

**Electrical and Computer Engineering**

Robot Cognition

Engineering Specification Document

*Collaboration Between ECE Senior Design Teams and UCCS Sponsors*

|  |  |  |
| --- | --- | --- |
| **UCCS ECE Senior Design Team** | | **UCCS Project Sponsors** |
|  |  |  |

**Project Specification Intent**

Professor Bill Michael has requested a sensor platform to be built that is capable of taking information from the surrounding area and processing for a cognition robot to move around.

**Project Requirements**

The following is a list, in order of importance according to the sponsors, requiring the sensor platform to:

* be capable of being powered by an 18-48 VDC power source
* provide 5 VDC at 10A for use by additional equipment
* provide 3.3 VDC at 10A for use by additional equipment
* provide 12 VDC at 5A for use by additional equipment
* generate point-cloud data
* maintain highly accurate geo-positioning
* perform Image/video collection
* generate altitude and gyro data
* format sensor data and provide the data to a single processing system
* be capable of being attached and moved by an external device

**Parameters and Target Values**

To ensure each of the project requirements are met, verifiable engineering parameters and accompanying target values are identified as follows. The sensor platform will have:

* four (4) ports for sensors
* two (2) ports to power additional equipment that use communication protocols I2C (Inter-Integrated Circuit) or SPI (Serial Peripheral Interface)
* one (1) port hold and power a processing system
* an inertial measurement unit (IMU) sensor to record gyro data
* a global positioning system (GPS) receiver to track location
* a light detection and ranging (LIDAR) sensor to generate point cloud data
* a camera sensor to generate at least HD (1280 x 720) resolution with at least 30 frames per second speed

**Agreement to Project Specification**

This document describes the specifications to successfully complete this project, including the project requirements, engineering parameters, and target values. The sponsor agrees the information presented in these documents accurately and fully captures the scope of the design project. The UCCS ECE Design Team agrees to deliver a working solution to the Customer that satisfies the design requirements to the best of their ability. This form serves as an agreement between the Customer and the UCCS Design team.

**PROJECT SPONSORS**

Bill Michael

|  |  |  |
| --- | --- | --- |
| Signature | Print Name | Date |

**UCCS ECE DESIGN TEAM REPRESENTATIVES**

Khaled Almathkour

|  |  |  |
| --- | --- | --- |
| Signature | Print Name | Date |

Makya Geist-Delgado

|  |  |  |
| --- | --- | --- |
| Signature | Print Name | Date |

Tristan Lee

|  |  |  |
| --- | --- | --- |
| Signature | Print Name | Date |

Angela Tran

|  |  |  |
| --- | --- | --- |
| Signature | Print Name | Date |