

# LIS

## Laboratoire d'ingénierie des systèmes de Vers

### PROJET10 - MASTER2 CSER 2015

#### Mechatronics Design and Realization of an Active knee brace

A project for a civil hydraulic exoskeleton.

According to the UN ( United Nations ), about 10 percent of the population, or 650 million people , live with disabilities . They are the largest minority in the world. Furthermore, this figure is increasing due to population growth , medical advances and the aging process.

In France, they would represent about 6 million people. We must add to this a " baby boom" generation aging that will bring a significant imbalance at this level. It is therefore a challenge for our future that offer solutions to overcome the handicap.

Several solutions exist , such as a wheelchair that allows people who can not walk to get around. However, this solution leads to many constraints . Hence the LISV proposal to design an exoskeleton to overcome the handicaps, preventing the mobility of people with

disabilities.

The first step of this project is to design and implement a knee brace. This orthosis will aim to reproduce the rotational motion around the knee.

Several technological solutions have been studied and compared . Mechanical analyzes were made to find the relationship between the pressure used and the torque produced, and between the angle of rotation and the displacement cylinders.

The solution with a linear actuator attached to the upper leg and lower leg was retained.

A virtual design has been built in order to check the dimensions of the system, and thus, able to get out the dimensions of the cylinder

Finally, the realization of the brace will be the last party to fully realize this project.

