

# ECHORD++

European Clearing House for Open Robotics Development Plus Plus

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**RIF@PARIS-SACLAY**

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**Demi-journée d'information ECHORD++**

**20 avril 2015 - M.E.N.E.S.R**



Bristol Robotics Laboratory



**RUROBOTS**  
Cognitive Science at Work





**Experiments**



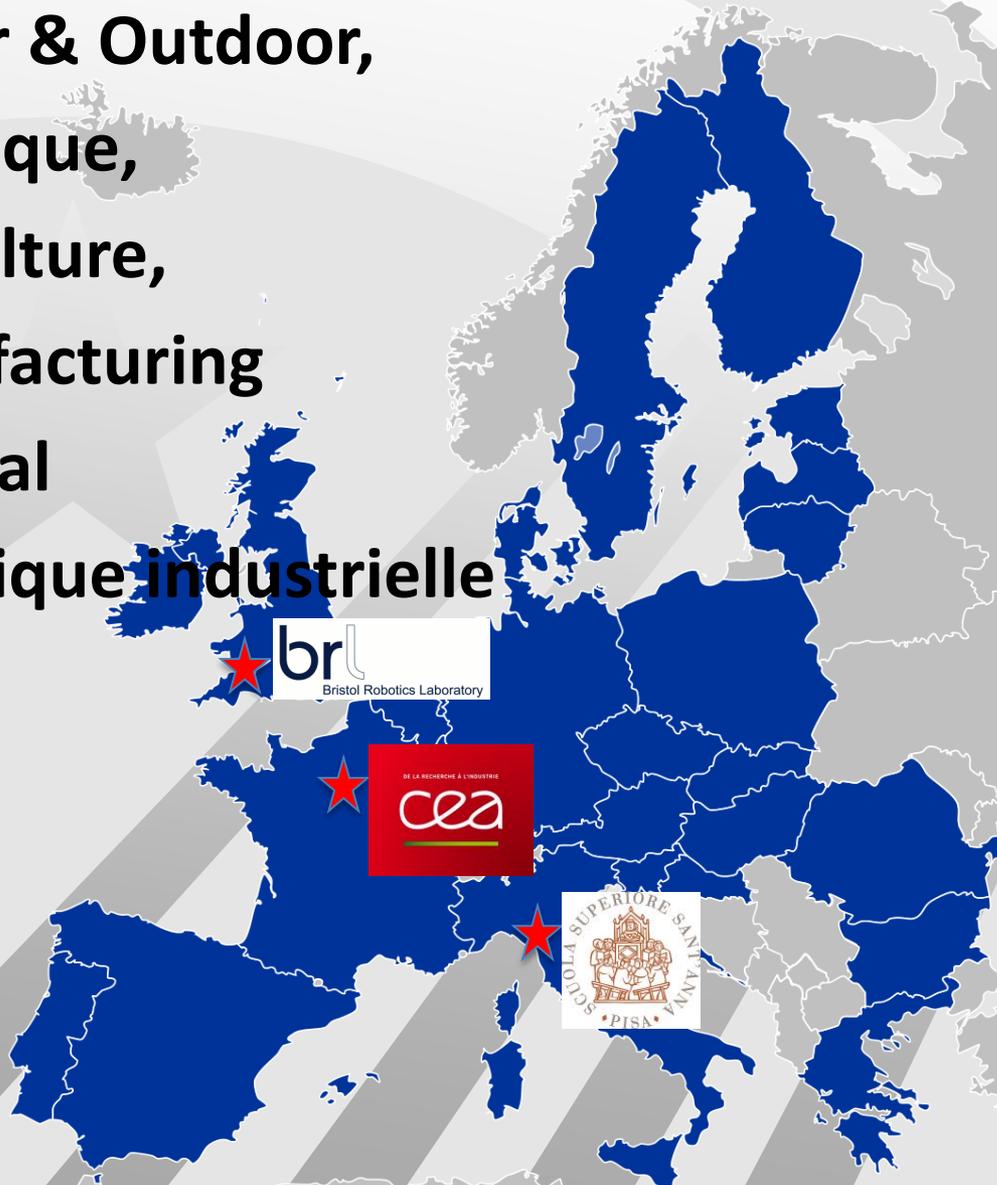
**Robotics  
Innovation  
Facilities  
(RIF)**



