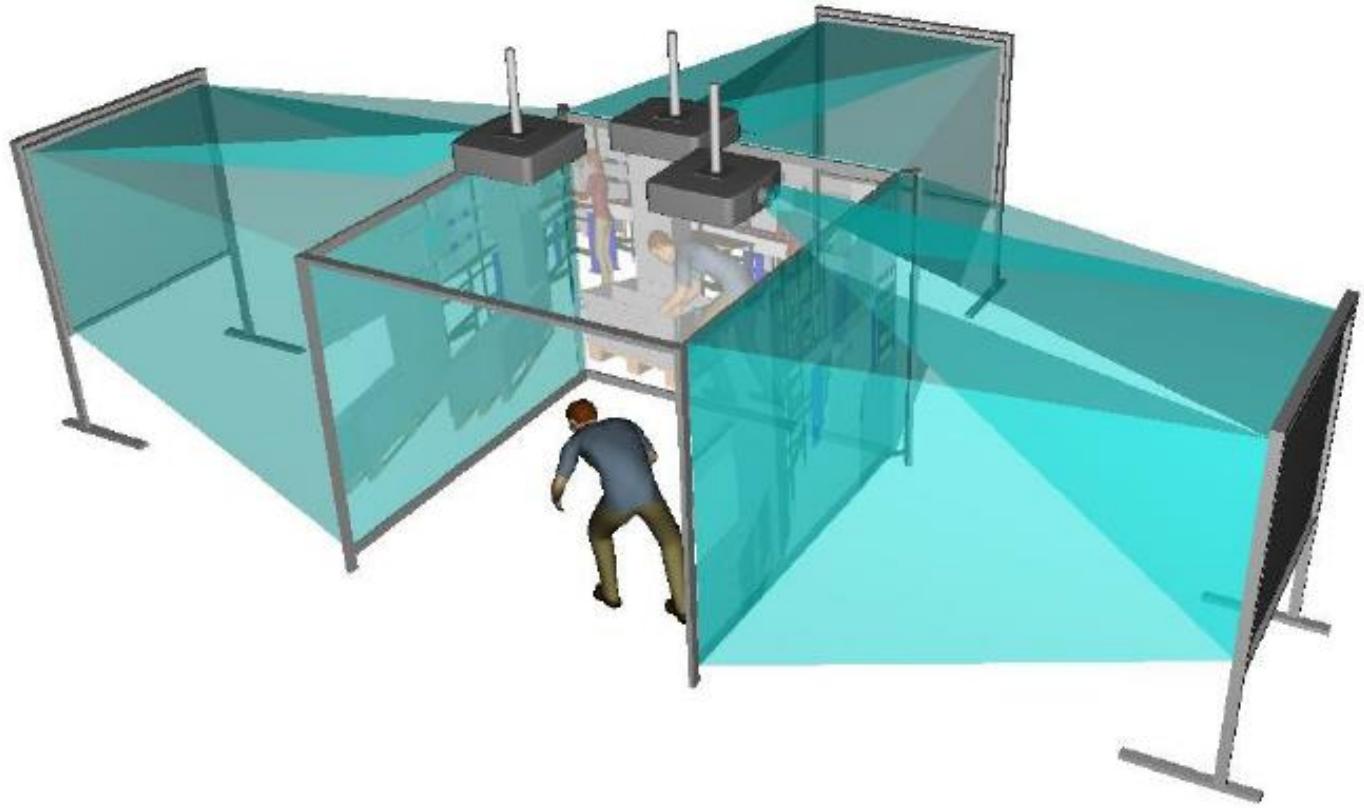
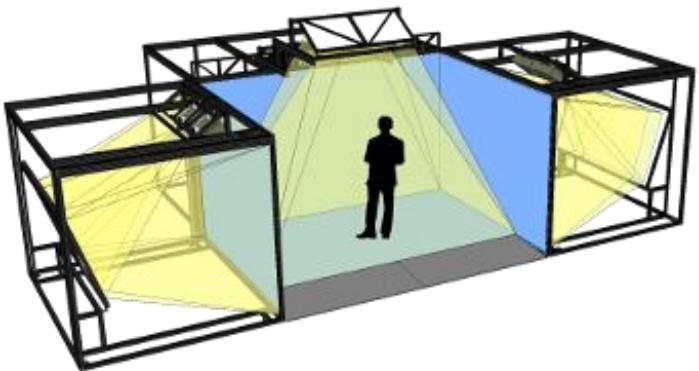
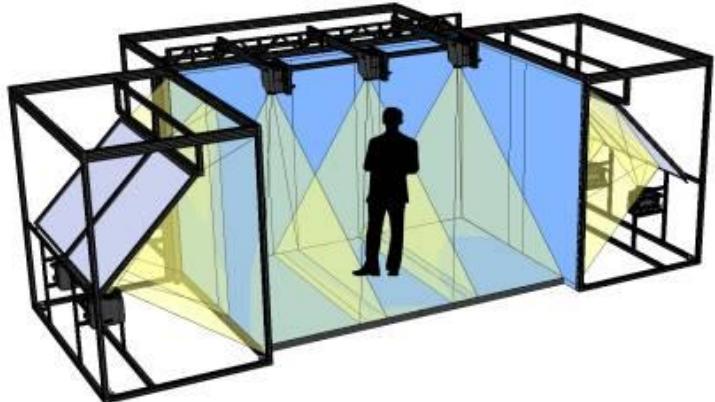
Ecrans auto-stéréoscopiques



Stéréoscopie dans un casque de RV

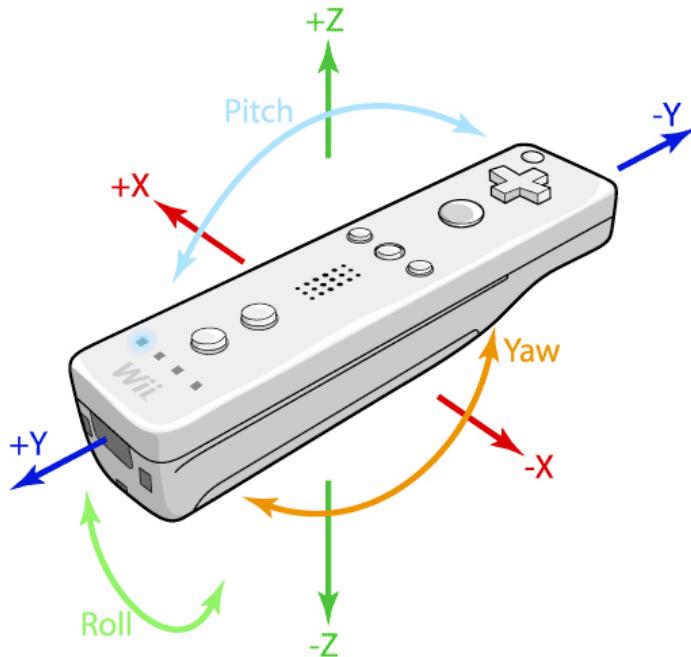


Calibration



Interactions pour la réalité virtuelle

Périphériques d'interaction



Métaphores d'interaction

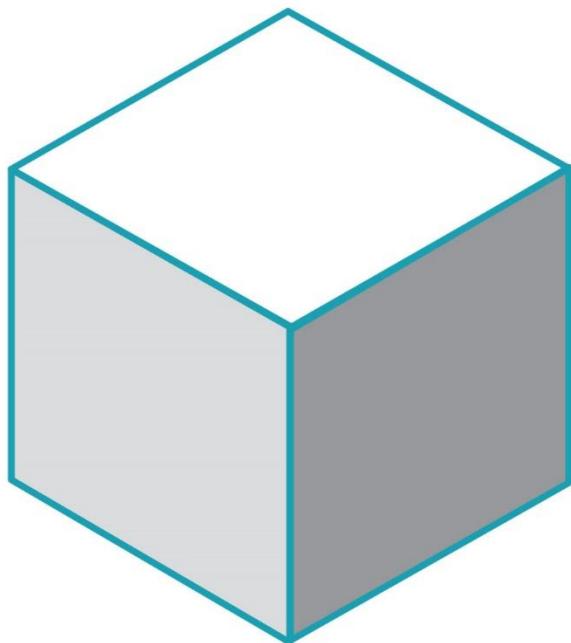
- Métaphore :

« Au lieu d'exploiter un comportement sensori-moteur et acquis de la personne, nous lui proposons, visuellement en général, une image symbolique de l'action ou de la perception souhaitée »

