

## PostDoc in Increasing the maneuverability of a 4-cables suspended robot

Research Department: Laboratoire de Conception Fabrication Commande, EA4495, Université de Lorraine.



Prototype de Robot à Câbles Ludique

### Context of the work

In order to introduce the public to Robotics and to illustrate the technicality of the control of a non-serial robot, a parallel sub-actuated robot with 4 cables has been developed within the framework of the INTERREG VA Robotix Academy Project. The working space is about 1 m<sup>3</sup>.

By means of manual control on the vertical uprights and a moulding system, the platform can be steered in x, y, z direction, but without being able to adequately control the orientation angles. There is currently a dependency between the x, y, and z positions of the robot and the observed inclinations which limits the useful working space of the robot.

To achieve this, cabled robots must have more cables, 7 to 8 cables, some attached at low points can be cumbersome in an industrial setting.

It has been shown that it is possible to control all the DDLs by changing the position of the cable attachment points, without additional cables, using actuators integrated into the platform. A patent has been filed on this topic in 2021.

### Subject

We want to add a servo system that will keep the lower platform parallel to the ground to improve maneuverability and automatically correct the platform's attitude.

It is a question of developing a platform in 2 parts, one, above, connected to the cables like the current one, the other, below, connected to the first one with a device allowing to modify the position and the inclination in  $\alpha$  and  $\beta$ , so that the operations of pick and place will be facilitated.

- The system for changing the angles can ideally have only 2 actuators.
- The correction of the attitude can be obtained via an angle measuring system providing a correction set point, in a value range of  $-30^\circ$  to  $+30^\circ$  for the angles  $\alpha$  and  $\beta$ .
- A light solution will be interesting to limit the efforts in the cables.

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### Candidate Profile

The candidat must have a PhD in robotic.

To apply, send a CV, any publications and a motivation letter

to: Gabriel Abba, [gabriel.abba@univ-lorraine.fr](mailto:gabriel.abba@univ-lorraine.fr)

Limit date for the application: 2021, August 15

Salary: around 24 k€ gross annual for 10 months

Startdate: 2021, September 1<sup>st</sup>