**Public end-user  
Driven  
Technological  
Innovation (PDTI)**

# 3 lieux dans 3 pays différents

- Indoor & Outdoor,
- Logistique,
- Agriculture,
- Manufacturing
- Médical
- Robotique industrielle



# Un concept

- Des lieux physiques avec des moyens et de l'expertise
- Une offre d'assistance et de services autour de la robotique, l'automatisation et les domaines connexes
- Des workshops réguliers sur la robotique et l'automatisation

## POUR QUI?

- Les PME et les start-up
- Les expérimentations d'Echord++
- Les étudiants
- Les nouveaux utilisateurs

## Un accès simple

Jusqu'à 6 semaines d'engagement renouvelable

# Modalités d'accès

- Formulaire en ligne pour la soumission de la proposition  
<http://www.echord.eu/facilities-rifs/rifsapplication/>
- Pas d'appels spécifiques, processus continu
- Évaluation bimensuelle des demandes
- Subvention partielle possible pour l'assistance au voyage et au séjour pour les PME dans un rayon de 500 km
- Accès nominal gratuit de 6 semaines
- D'autres mécanismes financiers peuvent être disponibles
- Les RIF:
  - ✓ Ne revendiquent pas de propriété intellectuelle sur les démonstrations au cours de la période d'engagement.
  - ✓ Mettent à disposition des accords entre les RIF et les clients (protection de la PI du client et des résultats)



## **Robotics Innovation Facilities (RIF)**

# L'EQUIPE



Vision and content engineering

- 50 ans d'expérience
- 30 ingénieurs permanents et chercheurs
- 20 doctorants, post-doctorants permanents