P. Fuchs, Le traité de la réalité virtuelle, Volume 1

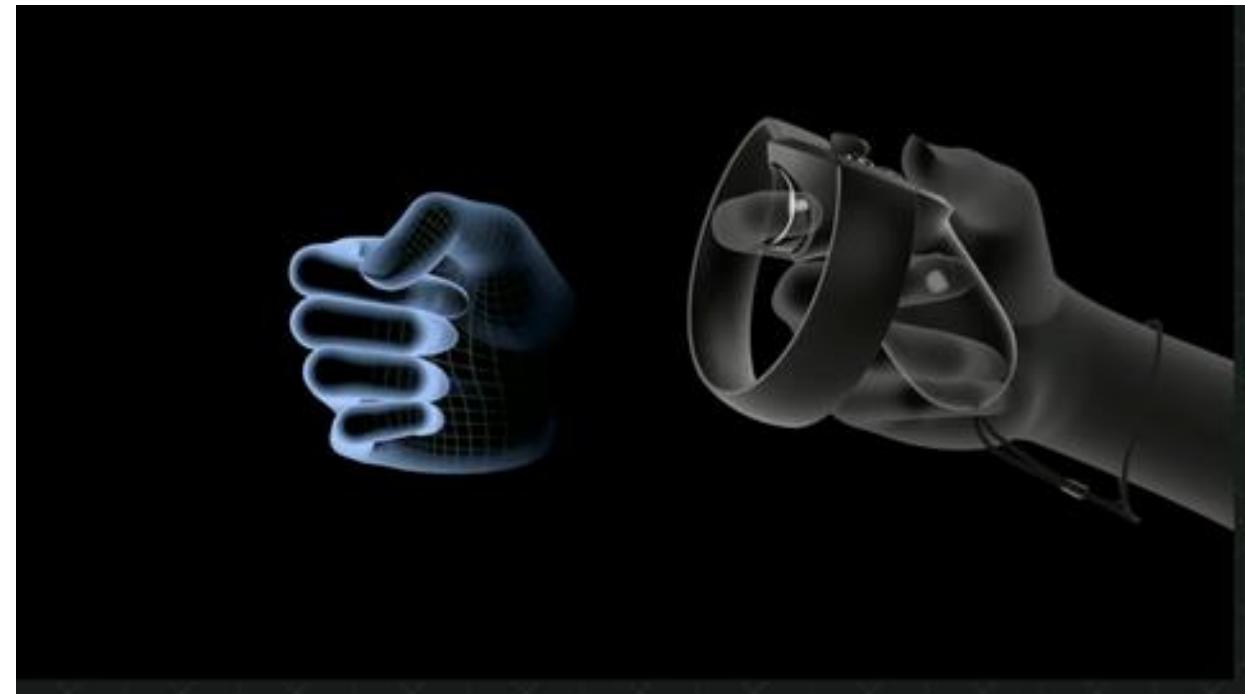
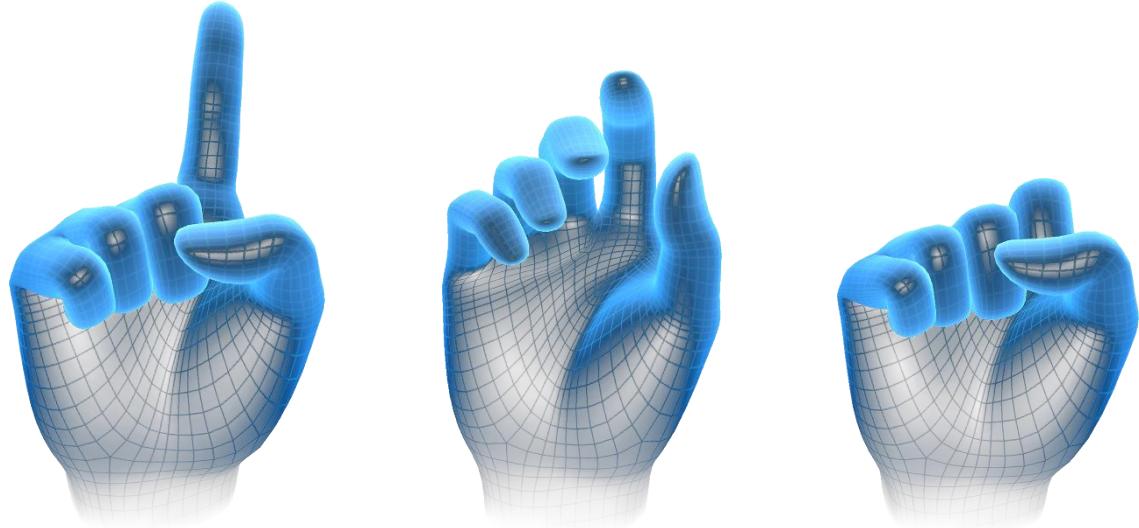
Métaphores d'interaction

- Manipuler un objet ?



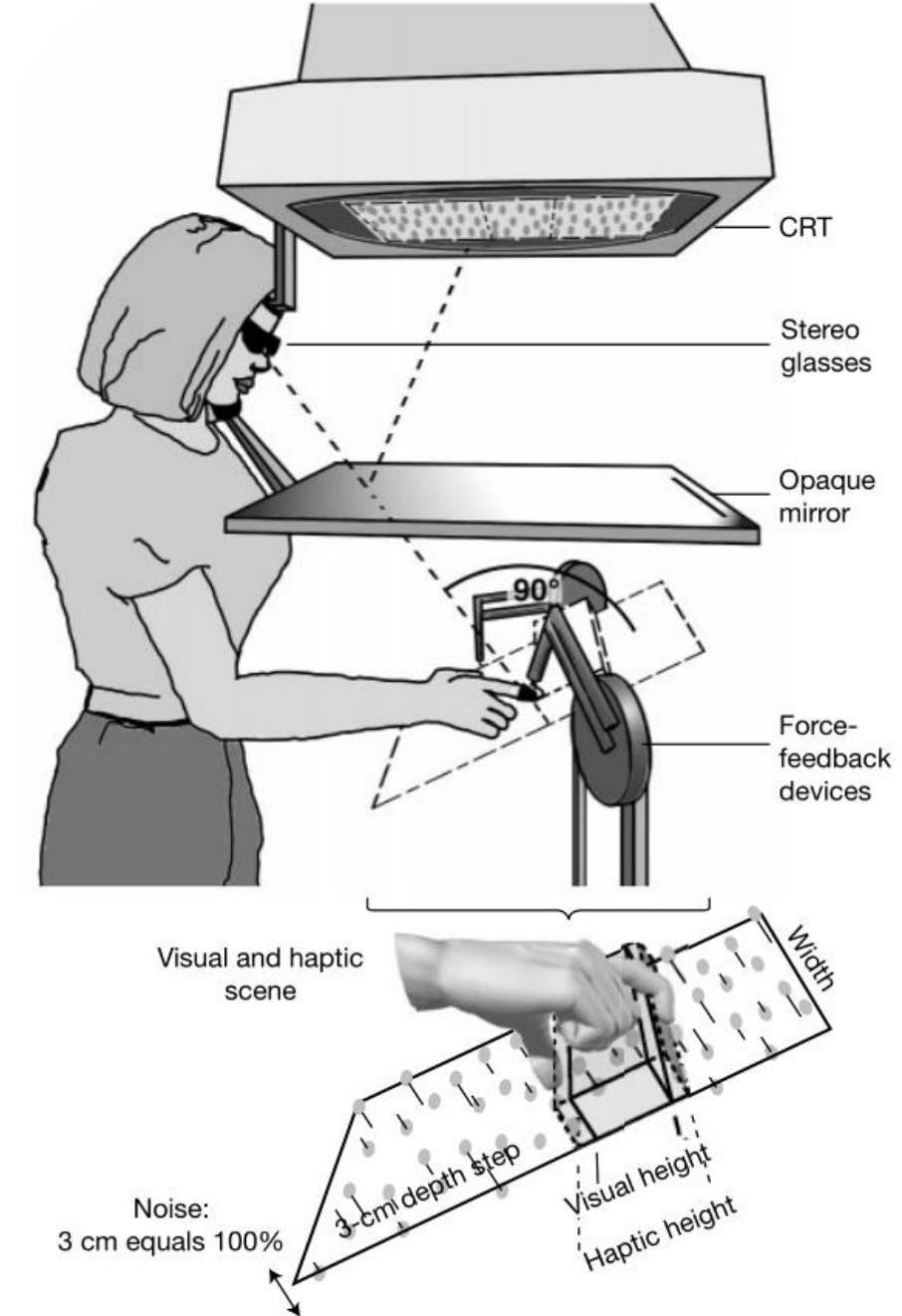
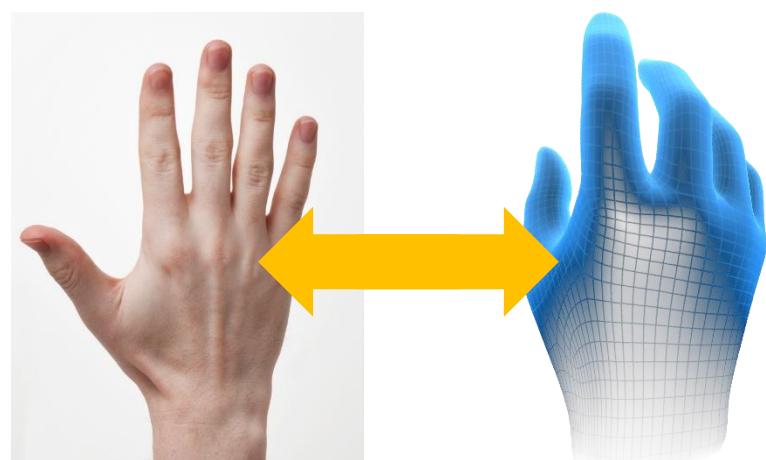
Métaphores d'interaction

