

Industrie

Prototypage virtuel

- Revue de projet

 - Design

 - Ingénierie

 - Ergonomie (utilisateur et employés)

- Simulation

 - Aide à la conception

 - Aide à la maintenance

 - Aide à la production

 - Etudes marketing

 - Principalement automobile et aéronautique

Industrie : Marketing

Présentation produit, configuration

Publicité

Sensibilisation

[GM]



[CRVM]



[PSA 1999]



Industrie : Revue de projet



[PSA 2004]



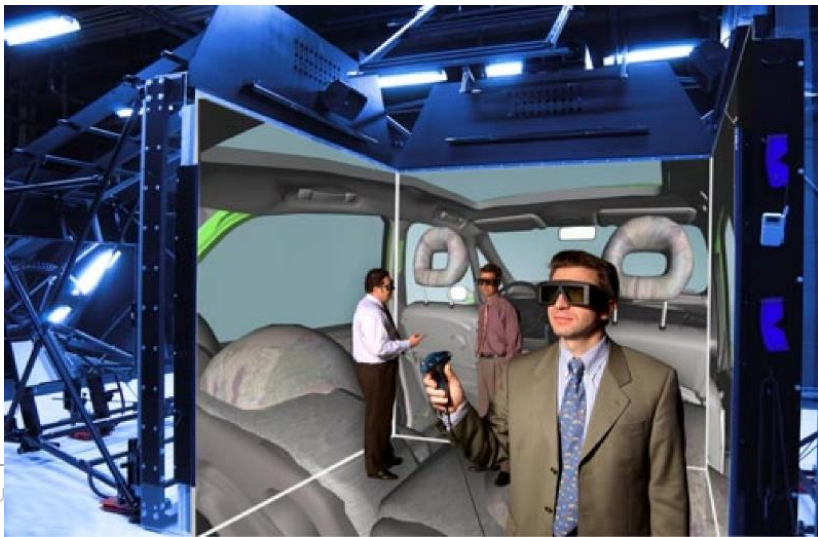
[PSA 2009]



Industrie : Revue de projet



Airbus Innovation Centre
2016



Industrie : Design



[GM 2015]



Industrie : Design

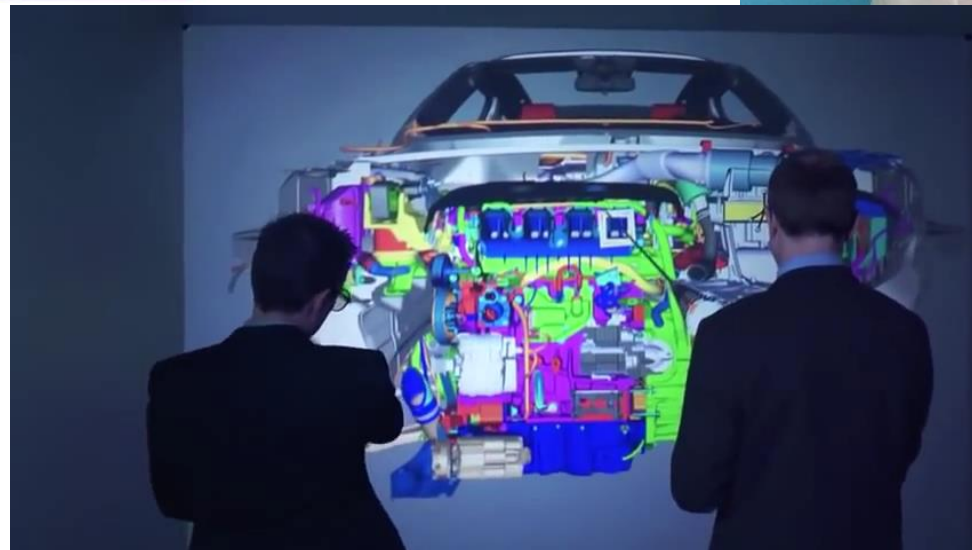


[Ford Motor Company, Immersion Lab, 2014]

