



Laboratoire
d'Informatique
de Robotique
et de Microélectronique
de Montpellier



Techno-Concept

ASSIST Project

Leader: P. Fraise (LIRMM)

Partners : CEA-LIST, LAAS, ISIR, Clinique Propara



Assistive robot for quadriplegic subject

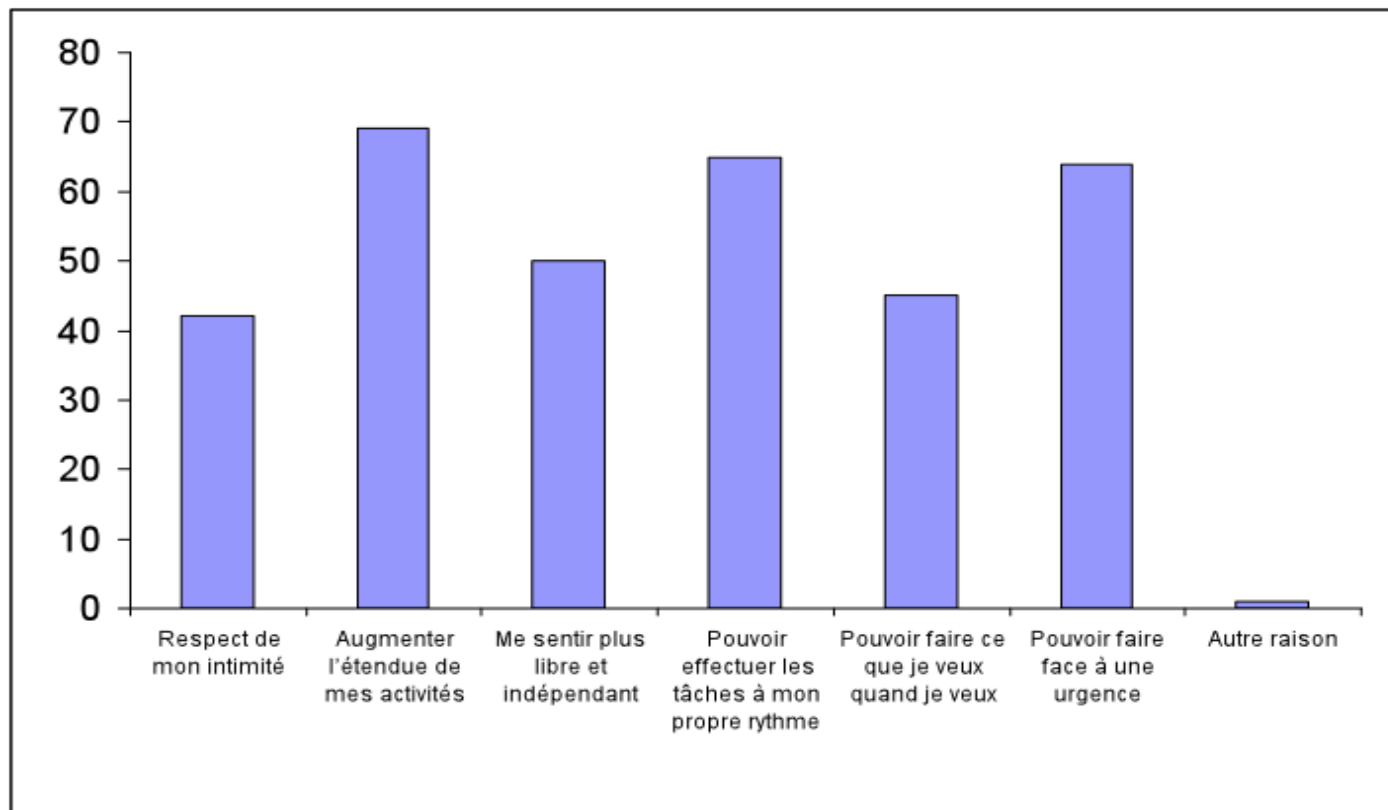
2008-2012

Objectives

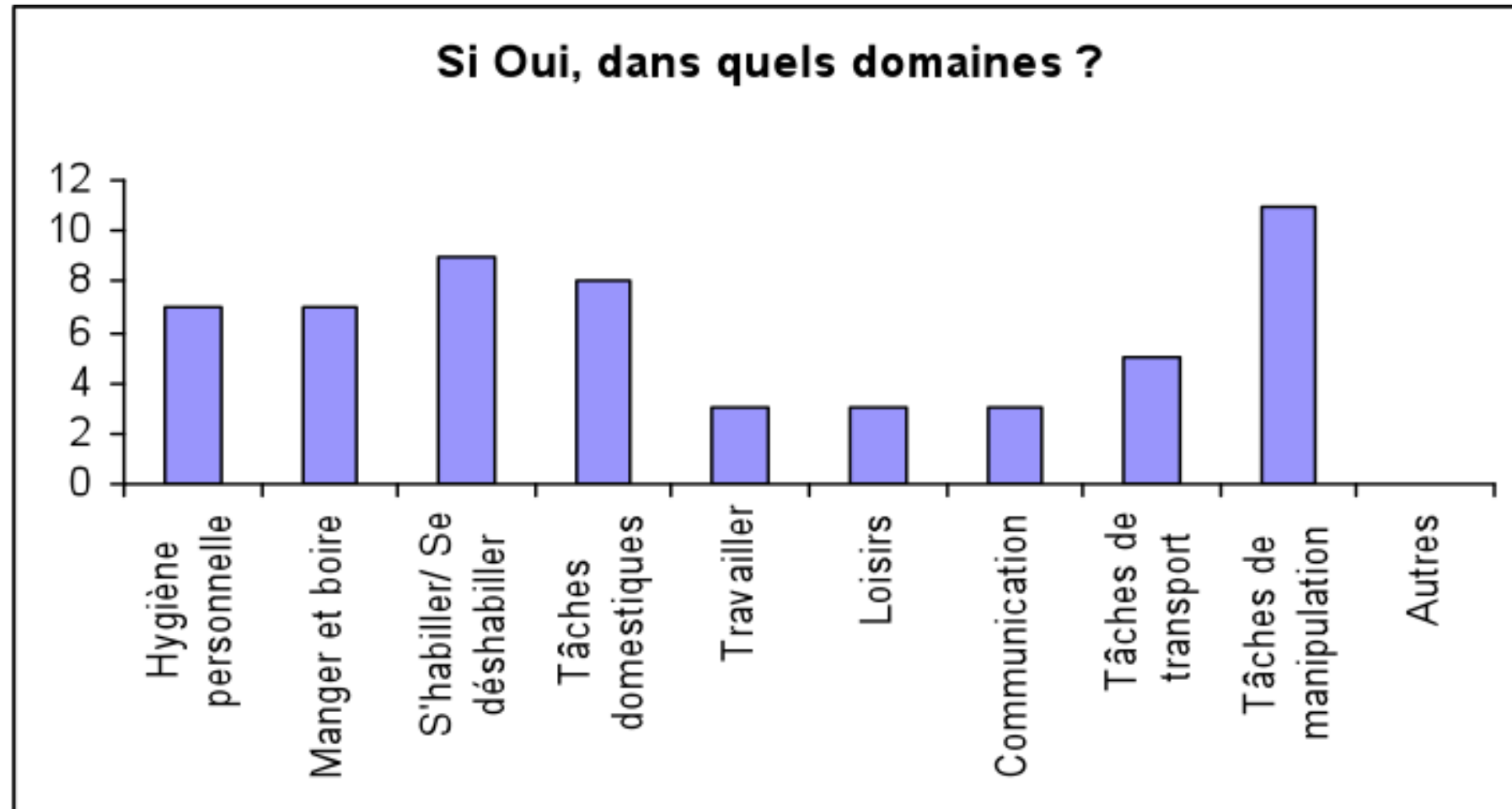
- To develop two-arm mobile manipulator with a vision system.
- This robot is dedicated to assist quadriplegic subjects to manipulate common object in their daily life.
- Partners :
 - CEA-LIST : mechanical design
 - Clinique Propara : specifications of the needs
 - LAAS : Human Robot Interaction (Vision)
 - ISIR : Object recognition and grasping
 - LIRMM : position/force/(vision) control for two-arm robot, control architecture.

Specifications

- The clinical center conducted a preliminary survey with the quadriplegic patients.