- Main virtuelle



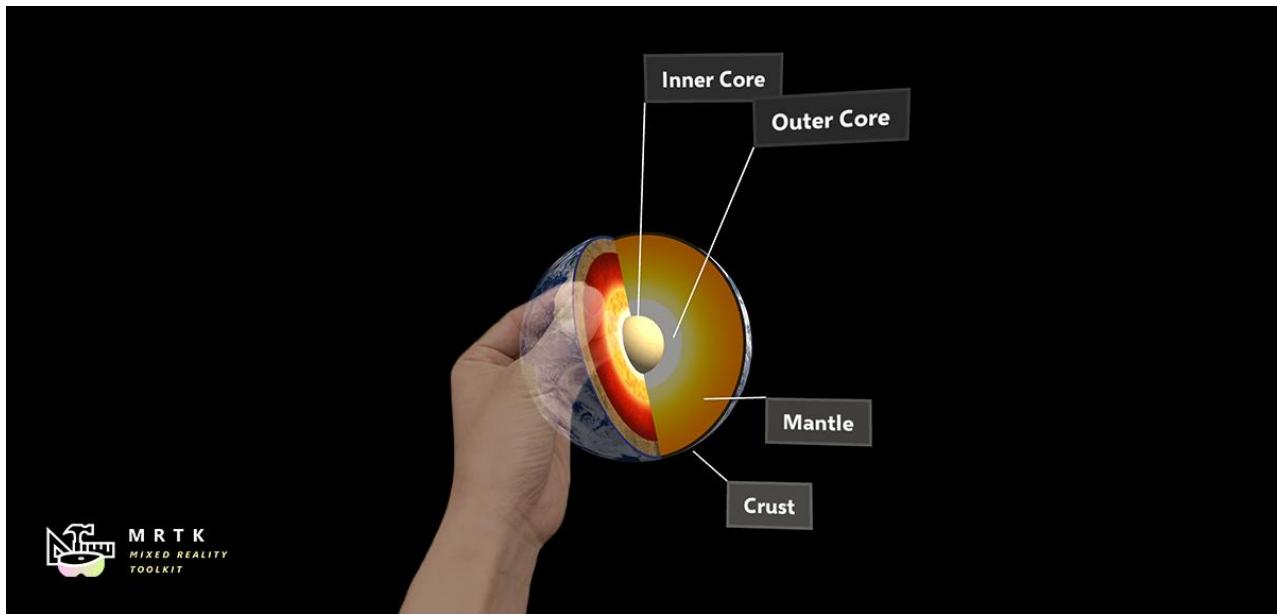
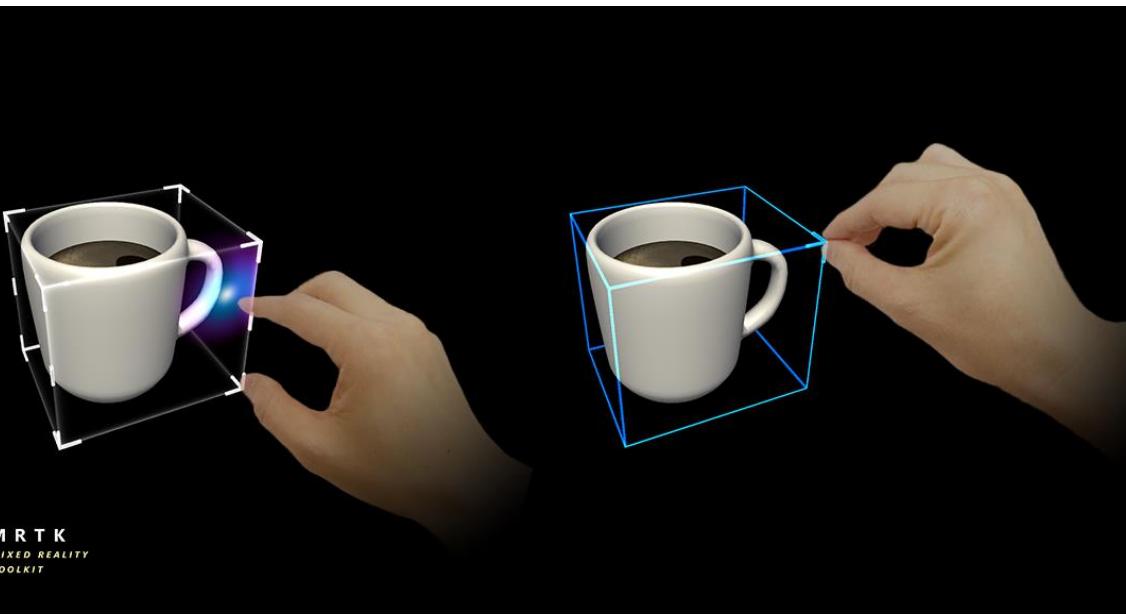
Métaphores d'interaction

- Main virtuelle : co-localisation



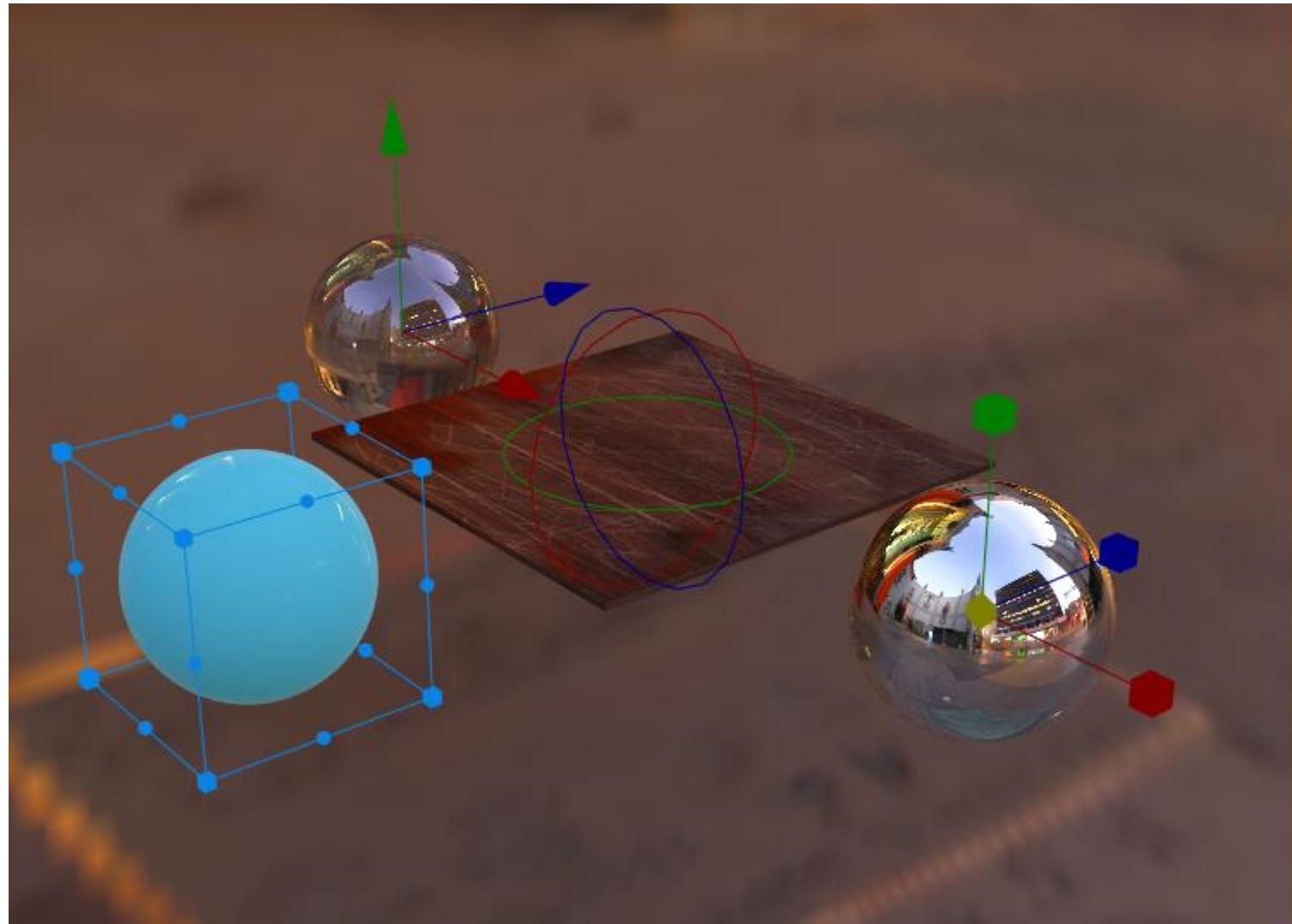
Métaphores d'interaction

- Gestes



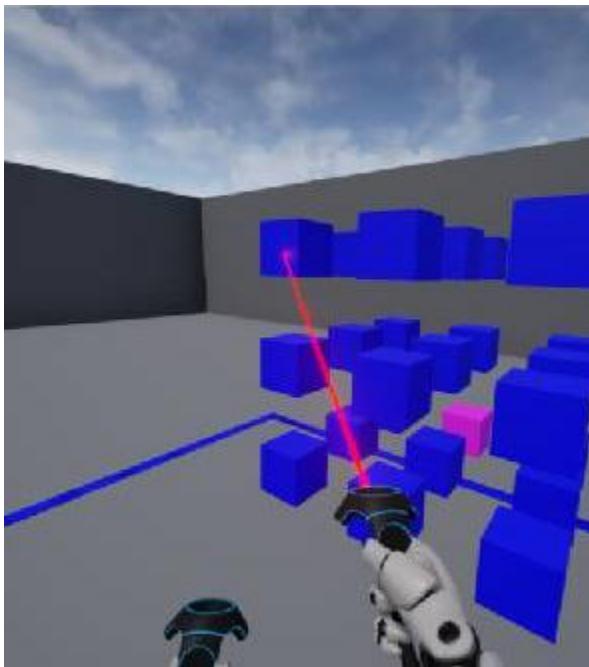
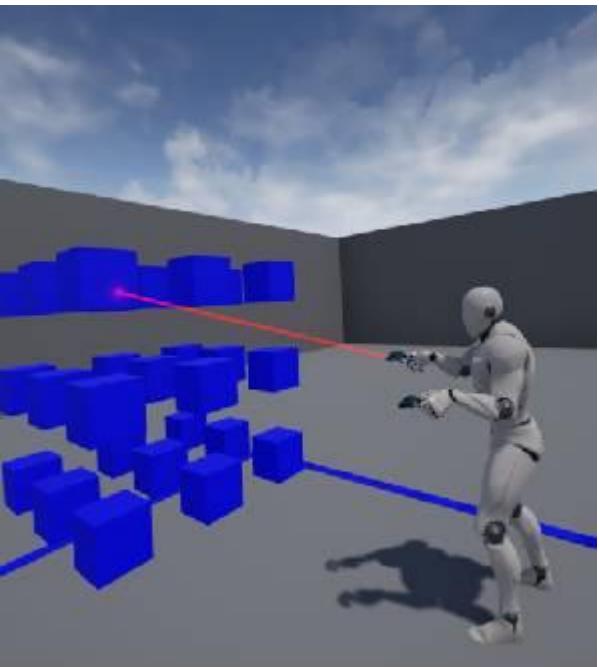
Métaphores d'interaction