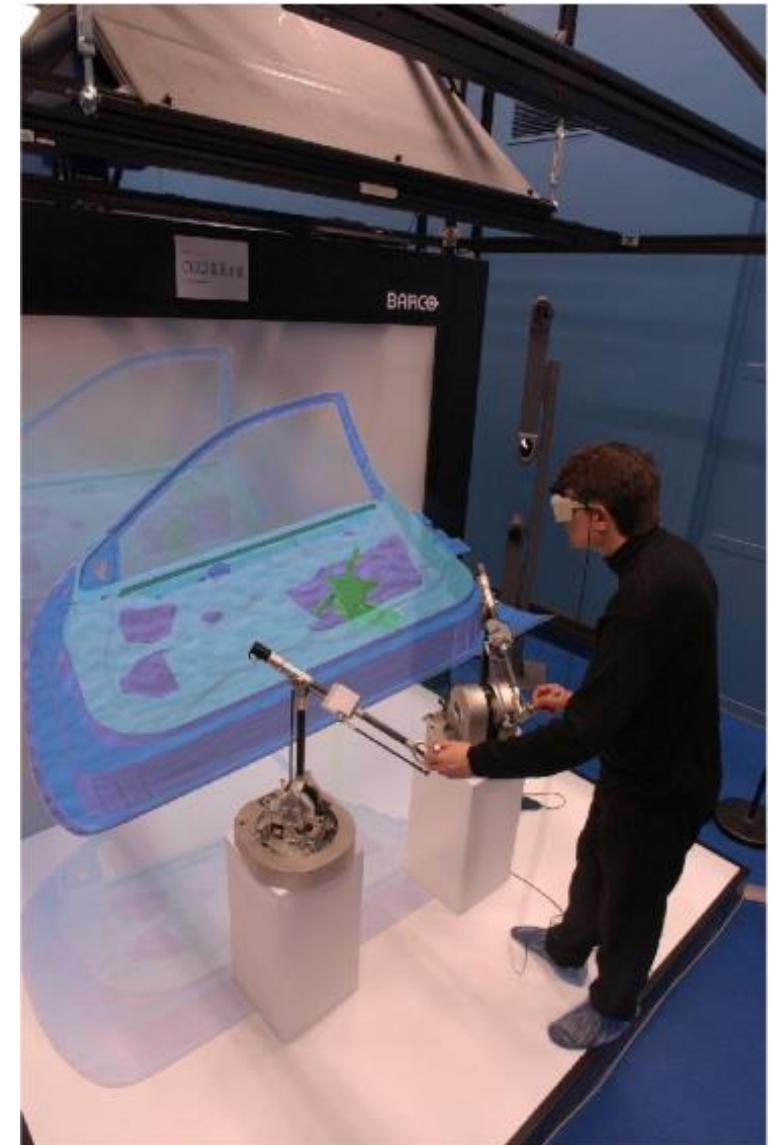
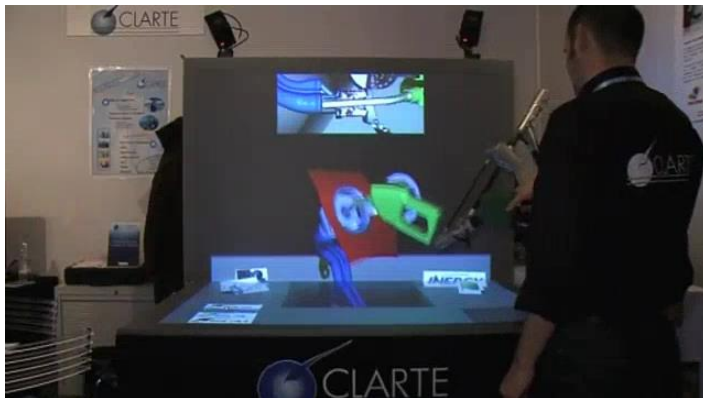
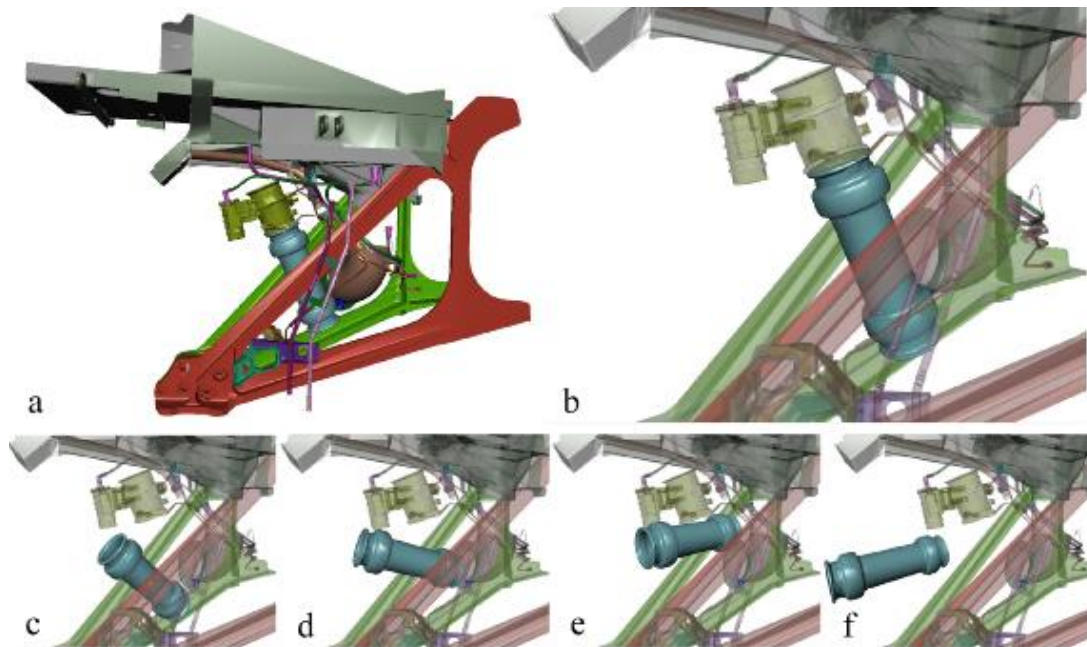
Industrie : Ingénierie



