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Team 315

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Customer Needs

## Introduction

This document outlines and interprets the needs of the customer for the development of a low-cost AI flight simulator for a drone. The simulation is intended to replicate the controls and behaviors of a real drone while providing an immersive experience through FPV and VR, allowing for realistic testing and user interaction. Furthermore, the simulation must be portable and adaptable, capable of integrating AI models for enhanced functionality.

The sponsor of the project is a graduate student of Professor Shonda Bernadin, who is working alongside her on the project. During the meeting with the sponsor, we covered the basic idea of the project as well as the goal for the simulation. By understanding the customer's requirements, the team can ensure that the simulation meets expectations for usability, portability, and technological integration. Initial discussions with the customer revealed a focus on ease of transport, FPV functionality, and the ability to leverage AI and VR technologies within the simulation. This document interprets those needs into specific, measurable requirements, providing a clear roadmap for the development process.

### **Questions we asked the sponsor:**

What aircraft should the flight simulator simulate?

Answer: A quadcopter drone

What should the AI do?

Answer: Left it open-ended

What does low-cost and portable mean?

Answer: Can easily be transported with a car and can be easily replicated by other schools (K-12).

Who is the target audience?

Answer: K-12

What are the inputs?

Keyboard and mouse, custom controller

What is the output?

Answer: Monitor and VR headset

What type of drone?

Answer: FPV Drone

## Customer Needs

Number	need/statement	Source
1	Must simulate a drone	Customer
2	Must have FPV capability	Customer
3	Must be portable	Customer
4	Must have AI integration	Customer
5	Must be able to use VR	Customer
6	Must be able to use our own controller	Customer
7	Must be low cost	Customer

## Requirements

Req #	Need #	Requirement/Interpretation
1	1	The simulation shall mimic the controls and behaviors of a drone
2	2	The Drone shall have a front-mounted camera to provide first person view of the flight
3	3	The simulation shall be able to be fit in a car for transportation
4	4	The simulation shall be able to use various AI models on the drone for testing
5	5	The simulation shall be able to connect to a VR headset for FPV flight
6	6	The controller shall provide inputs for the drone in the simulation and provide feedback
7	7	The cost must be low allowing other schools to replicate the project.

## **Summary**

This document captures and interprets customer needs for developing a drone simulation with FPV, AI integration, and VR compatibility. Key requirements include accurate drone behavior simulation, portability, and support for AI models and VR controls. The outlined needs and requirements provide clear guidelines to ensure the final product meets customer expectations for functionality and technological integration.