- Gizmos

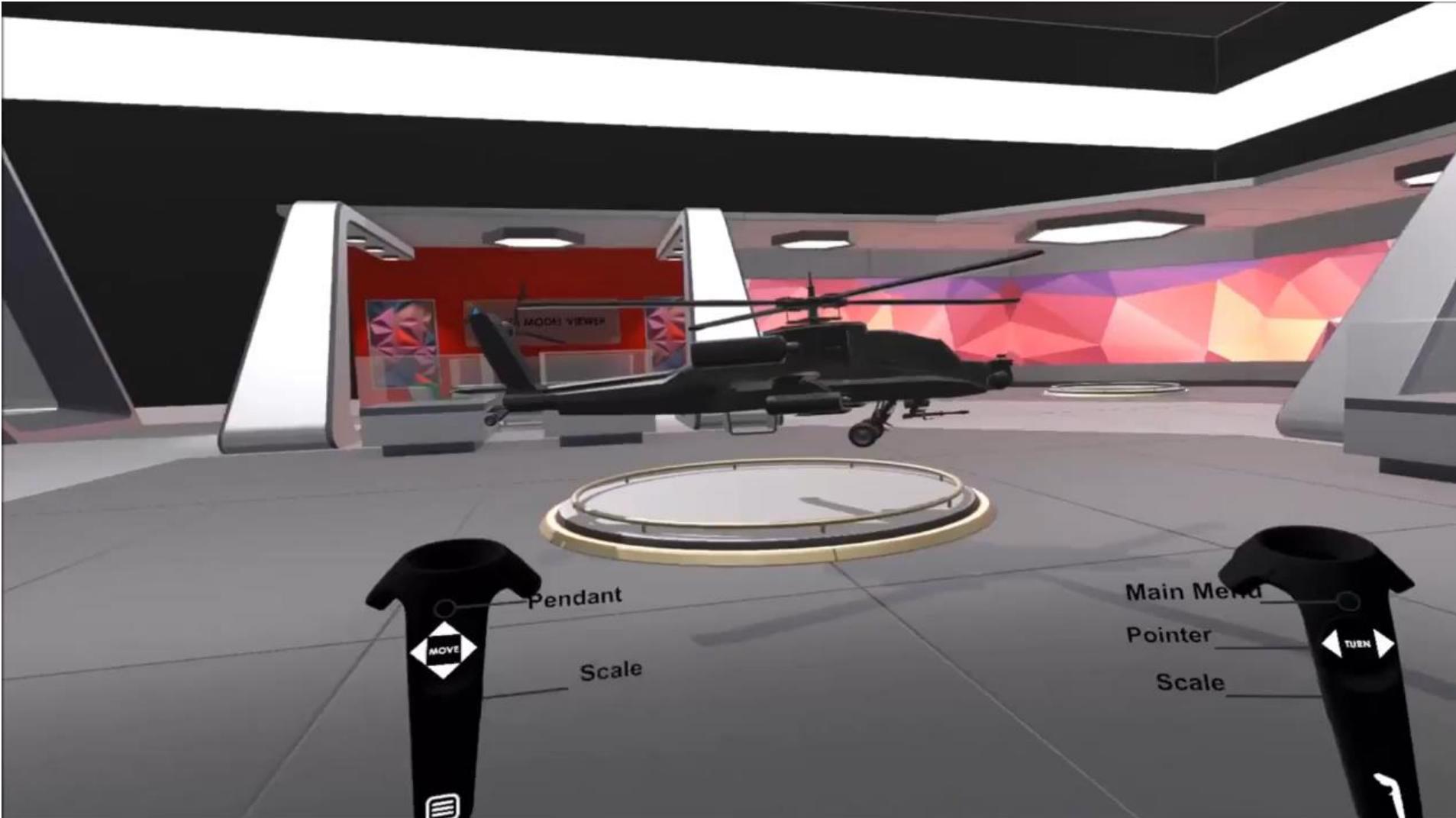


Métaphores d'interaction

- Rayon



Métaphores d'interaction



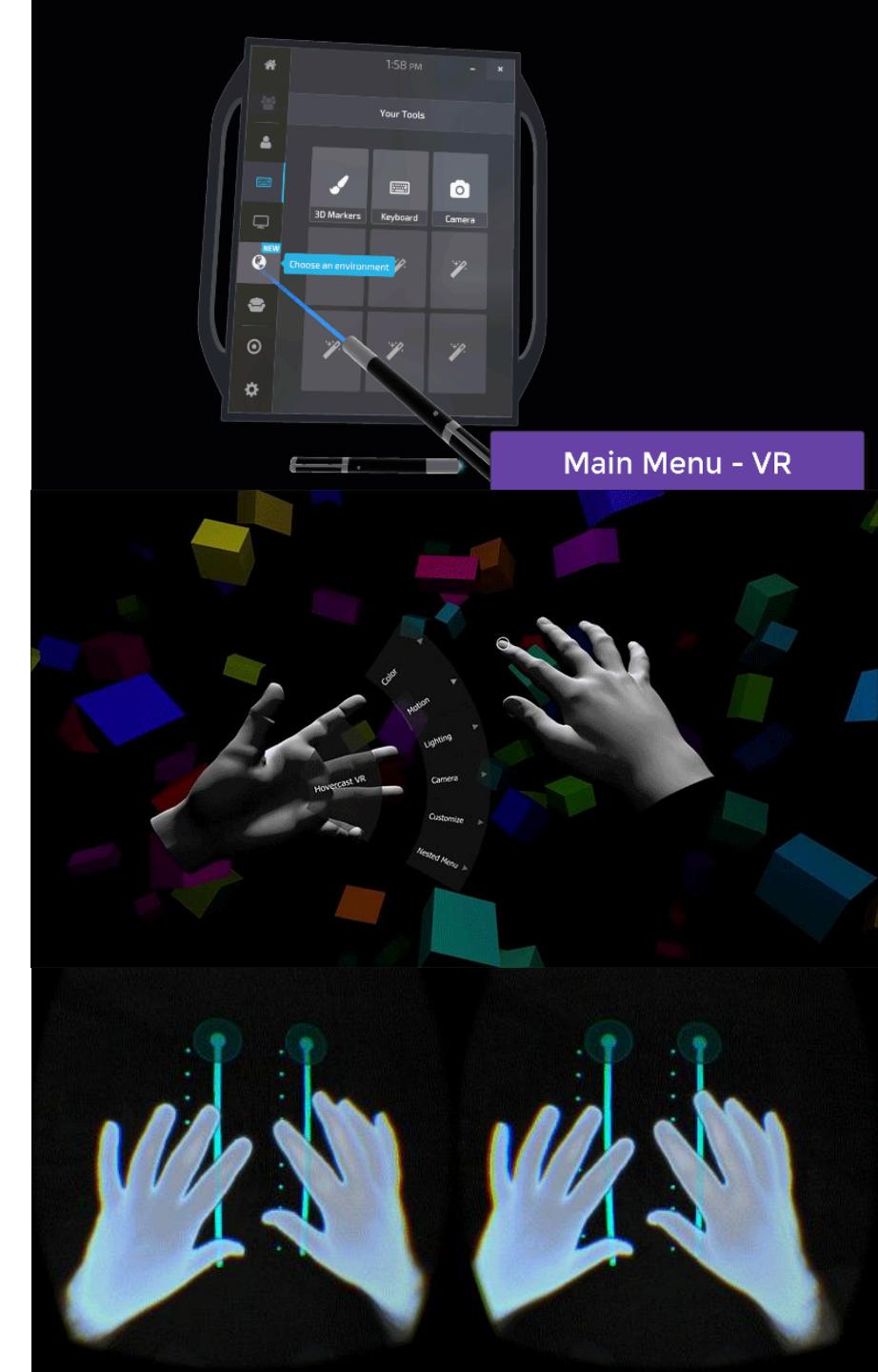
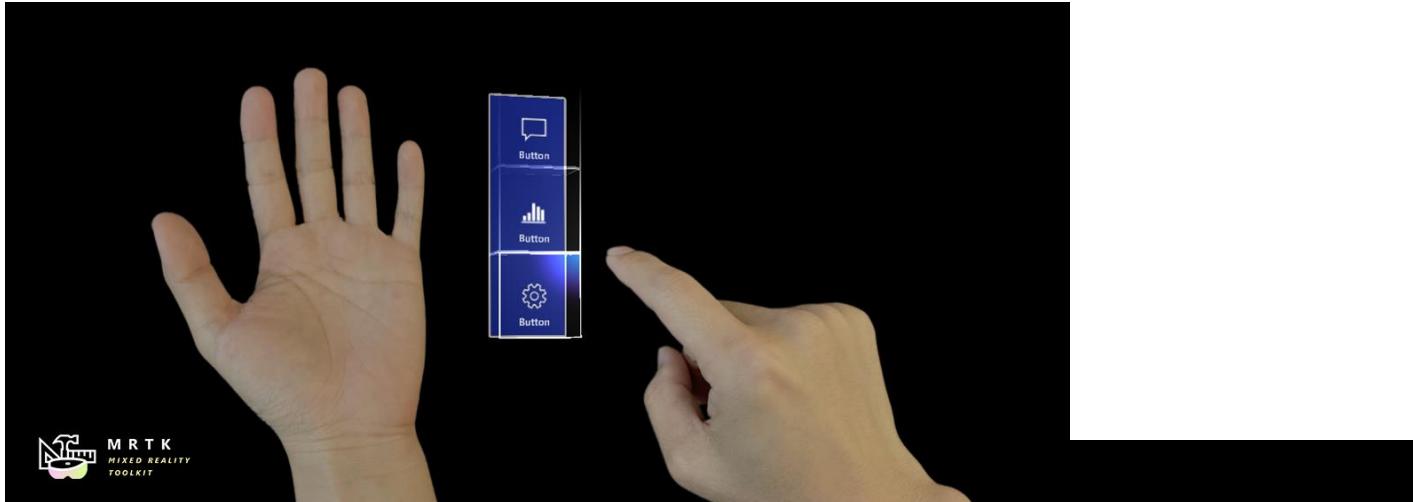
Métaphores d'interaction

