

SKYCLEAN: AUTOMATED DRONE CLEANING SYSTEM FOR BUILDING SURFACES

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ELEVATOR PITCH

Introducing SkyCleaner, the cutting-edge cleaning drone revolutionizing skyscraper maintenance. SkyCleaner is a high-performance, autonomous drone specifically designed to tackle the challenge of cleaning windows on towering skyscrapers. With its advanced technology and state-of-the-art features, SkyCleaner offers unparalleled efficiency, effectiveness, and safety. Imagine a fleet of SkyCleaner drones gracefully soaring up the sides of skyscrapers, effortlessly removing dirt, grime, and smudges from even the tallest windows. Equipped with precision sensors and advanced algorithms, SkyCleaner navigates complex building facades with ease, avoiding obstacles and ensuring a thorough cleaning process.



INTRODUCTION

High-rise buildings and towers dominate modern cityscapes, presenting a growing challenge and risk for window cleaning. The traditional methods are time-consuming, expensive, and potentially dangerous, creating a significant gap in the market for innovative and efficient solutions. The primary objective of the project is to develop an innovative window cleaning solution in the form of an advanced, automated drone system. This system aims to significantly enhance operational efficiency, ensure utmost safety, minimize environmental impact, and maintain cost-effectiveness. The project seeks to address the urgent market need for a technologically sophisticated, sustainable, and adaptable cleaning approach tailored for high-rise buildings and skyscrapers. By achieving these objectives, the window-cleaning drone project endeavors to revolutionize industry practices, providing a safer, faster, and more economical alternative to conventional window cleaning methods.

SPECIFICATIONS

Factor	Best
Water Pump Flow Rate	0.33 L/min
Cleaning Performance Score	10
Tank Volume	5 L
Total Manufacturing Cost	5172.5
Drying Time	30 Sec / window
Autonomy Level	-
Navigation Accuracy	-
Communication Range	100 m
Safety Features Count	-
Max Lifting Capacity	7 kg
Water pump power consumption	15 Watts

PROTOTYPE DESIGN

Novelty: Pioneering an autonomous drone technology specifically designed for efficient and safe window cleaning of high-rise structures, navigating challenges and ensuring impeccable cleaning.

Creativity: Unique design, advanced cleaning mechanism, and state-of-the-art navigation and control systems showcase our commitment to innovation and creative problem solving.

CONSTRAINTS

Here are the constraints that need to be met.

- System footprint $\leq 40 \times 50 \text{cm}$
- Capable to fit 5L of cleaning fluid
- The drone system must abide by the constraints and rules set forth by the KSA's aviation and drone operating authority.
- All building materials should be strong and able to survive the harsh climate of KSA, including exposure to wind and sand.

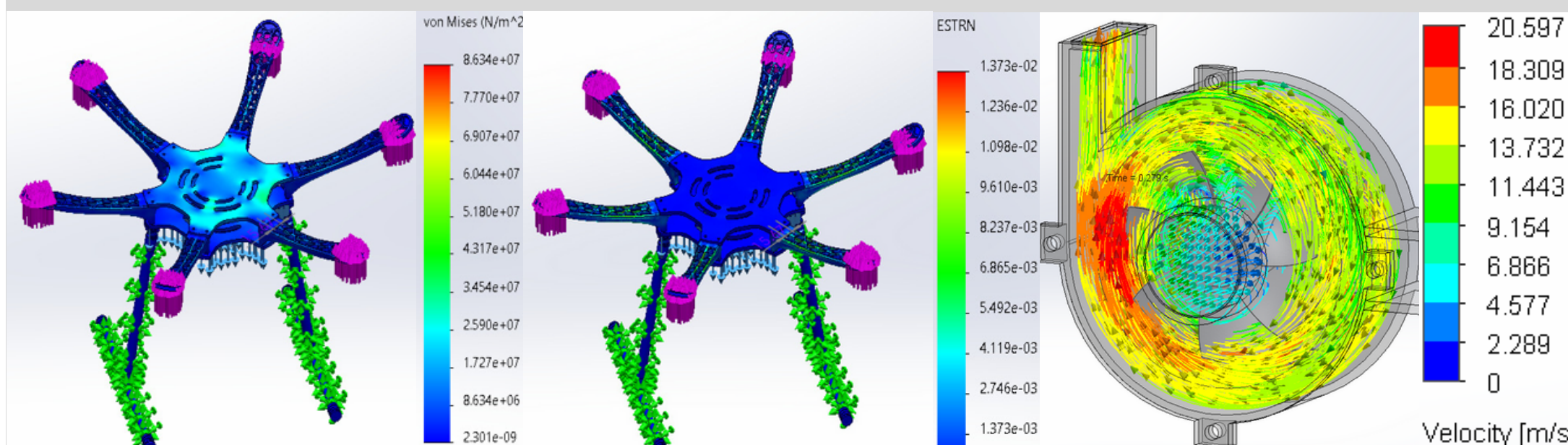
HARDWARE VALIDATION

While we have successfully met all hardware specifications, cost considerations present a noteworthy exception. As this marks our inaugural product, we encountered challenges in accurately specifying and integrating the most suitable equipment, necessitating the reordering of certain components to enhance the final product. It is important to underscore that cost constraints will be effectively addressed in subsequent product developments.