Communicating systems

- les nouvelles architectures robotiques,
- l'actement à haute performance



Sensory and ambient interfaces



Interactive robotics

## Technologies



actionnement, architecture  
es robots (flexible)  
mande en effort

Interactive simulation

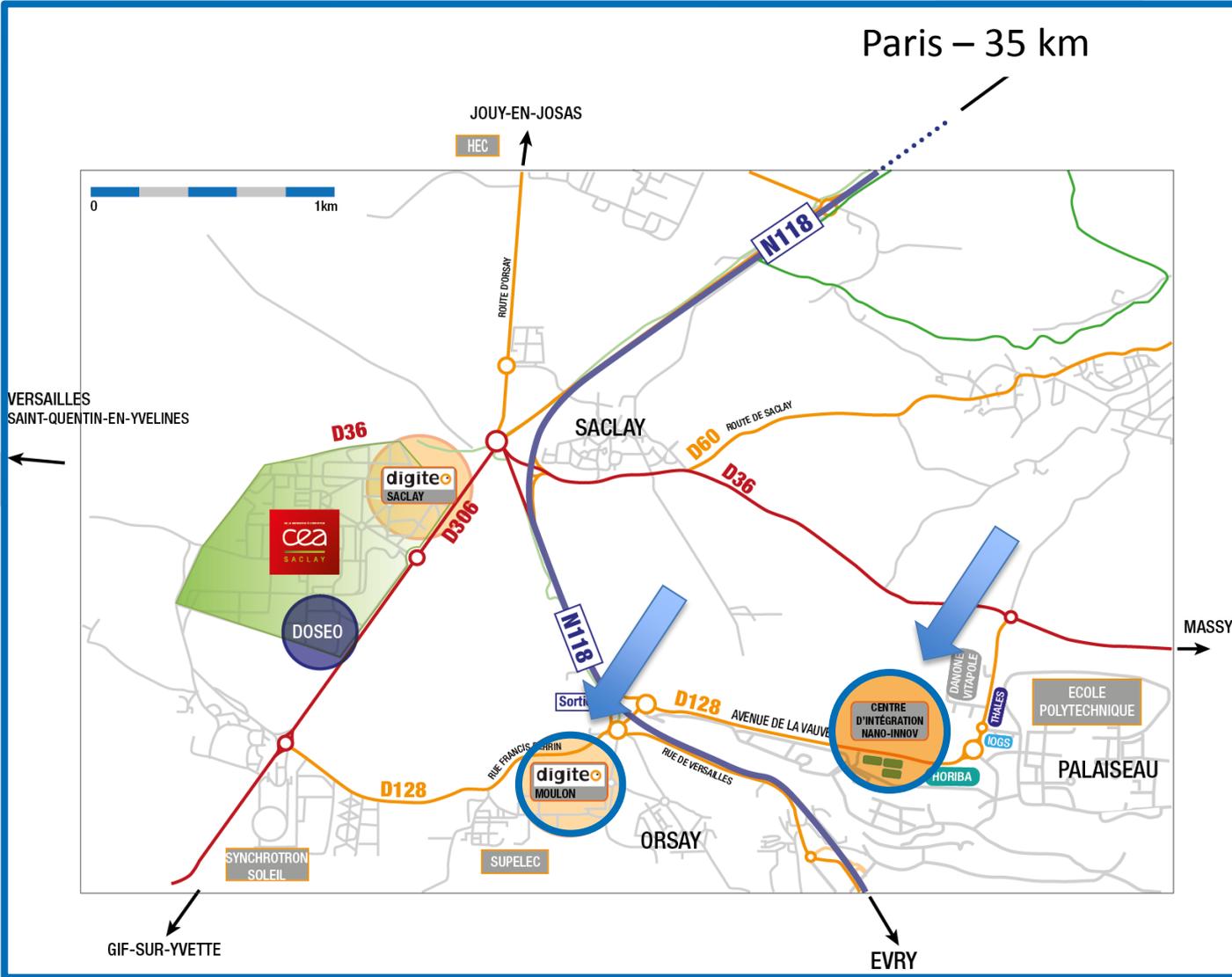