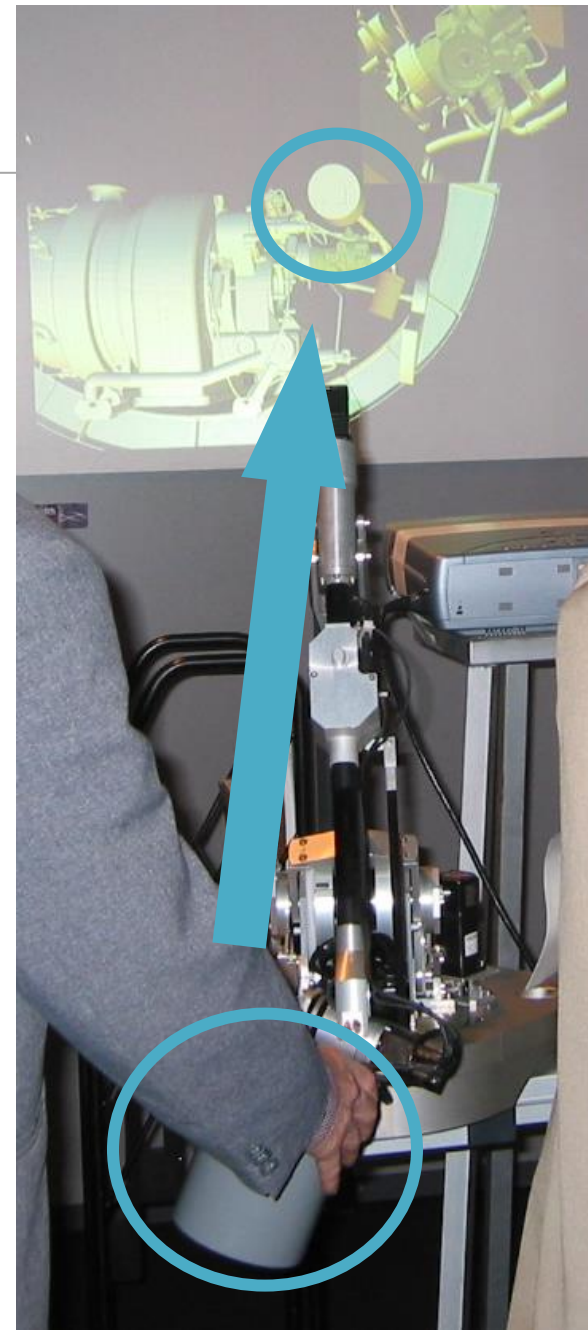
[Jaguar Land Rover 2010]



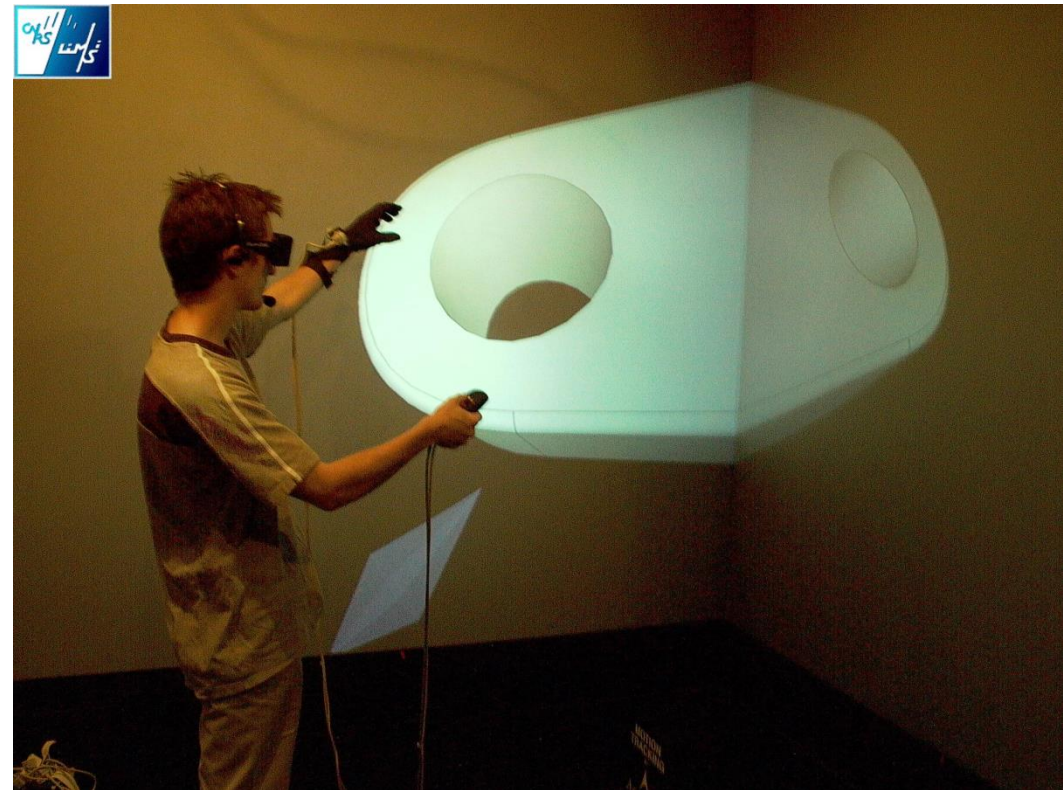
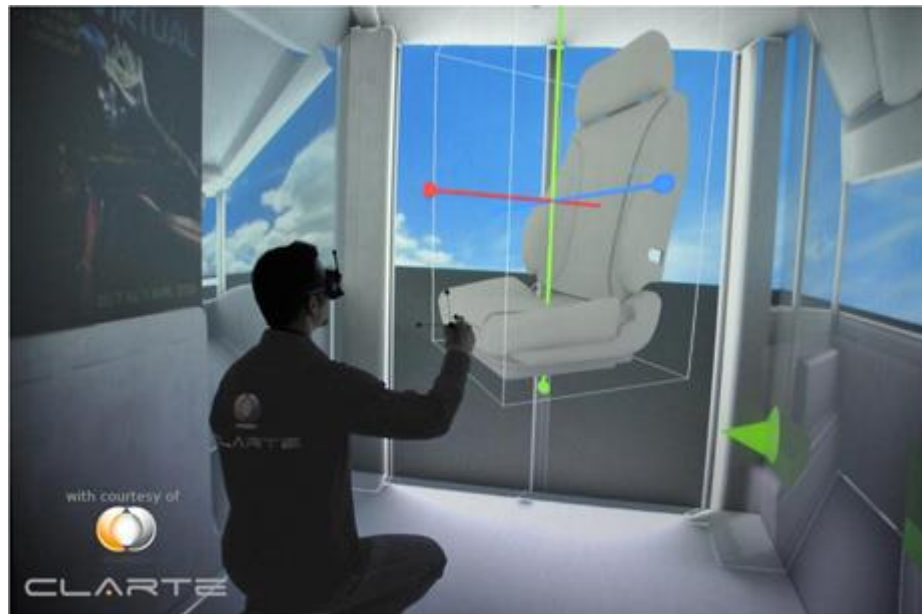
Industrie : Ingénierie