- Tactile



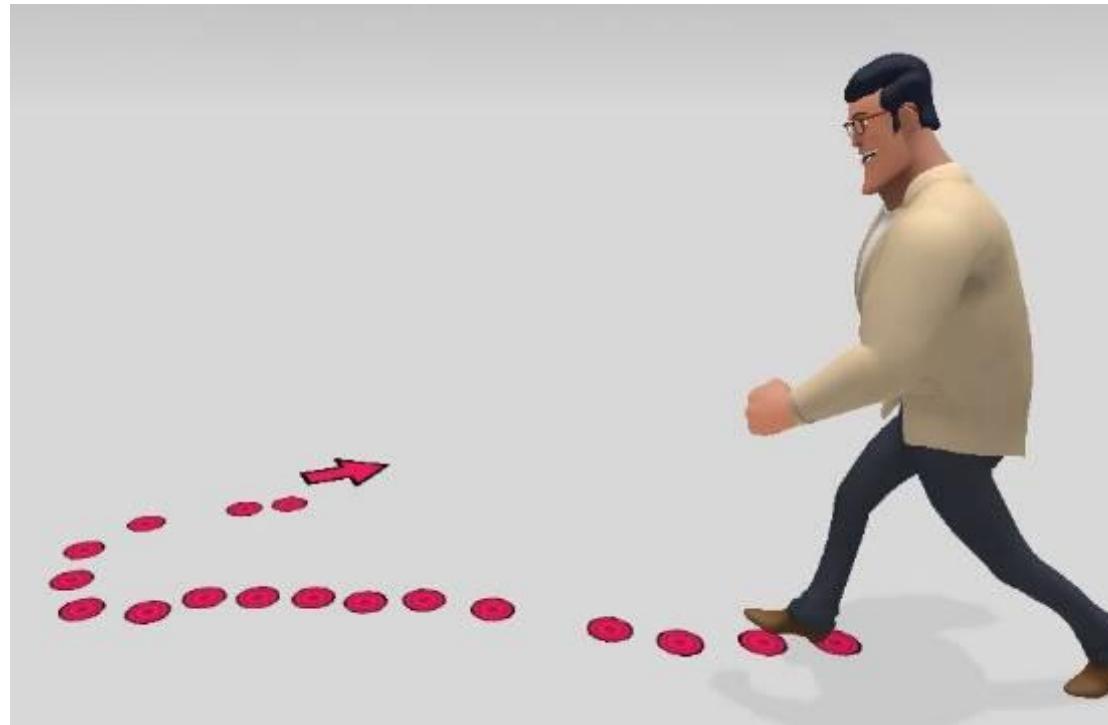
Métaphores d'interaction

- Contrôle de l'application



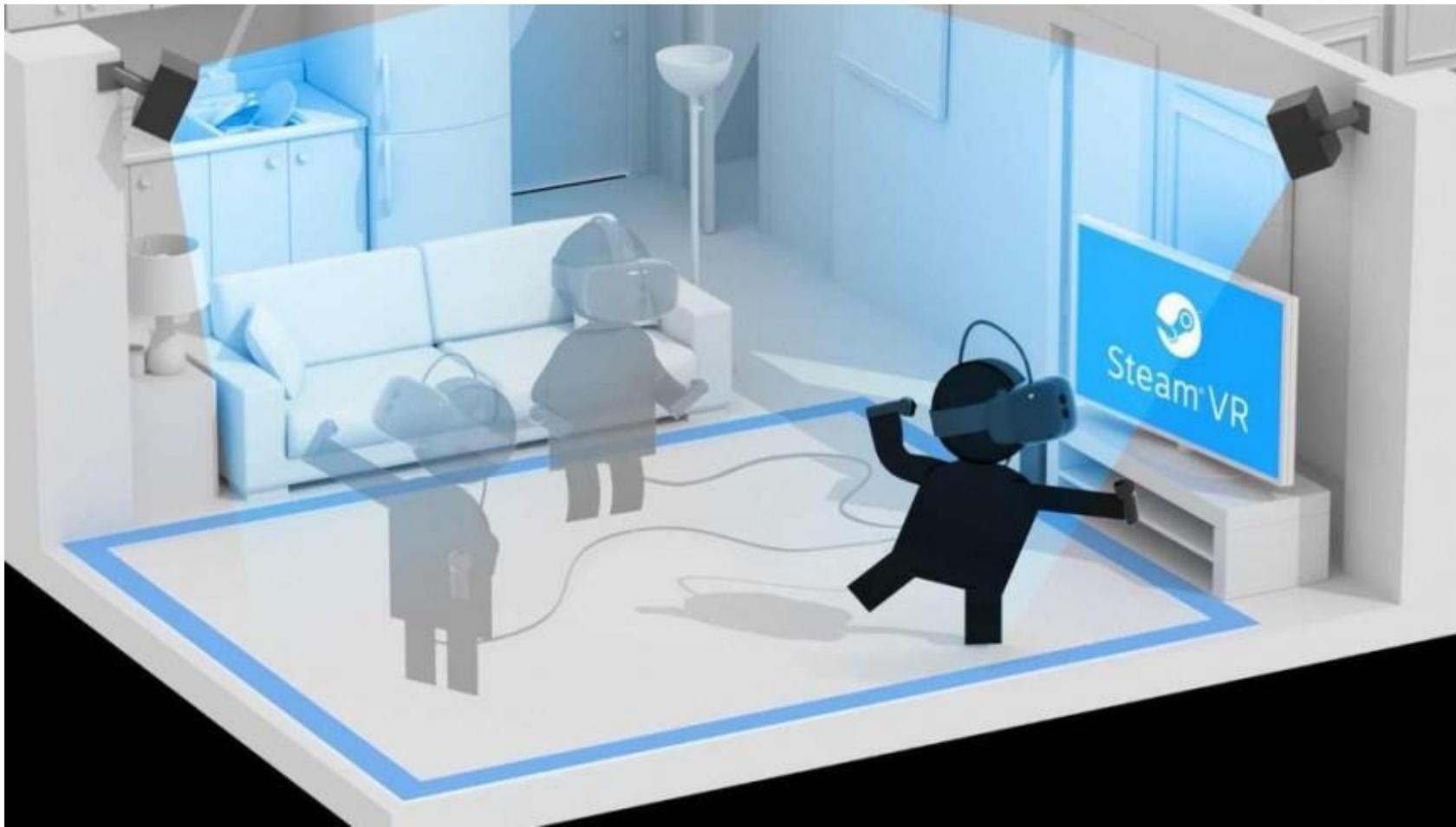
Métaphores de navigation

- Se déplacer dans l'environnement virtuel ?



Métaphores de navigation

- « Room scale »



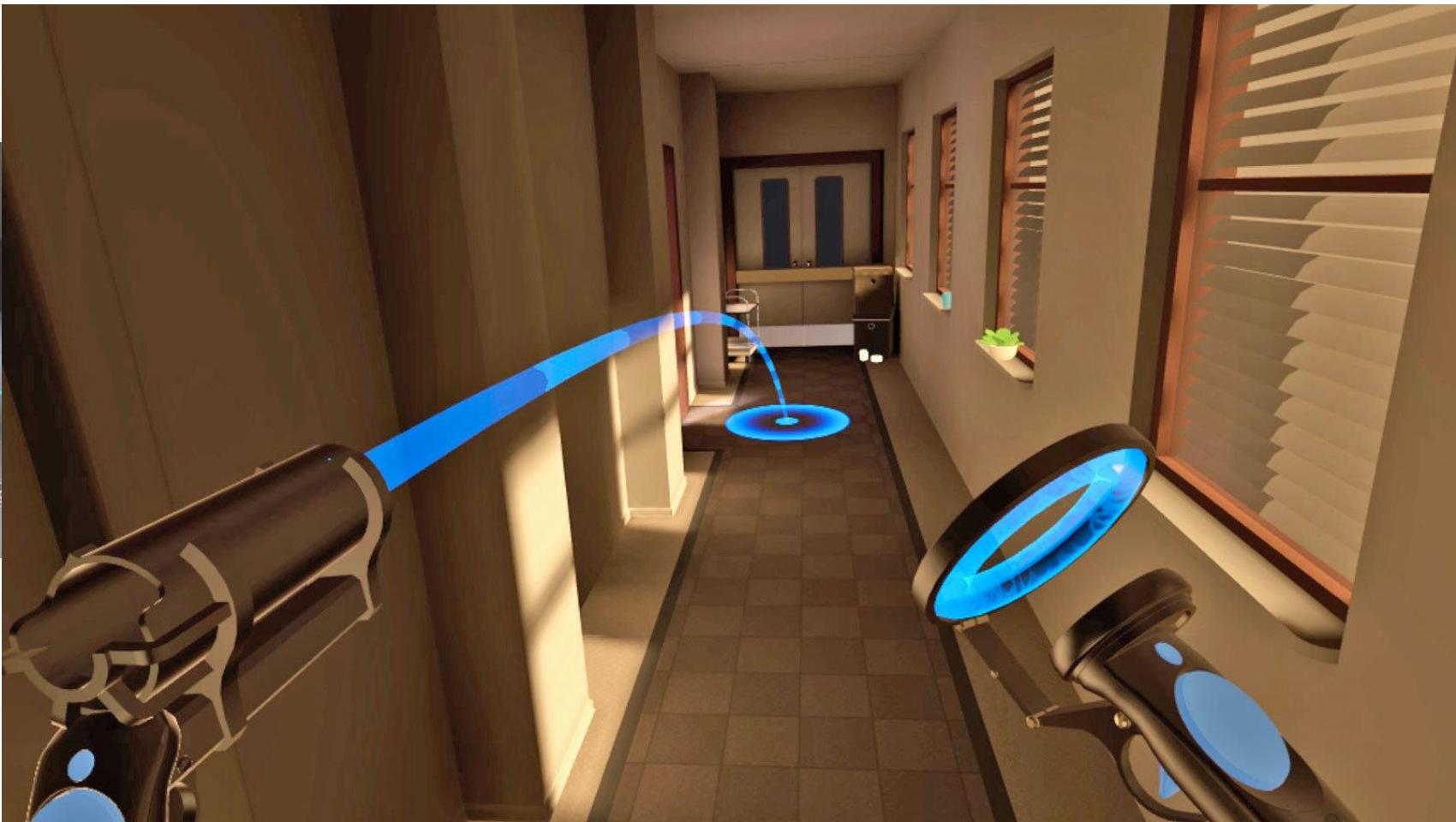
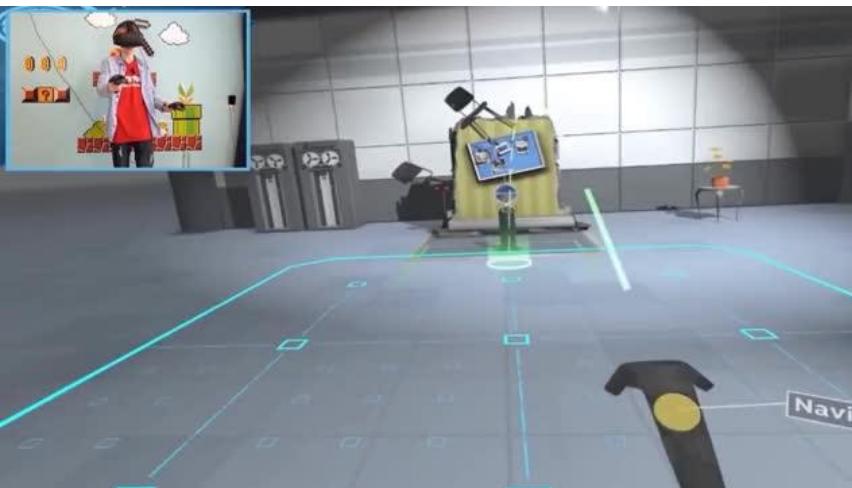
Métaphores de navigation

- Déplacement continu (manette, contrôleur, etc.)



