



# INSPECTION OF AIRCRAFTS BY DRONE



## INTRODUCTION

Aircraft inspections are a critical component of ensuring safety and operational efficiency in aviation. Traditional inspection methods, which rely heavily on skilled technicians manually examining components for damage, defects, and wear, are often time-consuming, costly, and labor-intensive. Accessing hard-to-reach areas on aircraft further complicates the process, requiring specialized equipment and increasing both time and expense. Moreover, manual inspections pose inherent safety risks, as personnel frequently work at heights or in confined spaces, exposing them to potential hazards and disasters.

## PROBLEM STATEMENT

Saudi Airlines currently faces significant challenges with their manual aircraft inspection process. This method requires skilled technicians to meticulously examine each component for rust, damage, and defects, leading to a time-consuming and costly operation. Technicians must often access hard-to-reach areas, which increases inspection times and operational costs. Additionally, manual inspections pose considerable safety risks, particularly when personnel work at heights or in confined spaces, raising the likelihood of accidents and injuries. So, we need to enhance this inspection process.

## OBJECTIVE

Developing an advanced inspection drone equipped with a LiDAR sensor offers a transformative solution for aviation maintenance, delivering inspections 20% faster than traditional methods while providing unparalleled accuracy. The drone leverages LiDAR technology to generate high-resolution 3D models of aircraft, capturing details like surface irregularities or structural damage. By comparing these generated models with the original model, the system automatically detects deviations and generates detailed reports for maintenance teams.

## SPECIFICATIONS



± 4 to ± 10 degrees error tolerance in each axis



Ability to resist and compensate for wind speeds up to 5 m/s

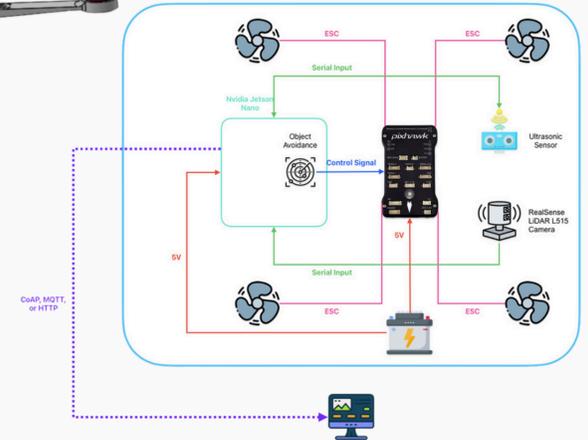


Ability to handle payloads of 500 g

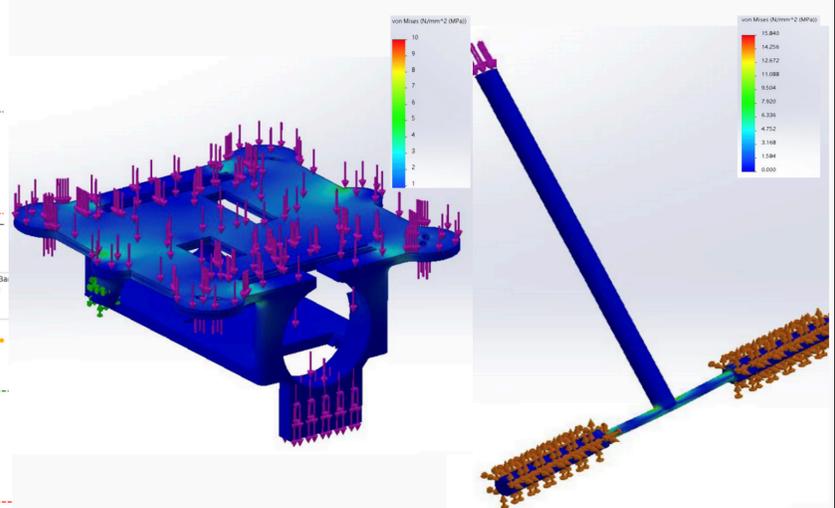
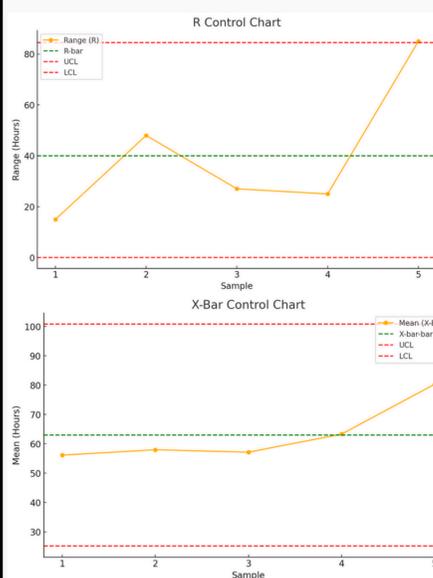


Time saved of inspections is greater than 14.4 hrs

## PROTOTYPE DESIGN



## TESTING / VALIDATION



## CONSTRAINTS



**Payload Capacity**

The capacity of the drone is 500 g



**Battery Life**

The drone Battery Life  $\geq$  9.3 minutes



**Maximum Altitude**

Maximum Altitude based on government regulation is 150 meters



**Cost**

Should not exceed allocated budget

## CONCLUSION

In conclusion, the development of a LiDAR-equipped inspection drone represents a significant leap forward in modernizing aircraft maintenance. By combining advanced technologies such as high-resolution 3D modeling, automated defect detection, and rapid inspection capabilities, this project addresses critical inefficiencies in traditional methods. It enhances safety by reducing the need for human intervention in hazardous areas, improves accuracy through detailed analysis, and minimizes aircraft downtime by completing inspections 20% faster. This innovative solution not only streamlines operational processes but also positions the aviation industry to adopt smarter, more cost-effective maintenance practices, paving the way for a safer and more efficient future in aviation.

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