• Temps réel d'effort  
de vision  
simulation - temps réel

## Thèmes

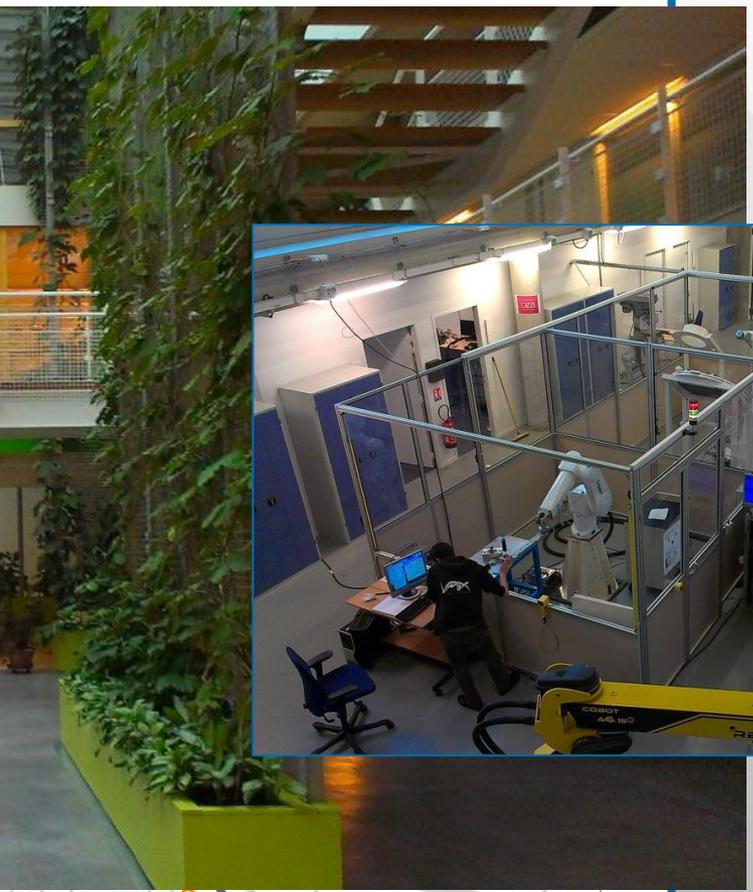
- ❖ Robotique pour la santé: assistance, medical, rééducation....
- ❖ Co-working pour le manufacturing : cobotique, robotique collaborative, assistance aux gestes
- ❖ Télé-robotique pour les environnements hostils