Industrie : Ingénierie



Industrie : Conception

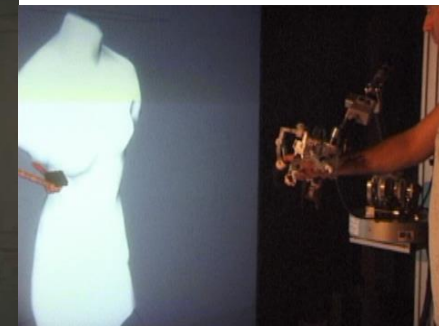


[VRAD, LIMSI-CNRS, 2006]

Industrie : Ergonomie utilisateur



[GM 2015]



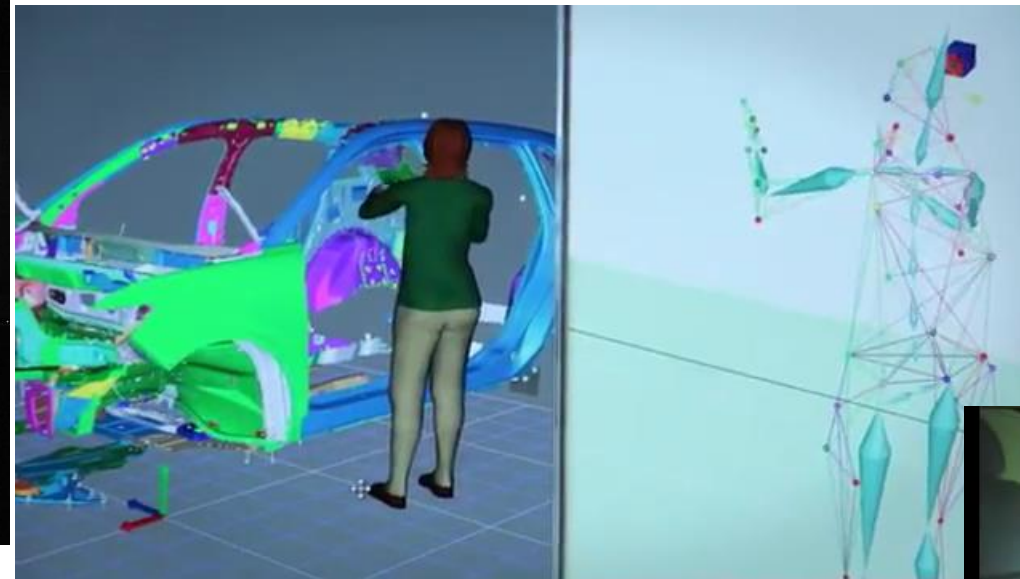
Industrie : Ergonomie production

Validation des postes de production

Réduction des TMS

Geste technique

[CEA-List]



[EADS]