 - On 17 patients we got the following result:



Specifications



Application

- We opted for two scenarios based on this survey:
 - By taking a glass and a bottle of water, carrying the set to the patient, and poure him a drink within his peripersonal space.
 - By picking up an item and bringing back to its initial location.
- This survey has been extended (+15 subjects).

State of the art



Rollin' Justin

A platform for
mobile manipulation

Institute of Robotics and Mechatronics
German Aerospace Center (DLR)



Rollin' Justin - © RAS - Hobe - JF

ASSIST's Arm



The hand

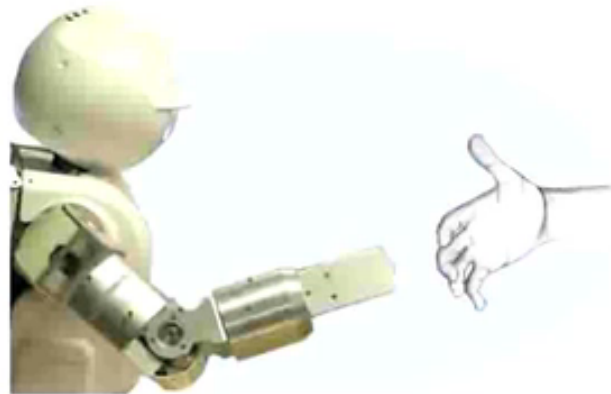


Control strategies

- We aim at controlling the relative positions and orientations of the arms as well as the external and internal forces.
- We aim at controlling the robot as a mobile manipulator (whole body control).
- Avoiding the kinematic singularities due to the mathematical representation.

