Skyshine Robotics

Status: Filled

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Sponsor(s):   Tech-E

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Project Description

As cities continue to grow vertically, maintaining the exterior surfaces of tall buildings poses a significant challenge. While these architectural marvels redefine skylines, the maintenance of their exteriors, especially cleaning windows at extreme heights, remains a daunting task.

Current methods involving manual labor or cumbersome machinery present safety risks, inefficiencies, and high costs. Many individuals in British Columbia are injured from high altitude-related jobs every year. According to WorkSafeBC stats, more than 4000 workers were injured from falls from elevation in 2021. Working at high altitudes is a demanding and often perilous task for individuals. It requires individuals to operate in environments where oxygen levels are reduced, weather conditions can be extreme, and the terrain is often rugged. An example of working at high altitudes is window cleaning, ensuring the safety of workers working at such high altitudes is a struggle. Traditional methods require workers to physically clean the

window-cleaning robot specialized for skyscrapers. This idea was developed during the Fall 2023 MSE 490 Tech-E course, and the market was found to be missing a practical and safe solution to the problem of skyscraper window s exsked durobleg TdE2 (c86)2 e,TJ0 Tc 0 Tw ape3taper.9 (ac)2 (
study
2. Study available technologies and select features required for the robot performing this task
3. Develop a data set for design objectives and design challenges
4. Construct a prototype integrating advanced robotics, sensors, and cleaning mechanisms to navigate vertical surfaces and perform cleaning tasks effectively.
5. Design a remotely controlled proof-of-concept and test it on low altitudes
6. Develop and integrate AI algorithms and automation systems for real-time decision-making, adaptive navigation, and efficient cleaning operations.

7. Perform rigorous safety and reliability tests, including stress tests, environmental simulations, and failure mode analysis, ensuring compliance with safety standards.

The project involves robotics, pneumatics, sensors, actuators, machine learning, computer vision, and AI. It is likely to lead to a future commercialization pathway. Funding will be provided from Tech-E for component purchases and prototyping.