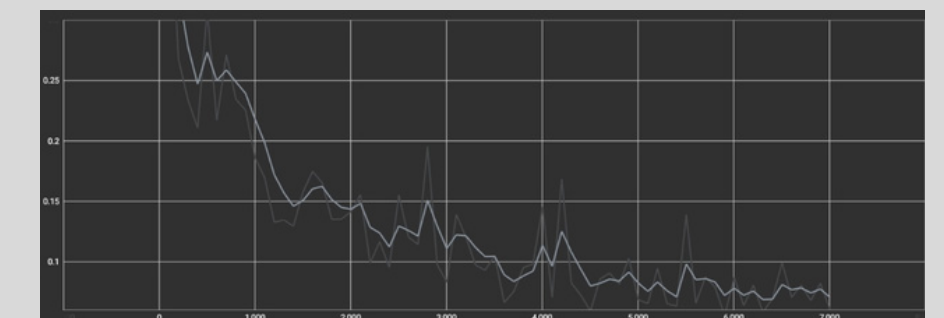
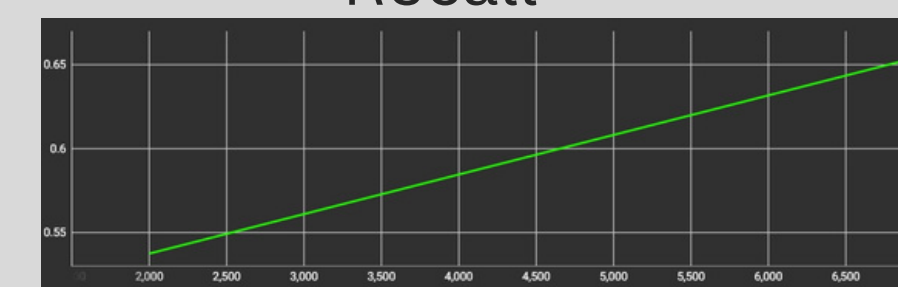
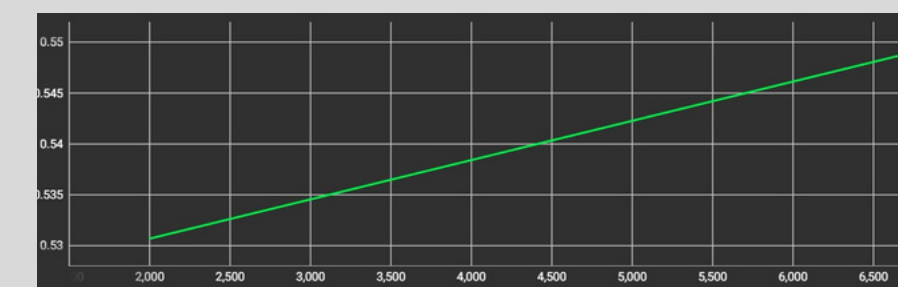
CONCLUSION

In conclusion, our Senior Design Project represents the culmination of our academic journey, passion, and dedication. Through this poster, we aimed to provide an engaging overview of our project, highlighting its innovation, implementation, and potential impact. Thank you for joining us on this exciting voyage of ideas and creativity.

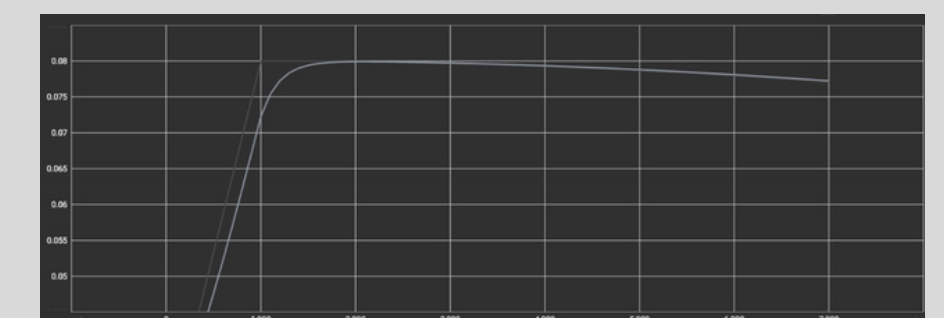
SIMULATION



SOFTWARE VALIDATION



loss



Learning Rate