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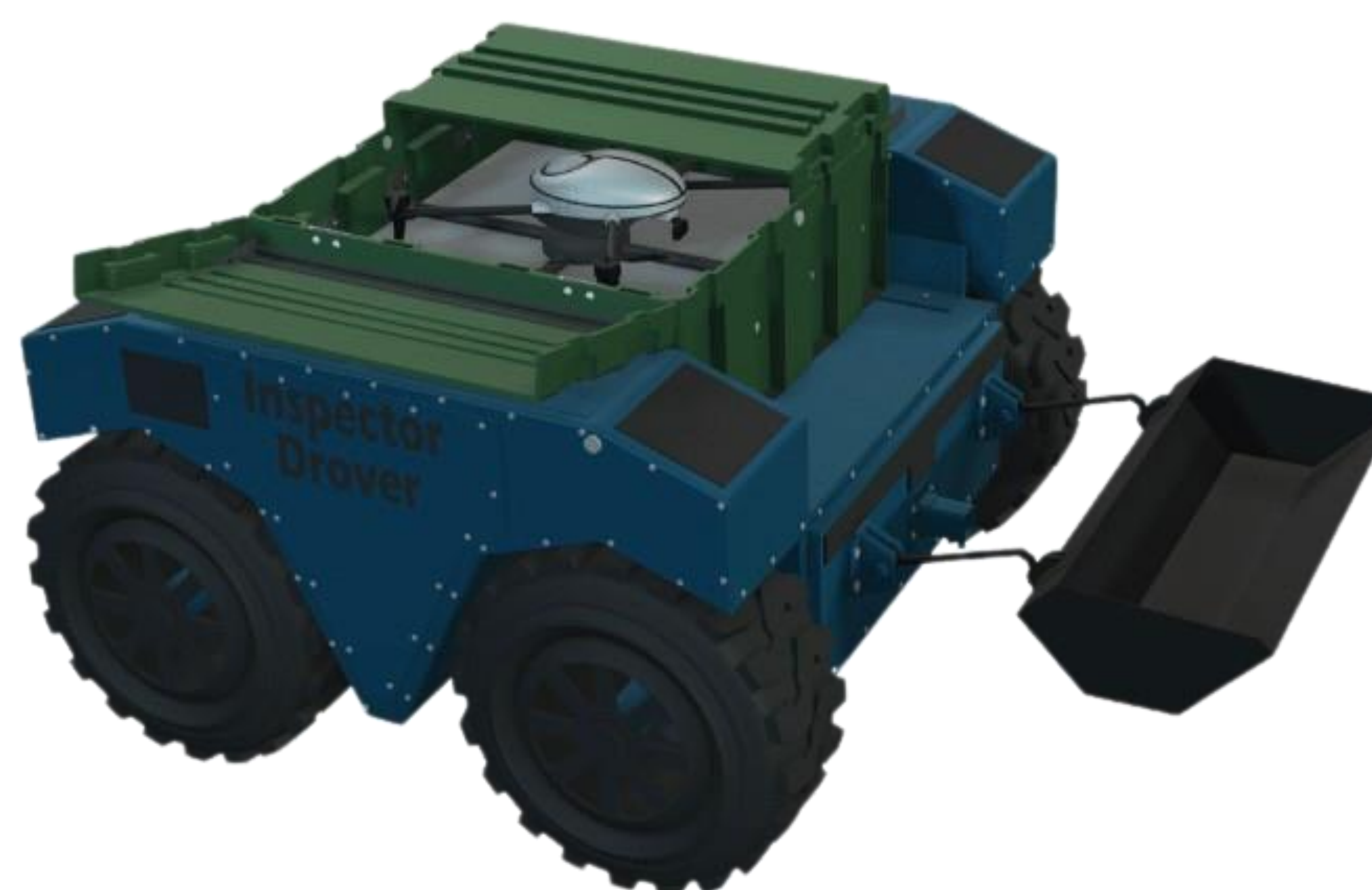
Introduction

The aviation industry is the safest mode of transportation today. One problem the industry constantly faces is Foreign Objects Debris (FOD) that appear on runways all over the world. The Hampton University Department of Aviation created a system to help detect and remove FOD to help lower the annual 4 billion dollar cost of repair due to FOD.