# Localisation



# Location: Digitéo Moulon

Paris – 35 km



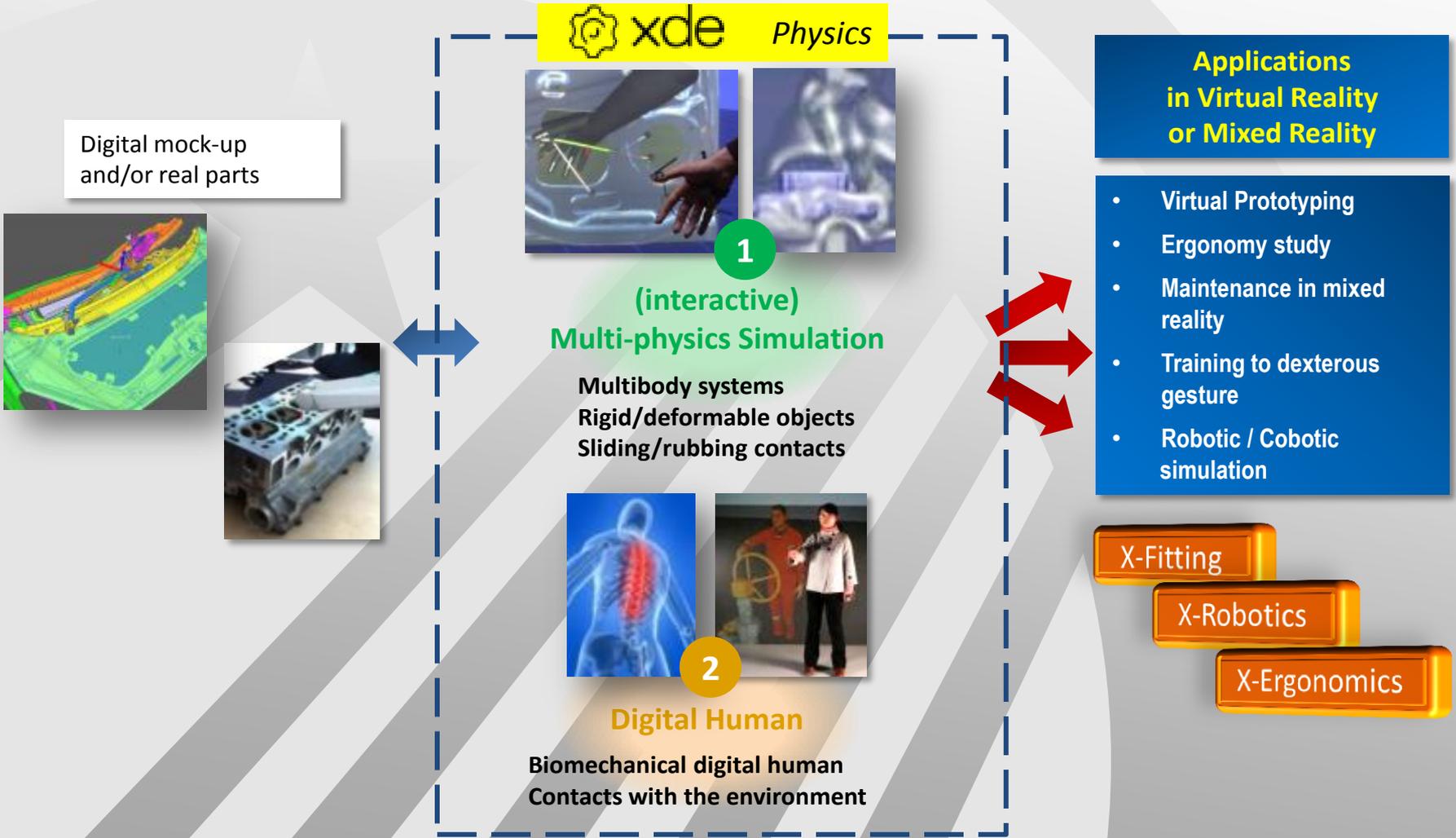
# Location: Nano-Innov

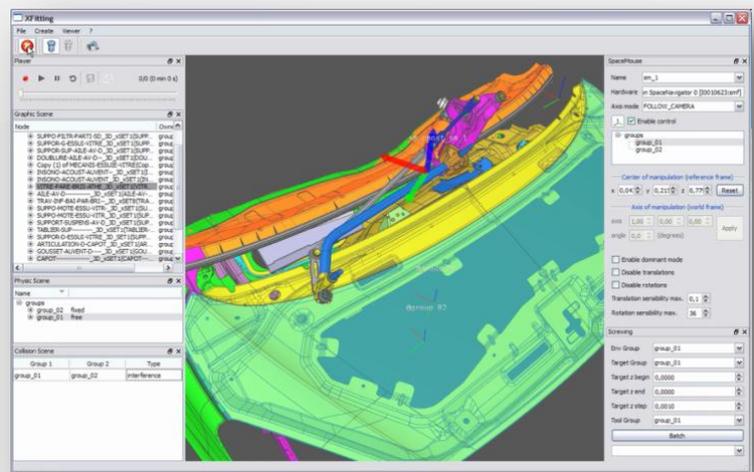
250m2 modular architecture



- Test of robotic application in real condition
- Fusion of heterogeneous sensors
- Comprehension of the activity of a person from distributed information