Ford 2015

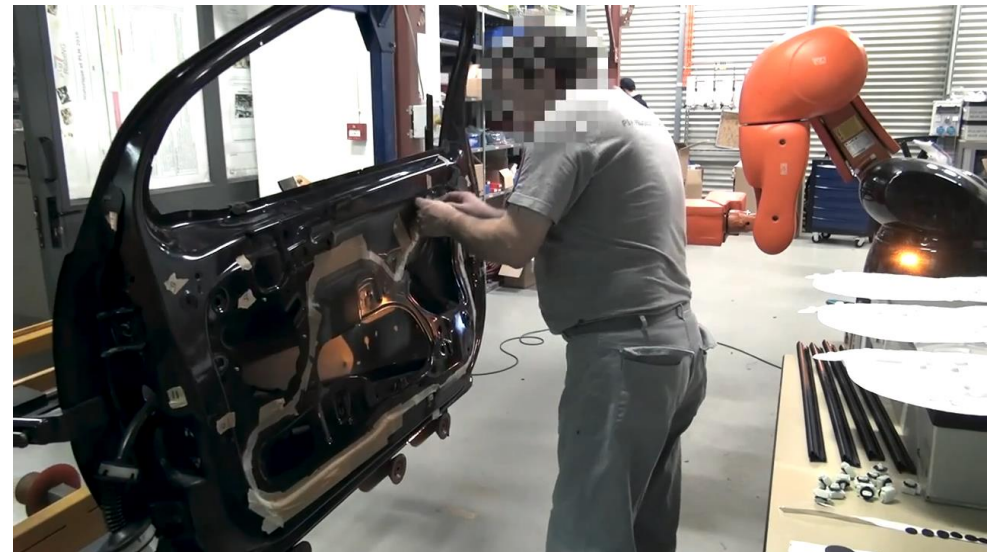
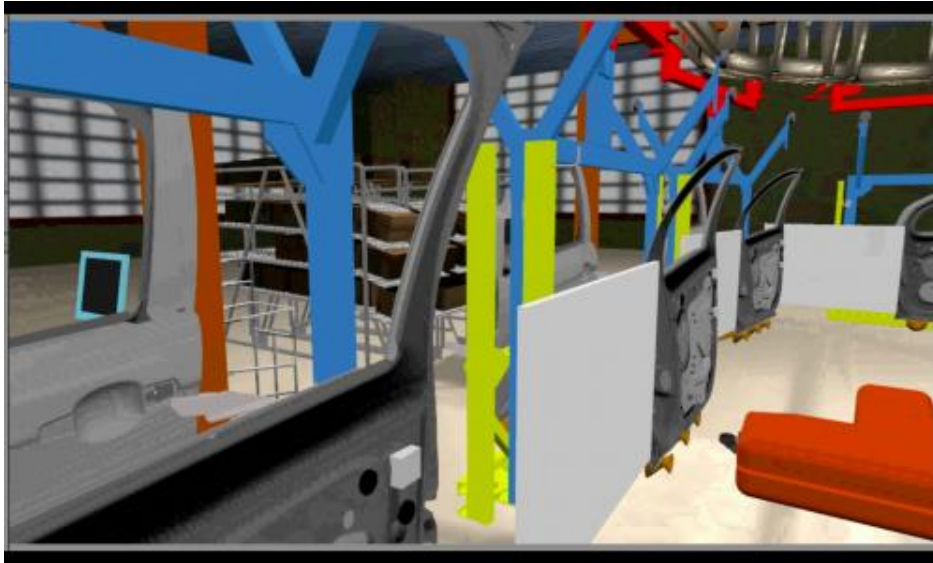


[ErgoWide³, Clarté / Didhaptic]

Industrie : Production

Chaines de montage
Collaboration homme-robot

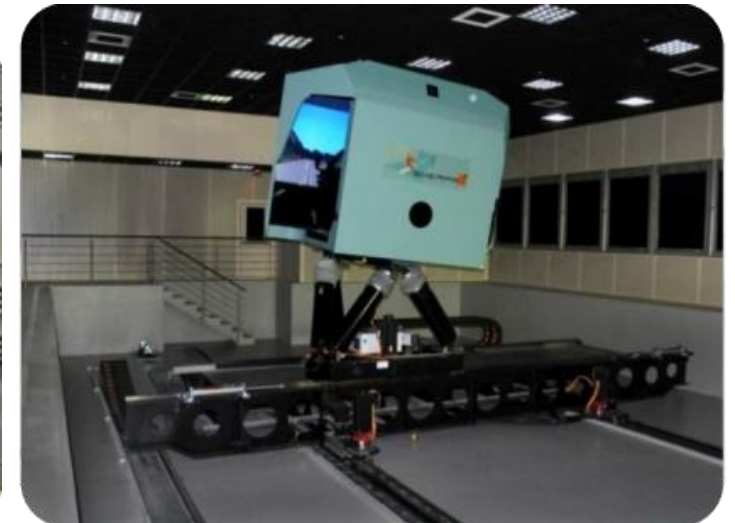
[PSA/CAOR Mines Paris-Tech 2012]



