

Project Index: 540425-LLP-1-2013-1-FI-ERASMUS-EKA

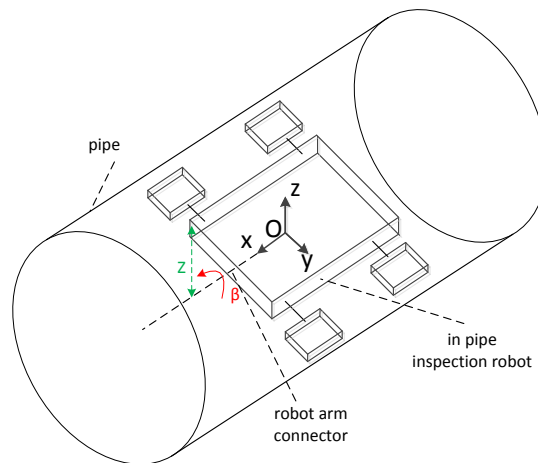
Project Title: Reshaped Partnerships for Competitiveness and Innovation Potential in Mechanical Engineering

Partner P2: Technical University of Cluj-Napoca

RLPS project theme

Multifunctional robotic arm with 2 degrees of freedom

Descriptions: The project proposed the development of a multifunction robotic arm for an in-pipe inspection robot. The robot arm must perform two movements: 1 rotation along the X Axis; 1 translation along Z axis (fig 1).



Requirements:

- 2 DOF – 1 rotation β (amplitude $\beta=0-360$ [deg], precision min 3[deg]), 1 translation Z(amplitude $Z_{min}=100$ [mm], $Z_{max}=400$ [mm], precision min 2 mm, translational speed ≥ 1 [mm/s]);
- characteristics: - weight ≤ 5 [kg];
 - inspected pipe dimension (ϕ 200-800 [mm])
 - connection to the robot : using 4 bolts (imposed dimension and form)
 - end effector/tool connection: allows connection of an electric mill with diameters from 40...60[mm]
 - maximum contact force between the pipe and toll : 100 [N]
- Actuation – 2 DC motors (the robot is teleoperated from distance, the controller already exist) with limit switch

Tasks:

- Design the mechanical parts of the arm, including the robot connection to the mobile robot platform and the end effector
- Designed the electrical circuits for motors and limit switch
- Production cost estimation