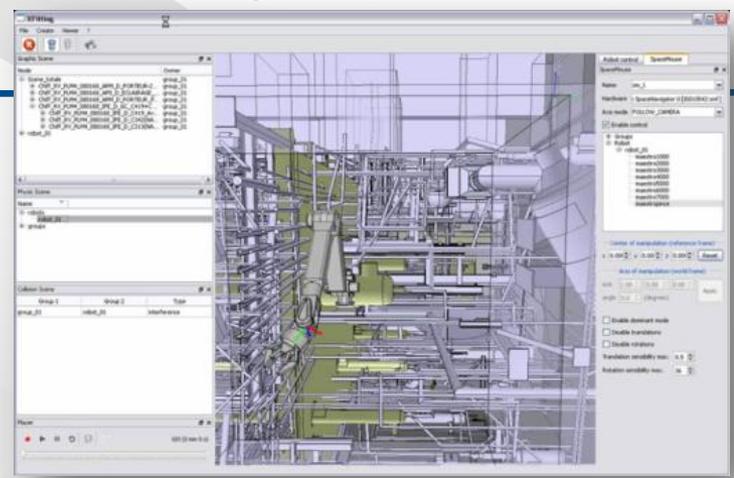




**X-Fitting**

*Virtual Prototyping*

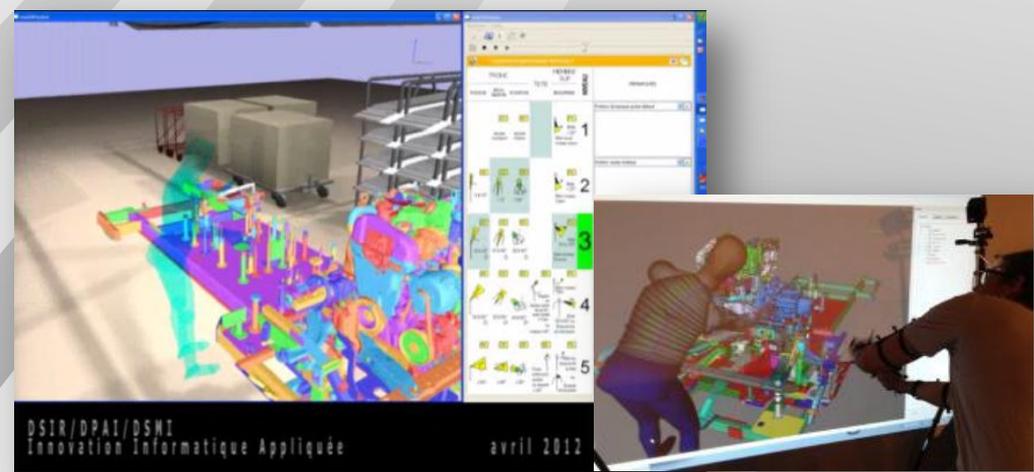
Wiper motor insertion  
(narrow space, multiple contacts)



**X-Robotics**

*robotics*

Complex scene (25x10x10m AND 2mm précision)  
Haptics real-time (1 kHz)



**X-Ergonomics**

*Ergonomy study*

# AUX GESTES MANUELS

Human gesture assistance to reduce musculoskeletal disorders

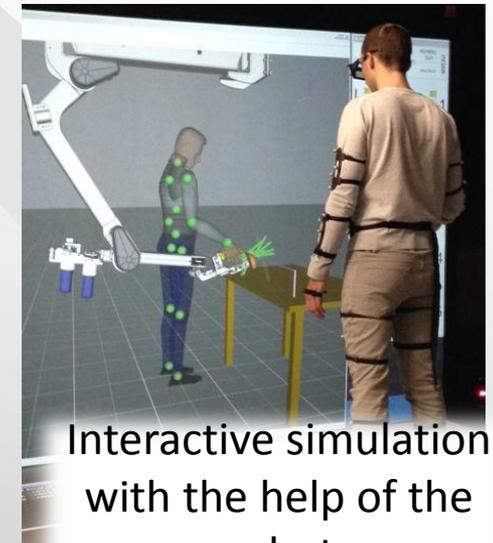
- Human : skills and intelligence
- Robot : Force, stiffness

Technologies:

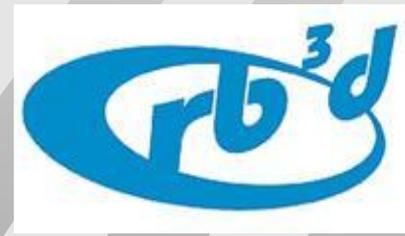
- Force control
- Safe interaction
- Weight balancing
- Force amplification
- Digital human with ergonomic simulation



Interactive simulation without help of the cobot



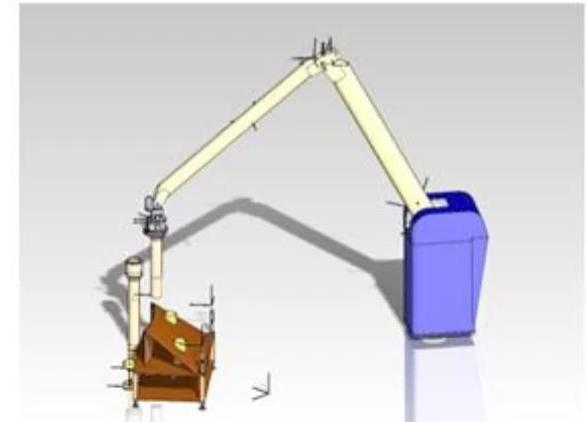
Interactive simulation with the help of the cobot