Industrie : Simulation

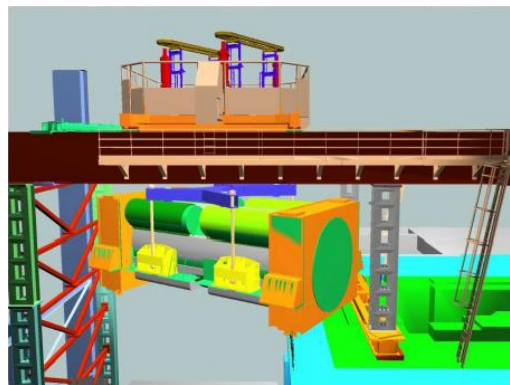
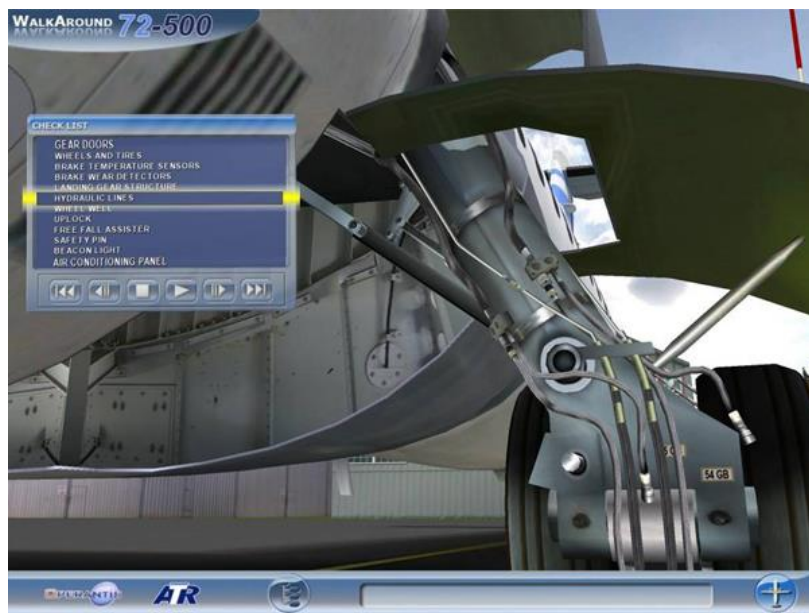


[PSA]



[Simulateurs PSA : statique, StellLab, dynamique]

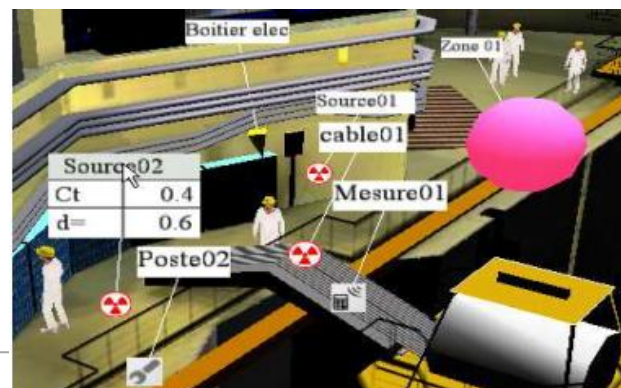
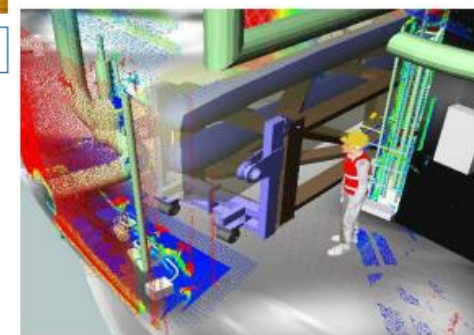
Industrie : Maintenance



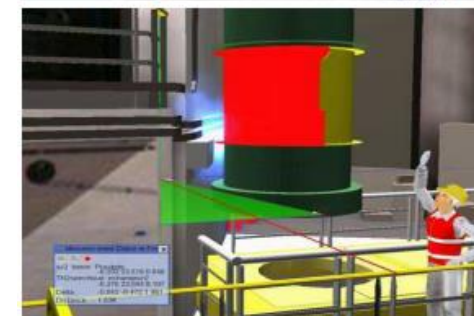
Environnement et Simulation 3D



Réalisation de la rotation du stator en tranche 2



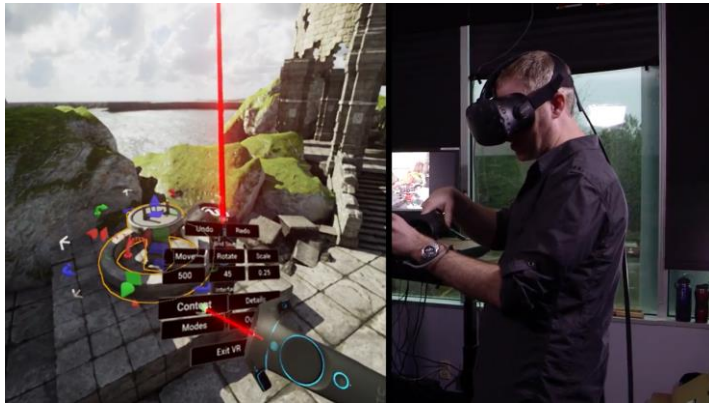
[EDF]



Télé-opération



Jeux



Culture et Patrimoine



Eternelle Notre Dame 2022



[Château des Ducs de Bretagne, 2007]



Culture et Loisirs

Atelier des Lumières



Roland Garros VR



NextVR



Tourisme

Visualise Thomas Cook



Google Earth VR



Exercice

Résumer les **apports** et identifier un **risque** de la RV pour

1. La formation
2. Le prototypage

A composite image with a blue tint. The left side shows a desk with a computer monitor displaying a 3D architectural rendering of a road or track, a keyboard, and a mouse. A desk lamp is positioned over the monitor. The right side shows a person wearing a VR headset and a dark blue t-shirt, standing in a room with a climbing wall and a white door. The person is gesturing with their right hand.