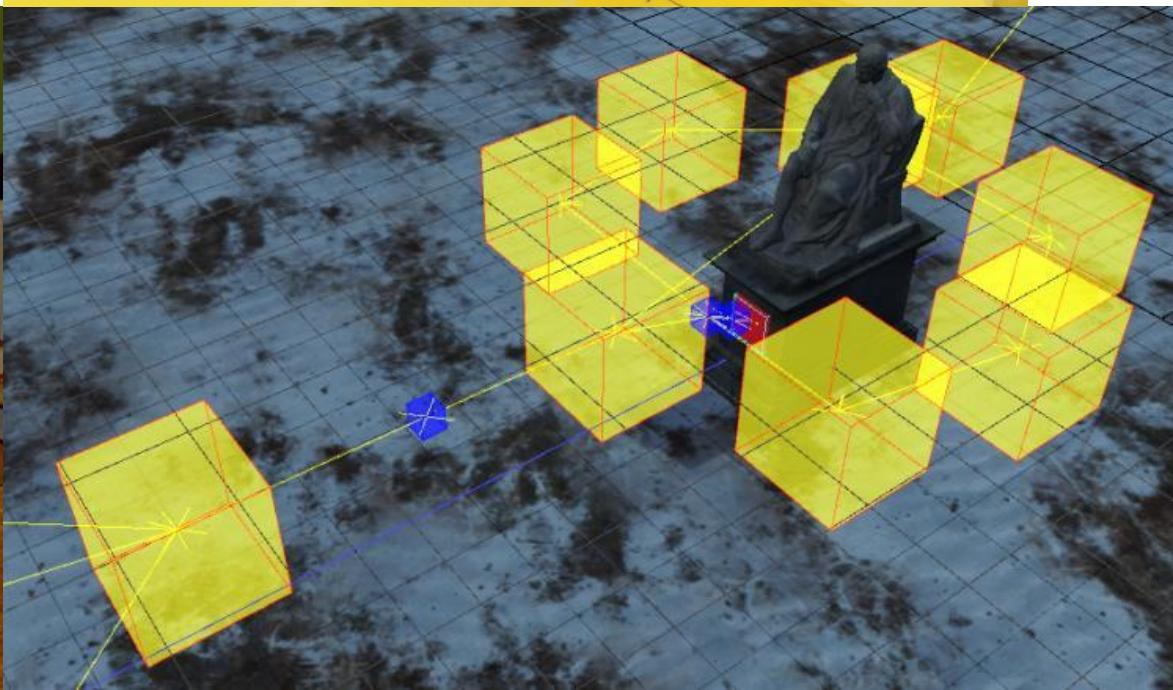
Métaphores de navigation

- Téléportation libre



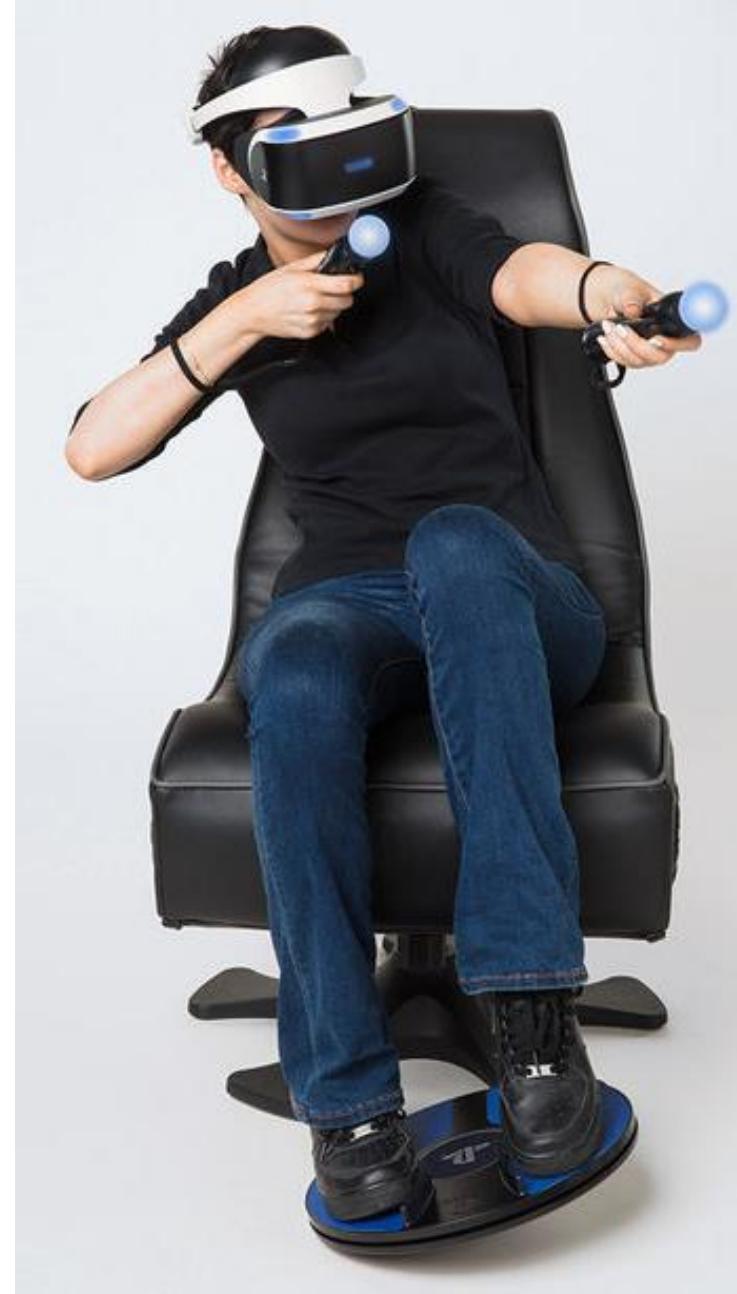
Métaphores de navigation

- Téléportation « point à point »