Real test of the Cobot

# COBOMANIP ASSISTANCE TO LOAD HANDLING

- Force control
- Safe interaction
- Weight balancing
- Virtual guides



FROM RESEARCH TO INDUSTRY  
cea tech

## SKILLS : SURGICAL TRAINING

- integrated mobile platform
- Co-localized multimodal feedback (visuo-haptic, audio-tactile)
- advanced haptic interface (unique capabilities in terms of workspace, 6dof force, stiffness, transparency)
- active prop (increased bandwidth)

**Example of application in maxillo-facial SURGERY**

→ Real time simulation of bone drilling



## ABLE : AN EXOSKELETON FOR THE UPPER MEMBER

Technology based on screw-cable actuator, high transparency and intuitive use, up to 7dof

In rehabilitation exercises with hybrid control laws with accurate management of forces in driving or resisting mode.

In the industry, as a cobot for force compensation

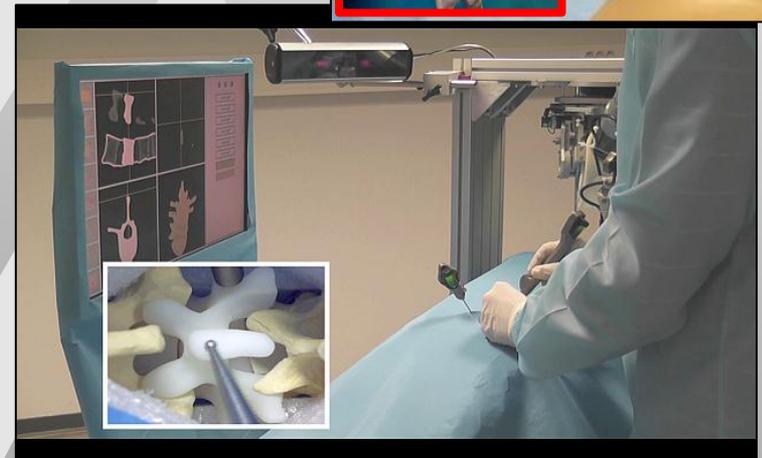
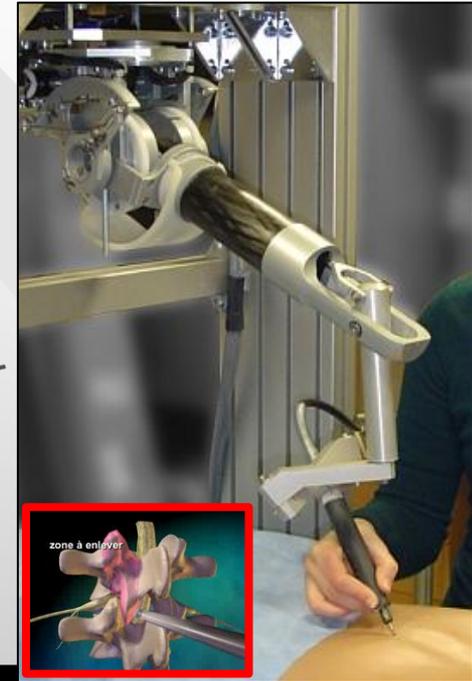
In tele-robotic or interactive simulation as an haptic interface



ORTHESE  
ABLE



- Patient's movement compensation (ex. breathing)
- Tool guidance
- Weight and friction active minimization
- Protection of organs ('safe' zones)



## Technologies:

- Brushless actuators and optimized electronics
  - ☞ High force capacity (40N)
  - ☞ High stiffness (x10, 40N/mm)
- Patented uni-directional auto-blocking system
  - ☞ High security

ANR Surgicobot



# ET ENCORE D'AUTRES MOYENS...



**Robot  
collaboratif**



**AGV**



**exosquelette**



**Robot  
Industriel**



## CHISELING WITH A COBOT





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