LA RECHERCHE

EN RÉALITÉ VIRTUELLE

Ex. de journaux et conférences

IEEE VR

<https://ieeevr.org/2022/program/papers/>

ACM VRST

<https://vrst.acm.org/vrst2021/program/>

ISMAR

<https://ismar21.org/program/accepted-papers/>

GRAPP

ACM CHI

ACM UIST

IEEE Transactions on Multimedia

VR Journal Springer

...

Ex. de Call for Papers (IEEE VR 2022)

Each research paper should provide a validated contribution covering one or more of the following categories: methodological, technology, applications, and systems.

- **Methodological papers** should describe advances in theories and methods of AR/VR/MR and 3DUI, such as ethical issues, theories on presence, or human factors.
- **Technology papers** should describe advancements in algorithms or devices critical to AR/VR/MR and 3DUI development such as input, display, user interaction, or tracking.
- **Application papers** provide an important insight to the community by explaining how the authors built upon existing ideas and applied them to solve an interesting problem in a novel way. Each paper should include an evaluation of the success of the use of AR/VR/MR and/or 3DUI in the given application domain.
- **System papers** should indicate how the developers integrated techniques and technologies to produce an effective system, and convey any lessons learned in the process.

Ex. de Call for Papers (IEEE VR 2022)

IEEE VR 2022 seeks contributions in VR/AR/MR and 3DUI including, but not limited to, the following topics:

- 3D and volumetric display and projection technology
- 3D authoring
- 3D user interaction
- 3DUI metaphors
- Accessibility of immersive interfaces
- Audio interfaces and rendering
- Collaborative interactions
- Computer graphics techniques
- Crowd simulation
- Diversity and gender issues
- Embodied agents, virtual humans and (self-)avatars

- Ethical issues
- Evaluation methods
- Haptic interfaces and rendering
- Human factors and ergonomics
- Immersive / 360° video
- Immersive analytics and visualization
- Immersive games
- Input devices
- Locomotion and navigation
- Mediated and diminished reality
- Mobile, desktop or hybrid 3DUIs
- Modeling and simulation
- Multi-user and distributed systems
- Multimodal capturing and reconstruction

- Multimodal/cross-modal interaction and perception
- Multisensory interfaces and rendering
- Perception and cognition
- Presence, body ownership, and agency
- Scene description and management issues
- Software architectures, toolkits, and engineering
- Teleoperation and telepresence
- Therapy and rehabilitation
- Touch, tangible and gesture interfaces
- Tracking and sensing
- User experience and usability

Extrait de programme (IEEE VR 2022)

Bullet Comments for 360° Video

Conference

Yi-Jun Li, Jinchuan Shi, Fang-Lue Zhang, Miao Wang

▶ Abstract

An Evaluation of Virtual Reality Maintenance Training for Industrial Hydraulic Machines

Conference

Thuong Hoang, Stefan Greuter, Simeon Taylor

▶ Abstract

GazeDock: Gaze-Only Menu Selection in Virtual Reality using Auto-Trigging Peripheral Menu

Conference

Xin Yi, Yiqin Lu, Ziyin Cai, Zihan Wu, Yuntao Wang, Yuanchun Shi

▶ Abstract

OctoPocus in VR: Using a Dynamic Guide for 3D Mid-Air Gestures in Virtual Reality

Invited Journal

Katherine Fennedy, Jeremy Hartmann, Quentin Roy, Simon Tangi Perrault, Daniel Vogel

URL: <https://doi.org/10.1109/TVCG.2021.3101854>

▶ Abstract

EHTask: Recognizing User Tasks from Eye and Head Movements in Immersive Virtual Reality

Invited Journal

Zhiming Hu, Andreas Bulling, Sheng Li, Guoping Wang

URL: <https://doi.org/10.1109/TVCG.2021.3138902>

▶ Abstract

Evaluating Visual Cues for Future Airborne Surveillance Using Simulated Augmented Reality Displays

Conference

Nicolas Barbotin, James Baumeister, Andrew Cunningham, Thierry Duval, Olivier Grisvard, Bruce H. Thomas

▶ Abstract

Empirical Evaluation of Calibration and Long-term Carryover Effects of Reverberation on Egocentric Auditory Depth Perception in VR

Conference

WanYi Lin, Ying-Chu Wang, Dai-rong Wu, Rohith Venkatakrishnan, Roshan Venkatakrishnan, Elham Ebrahimi, Christopher Pagano, Sabarish V. Babu, Wen-Chieh Lin

▶ Abstract

Simulating Olfactory Cocktail Party Effect in VR: A Multi-odor Display Approach Based on Attention