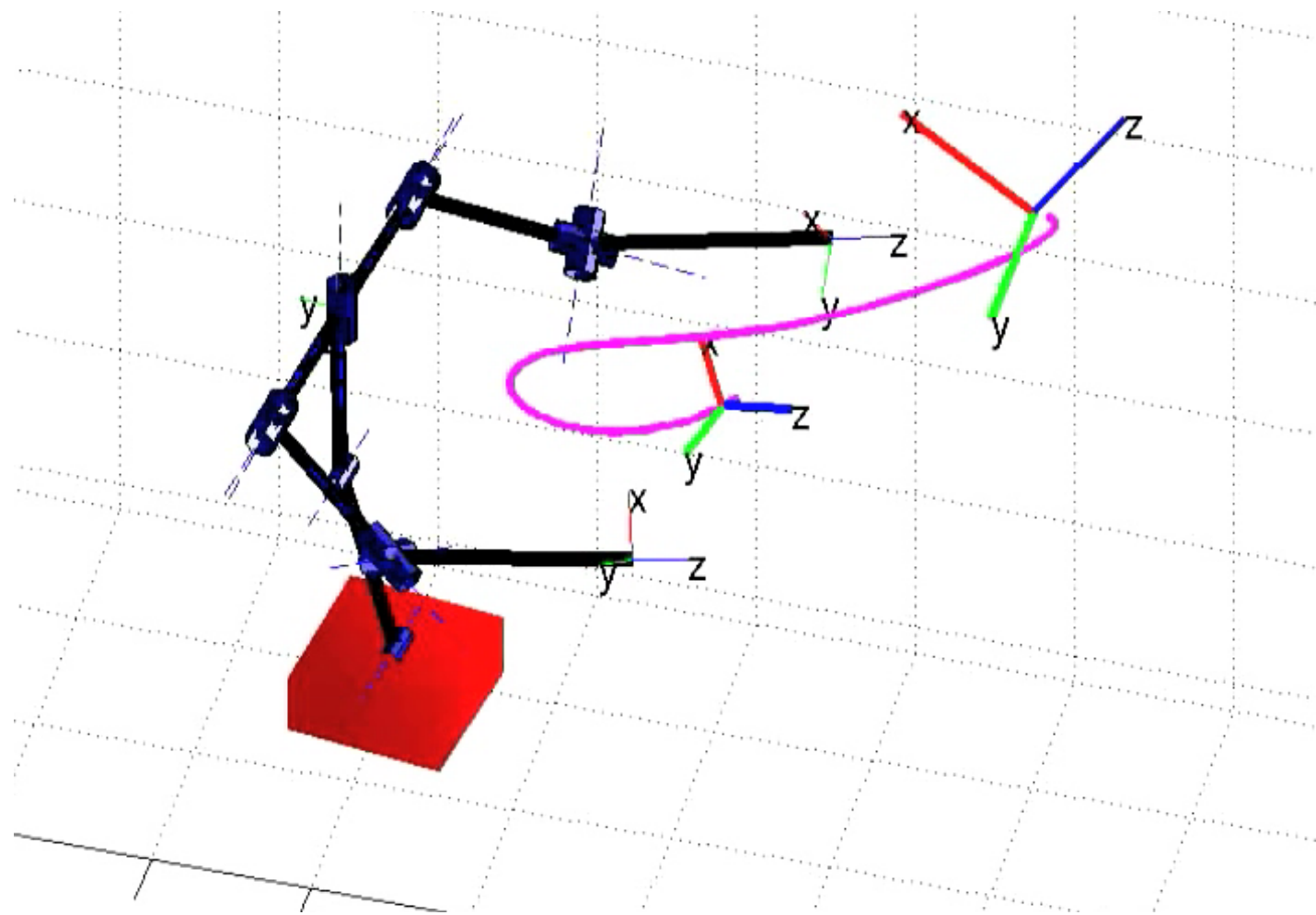
Experimentations

Towards a Cooperative Framework for Interactive Manipulation Involving a Human and a Humanoid



Bruno Vilhena Adorno
Antônio Padilha Lanari Bó
Philippe Fraise
Philippe Poignet

Experimentations



Conclusion

- The ASSIST mobile manipulator should be completed mid 2011.
- The clinical assessments should start early 2012 in Propara (apartment for handicapped people).
- Assistive robot is very popular with quadriplegic patients, not with paraplegics or elderly.