

Robotic Window Cleaner

Status: Filled

Group Members: Ghassan Hijazi, Meghdad Hendi, Mazen Kawam, Adam Frado, Patek Yeung

Sponsor(s):

Supervisor(s): Ed Park, PhD, PEng, Associate Director/Professor, Mechatronics Systems Engineering

Project Description

Cleaning high rise building windows has always been a difficult matter when it comes to labor and safety. Furthermore, most cleaning companies compensate the workers for the safety risk in repelling down a building to clean it. In order to reduce the life risk and the hefty labor bill, we have come up with an idea of developing a robotic window cleaning system where the only labor involved is pressing a button once to get the machine started.

A robotic window cleaner will be a true application of a Mechatronics system, where mechanical, electrical, and control skills are needed. This would be the best opportunity to show case the knowledge we have gained from our studies. We are aware of the existence of other products in the market with the same purpose. We are aiming to base our project on simplicity, efficiency and low cost in order to be competitive.

We have looked at products that are available on the market and found that most of them are remotely controlled as opposed to being fully automated. Our goal is to make fully automated product that will save the facilities manager money on cleaning costs. Hiring a cleaning crew should not be cheaper than purchasing and using this machine.

We want to have a rigid structure that hangs from the roof on wire ropes. The structure itself may be similar to a picture frame. There will be a cleaning unit/head that will be able to maneuver around the inside of the hanging structure in a grid like fashion. A horizontal railing holding the cleaning head will be able to move vertically inside the frame. The cleaning head will be able to move horizontally along the railing. The combination of these two movements will allow the machine to clean the entire window. To clean the window thoroughly we want to have a combination of a water-spray head, a rotating cleaning brush and a rubber squeegee. Mechanical actuation will be programmable in order to make the machine run on its own and be adjusted for different working scenarios.

We have decided to target high rise buildings with glass exteriors. The panes of glass will need to be flat/planer.

We are looking forward to your feedback on this project proposal. Upon your approval we are willing to work as hard as possible in order to turn the idea into a working prototype.