Conference

Shangyin Zou, Xianyin Hu, Yuki Ban, Shinichi Warisawa

▶ Abstract

Shape Aware Haptic Retargeting for Accurate Hand Interactions

Conference

Brandon J. Matthews, Bruce H. Thomas, Stewart von Itzstein, Ross Smith

▶ Abstract

Adaptive Reset Techniques for Haptic Retargeted Interaction

Invited Journal

Brandon Matthews, Bruce H Thomas, Stewart Von Itzstein, Ross Smith

URL: <https://doi.org/10.1109/TVCG.2021.3120410>

▶ Abstract

Studying the Effects of Congruence of Auditory and Visual Stimuli on Virtual Reality Experiences

Journal

Hayeon Kim, In-Kwon Lee

URL: <https://doi.ieeecomputersociety.org/10.1109/TVCG.2022.3150514>

▶ Abstract

Research Trends in Virtual Reality Locomotion Techniques

Conference

Esteban Segarra Martinez, Annie S. Wu, Ryan P. McMahan

▶ Abstract

ENI: Quantifying Environment Compatibility for Natural Walking in Virtual Reality

Conference

Niall L. Williams, Aniket Bera, Dinesh Manocha

▶ Abstract

Evaluating the Impact of Limited Physical Space on the Navigation Performance of Two Locomotion Methods in Immersive Virtual Environments

Conference

Richard Paris, Lauren Buck, Timothy P. McNamara, Bobby Bodenheimer

▶ Abstract

Remote research on locomotion interfaces for virtual reality: Replication of lab-based research on the teleporting interface

Journal

Jonathan Kelly, Melynda Hoover, Taylor A Doty, Alex Renner, Moriah Zimmerman, Kimberly Knuth, Lucia Cherep, Stephen B. Gilbert

URL: <https://doi.ieeecomputersociety.org/10.1109/TVCG.2022.3150475>

▶ Abstract

Adaptive Redirection: A Context-Aware Redirected Walking Meta-Strategy

Journal

Mahdi Azmandian, Rhys Yahata, Timofey Grechkin, Evan Suma Rosenberg

URL: <https://doi.ieeecomputersociety.org/10.1109/TVCG.2022.3150500>

▶ Abstract

Validating Simulation-Based Evaluation of Redirected Walking Systems

Journal

Mahdi Azmandian, Rhys Yahata, Timofey Grechkin, Jerald Thomas, Evan Suma Rosenberg

URL: <https://doi.ieeecomputersociety.org/10.1109/TVCG.2022.3150466>

▶ Abstract

A person wearing a VR headset and a white protective suit, holding a paintbrush, standing in a studio with an easel and a rainbow flag.

LES TÂCHES

EN REALITE VIRTUELLE

Types de tâche [Bowman]

Tâches élémentaires et fondamentales, souvent combinées pour créer une interaction plus complexe

1. Navigation
2. Sélection
3. Manipulation
4. Contrôle d'application

Liées aux objectifs de l'application

Conditionnent le contenu de l'EV et les interactions/interfaces utilisées

Navigation

2 composantes

Déplacement ("Travel") : Partie mobile de la navigation, déplacement physique d'un endroit à l'autre (déplacement du point de vue)

Recherche de chemin ("Wayfinding") : Composante cognitive, prise de décision de navigation ("où suis-je ?", "où dois-je aller ?", "comment arriver là ?")

Exemples

Exploration : navigation sans but explicite ni restriction, découverte et connaissance de l'environnement

Recherche de cible : Naïve (position cible inconnue), Ciblée (position connue), Assistée (position connue par le système)...

Manœuvre : Tâche nécessitant mouvements courts et précis, Changement faible du point de vue

Sélection

Acquisition d'une cible pour un certain objectif

Étapes

1. Désignation par l'utilisateur d'un objet ou d'un ensemble d'objets
2. Nécessite une validation de l'utilisateur
3. Puis une confirmation du système

Manipulation

Spécification/Modification des propriétés d'un objet ou d'un ensemble d'objets virtuels

Géométriques : position, orientation, échelle

Autres : couleur, texture...

Nécessite une sélection préalable

Manipulation directe ou indirecte (via outils virtuels ou matériels)

Contrôle d'application

Regroupe les techniques d'interaction indirecte

- Exécuter une application

- Changer l'état du système

- Changer le mode d'interaction

Envoi d'ordres (explicite ou implicite) au système

Exercice

1. Choisissez une application dans les slides précédents
2. Identifiez les tâches de navigation, sélection et manipulation
Par quels moyens matériels et logiciels ces tâches sont mises en œuvre ?
Quelles sont les contraintes de ces tâches dans l'application choisie ?

BILAN



Bilan

Nombreux domaines d'applications

- Réalisations diverses

- Certains objectifs/tâches communs

- Cibler les besoins des utilisateurs !

Besoin de (moins en moins de) moyens

Nombreuses problématiques de recherche spécialisées

Commence à devenir mature mais reste une niche spécialisée

Voir ou revoir les vidéos

<https://frama.link/vr-health>

<https://frama.link/vr-history>

<https://frama.link/vr-apps>

<https://frama.link/evra-youtube>