Objectives

Inspector Drover must be able to:

- Using drone technology, find and locate FOD on top of runway
- Using a rover to autonomously locate and collect the FOD
- Safely follow the rules and regulations of the FAA

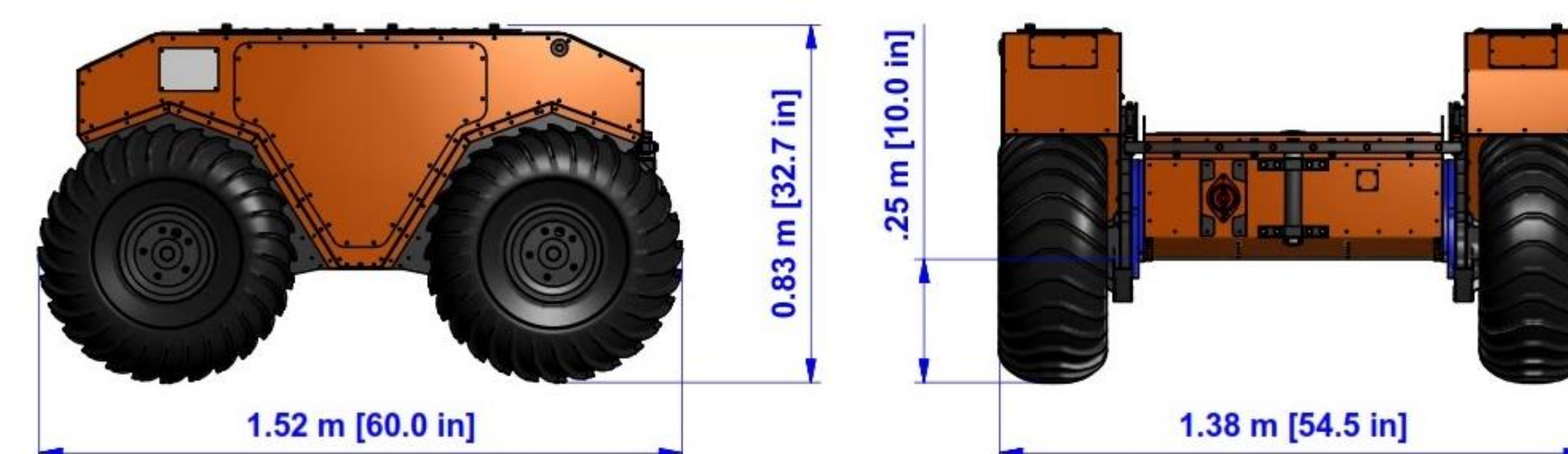


Concept of Operation

When it is due time for a runway inspection, the operations manager will coordinate with ATC to start the autonomous process from their office. The rover will power on and proceed under the direction given by ATC to the active runway. The rover will then proceed to open the center end of the runway and commence the inspection protocol. The rover will open the drone-in-a-box solution and then deploy the drone.

Once the drone is in the air and commences its sweep, the rover will follow behind the drone down the edge of the runway. When the drone signals to the rover that it detects FOD, the rover will receive an accurate GPS location of the debris and move from the edge of the runway to the FOD's current location. The rover will then drive up and scoop the debris in its front arms. Once the rover has scooped the debris, it will return to the edge of the runway and continue the FOD inspection process with the drone and repeat the pickup execution if needed.

Design



The engineering team decided to create a modular rover system that would be integrated with a drone-in-a-box system. This would allow the Inspector Drover system to be compact and operate in all environments. The Inspector Drover system will have all the necessary safety devices, such as ADS Transponder and real time 4k cameras to help locate the systems and operate effectively.

Conclusion

Inspector Drover will help automate the inspection process while making inspections safer, faster, more precise. Our design has the potential to save airlines billions from fuel cost and maintenance repair on aircraft.