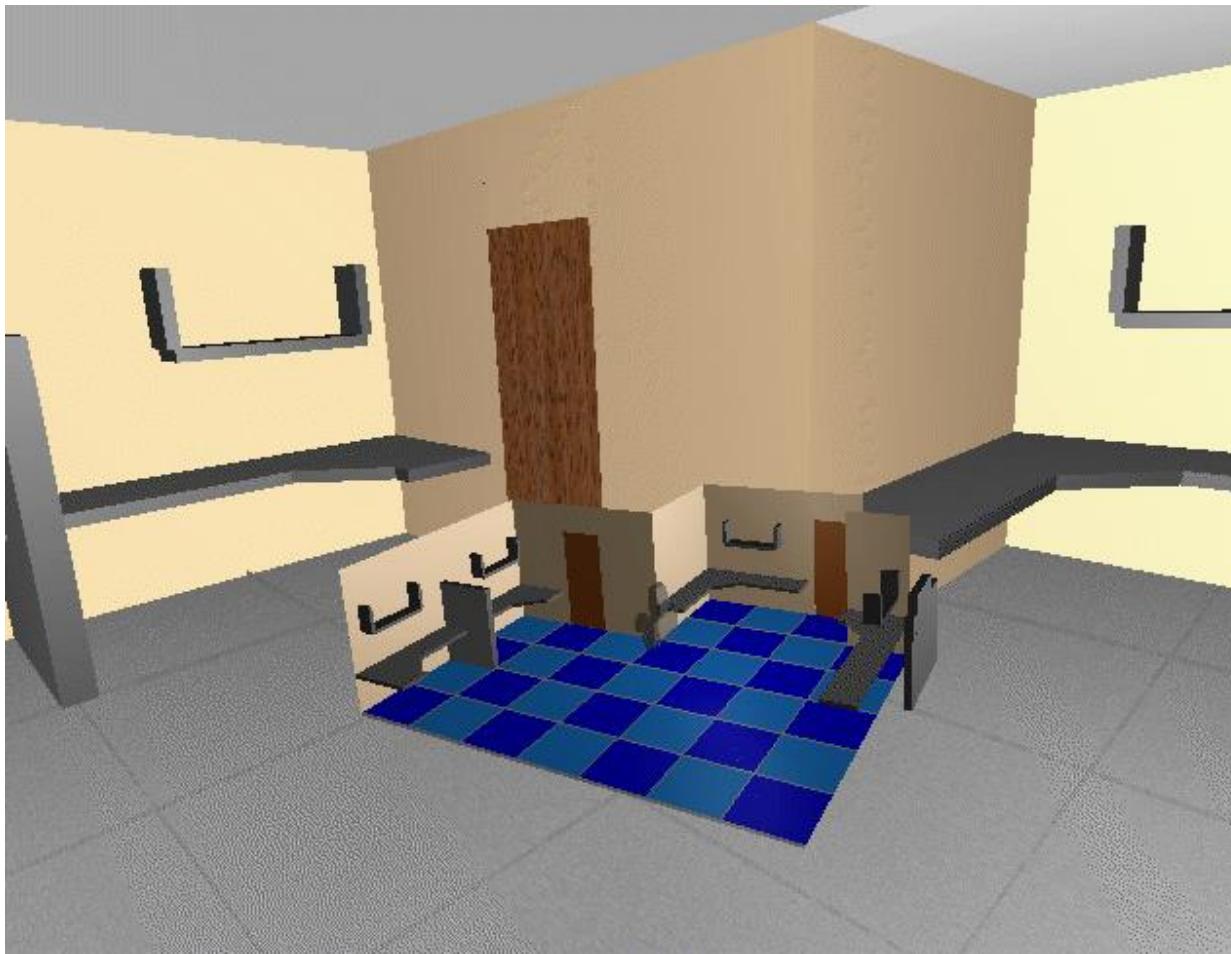
Métaphores de navigation

- Matériel dédié



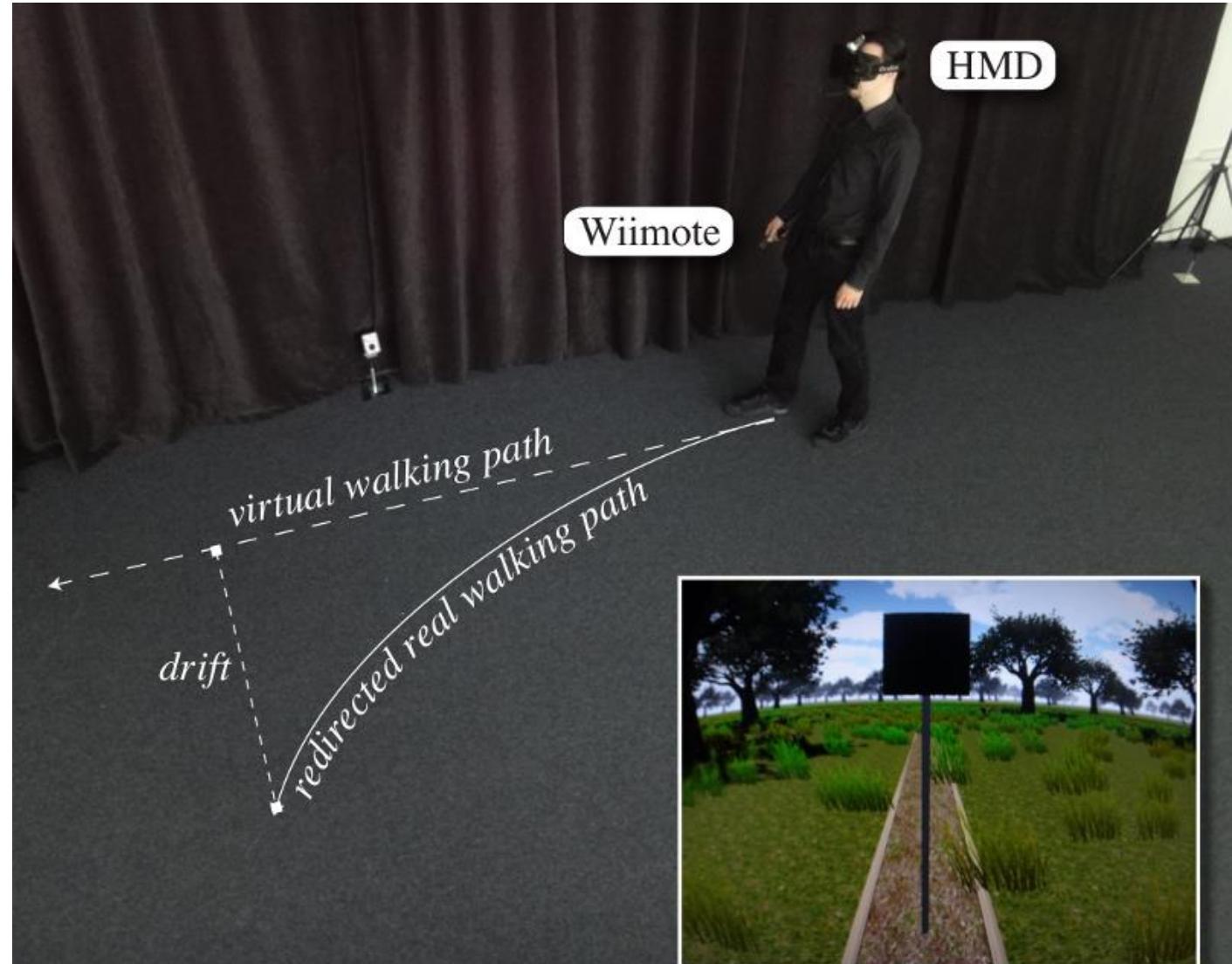
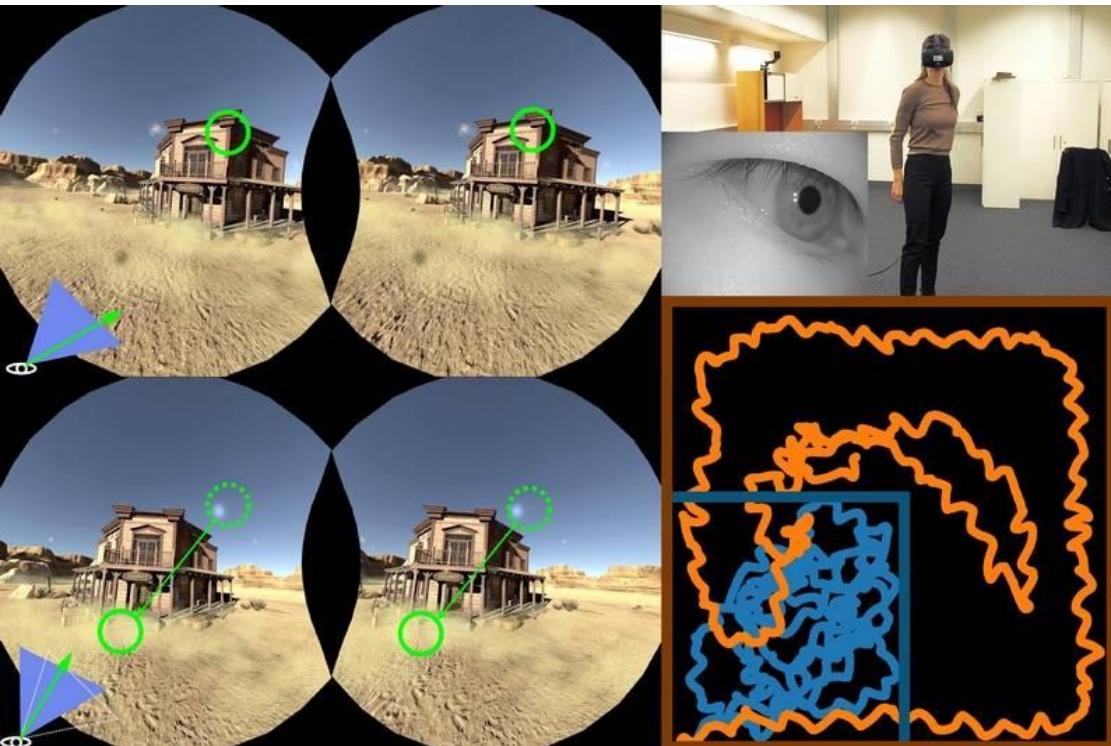
Métaphores de navigation

- Monde en miniature



Métaphores de navigation

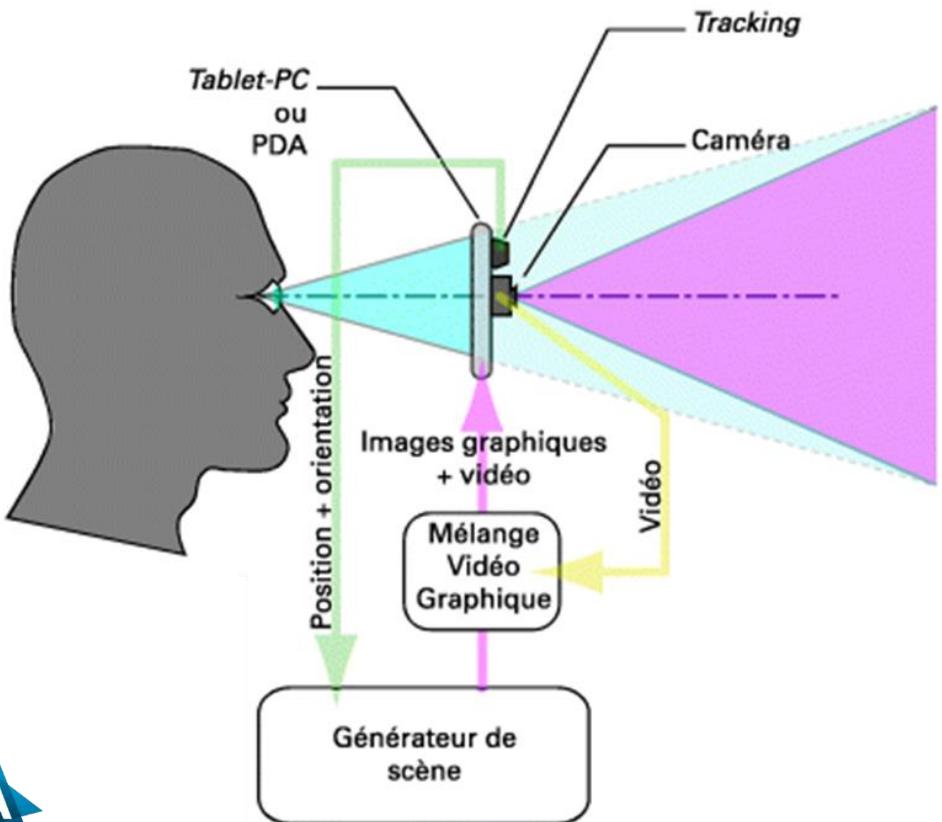
- Redirected walking



Réalité Augmentée

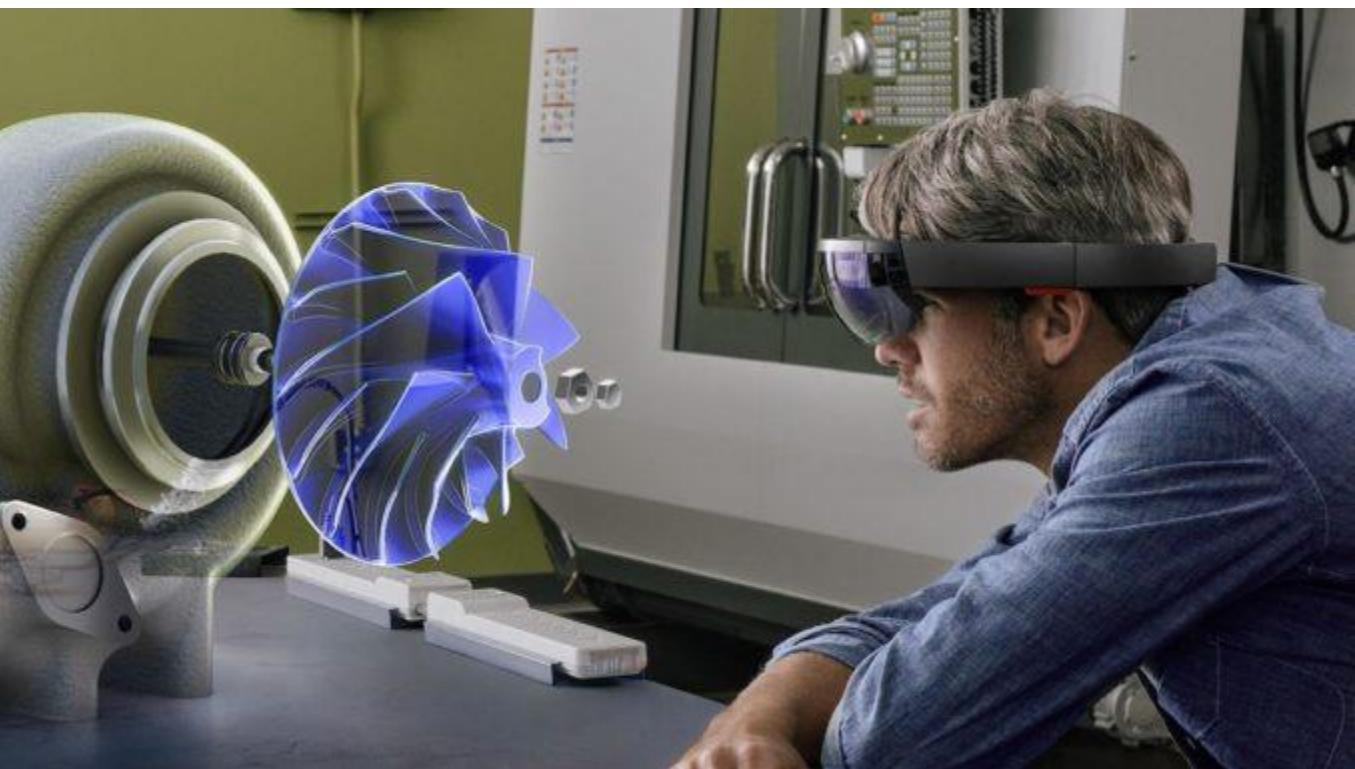
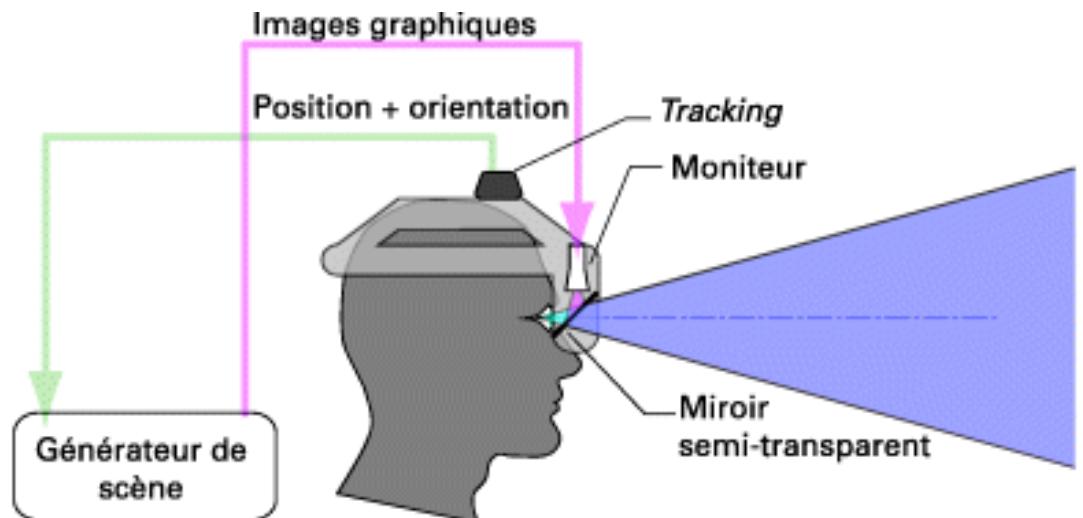
Réalité augmentée

- Vue indirecte (*video see-through*)



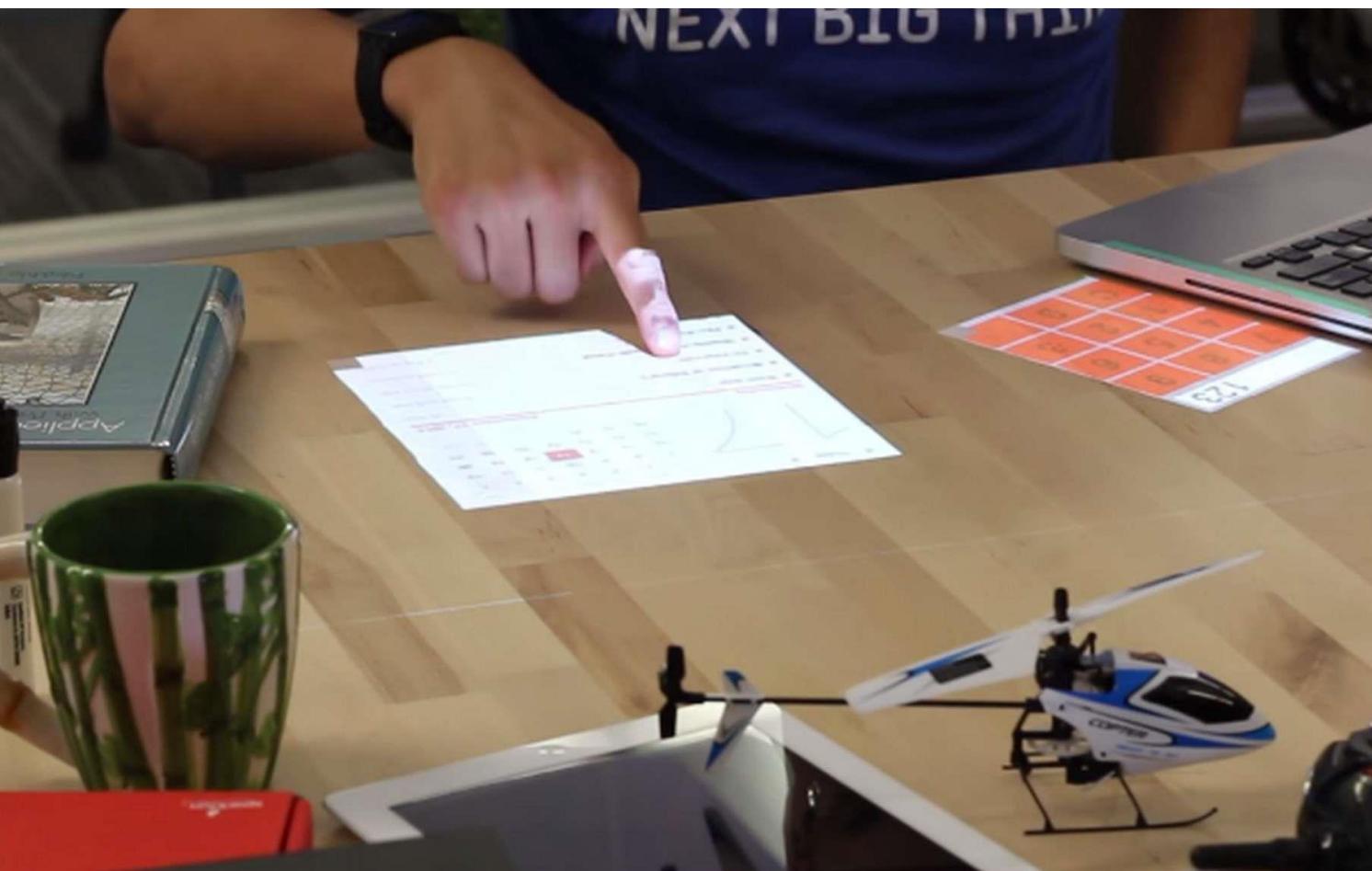
Réalité augmentée

- Vue directe (*optical see-through*)

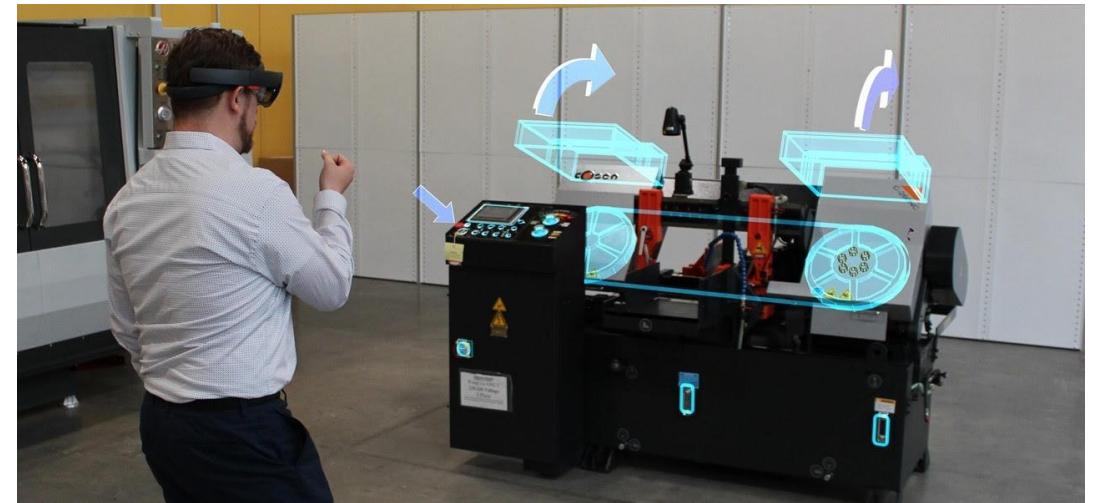


Réalité augmentée

- Projection dans l'environnement



Nouveaux périphériques de réalité augmentée



Nouveaux périphériques de réalité augmentée

Made with  unity

