

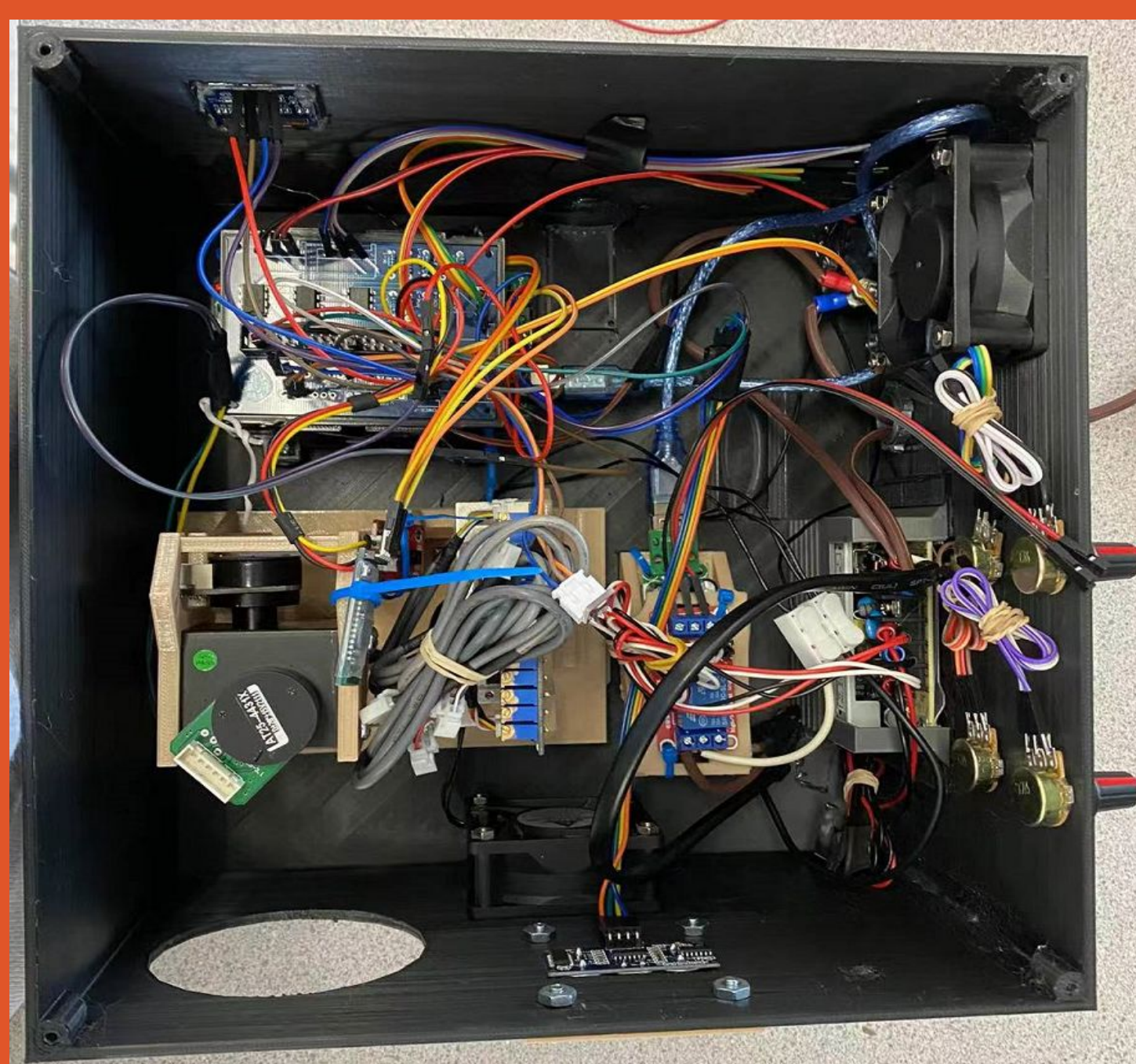
Project Details

System Summary

- Illustrates an image onto a surface using a laser
- Project a Clear Image
- The system uses an Arduino as a central microcontroller for motor control and data processing
- The microcontroller controls a galvanometer, which guides the laser source
- The GUI shows system parameters and control options
- The system has several safety features to mimic real controls solutions

Engineering Requirements

1. The system lets the users define the timeout durations of 30, 60 and 90 seconds.
2. The system lets the user control the system via a user scanned image from the user interface.
3. The system lets the user control the system using control knobs to adjust the X and Y location of the image and the size of the image.
4. The system will turn on an intake and an exhaust fan if the internal components are greater than or equal to 75 degrees fahrenheit.
5. A receptor will run parallel to the laser beam and the laser will turn off if an object crosses the laser system's path.
6. The system will display an identifiable and readable word.
7. The system will display system operating data on an OLED display.
8. The system is less than 30 pounds, less than 1.5 cubic feet, and all connectors are removable.



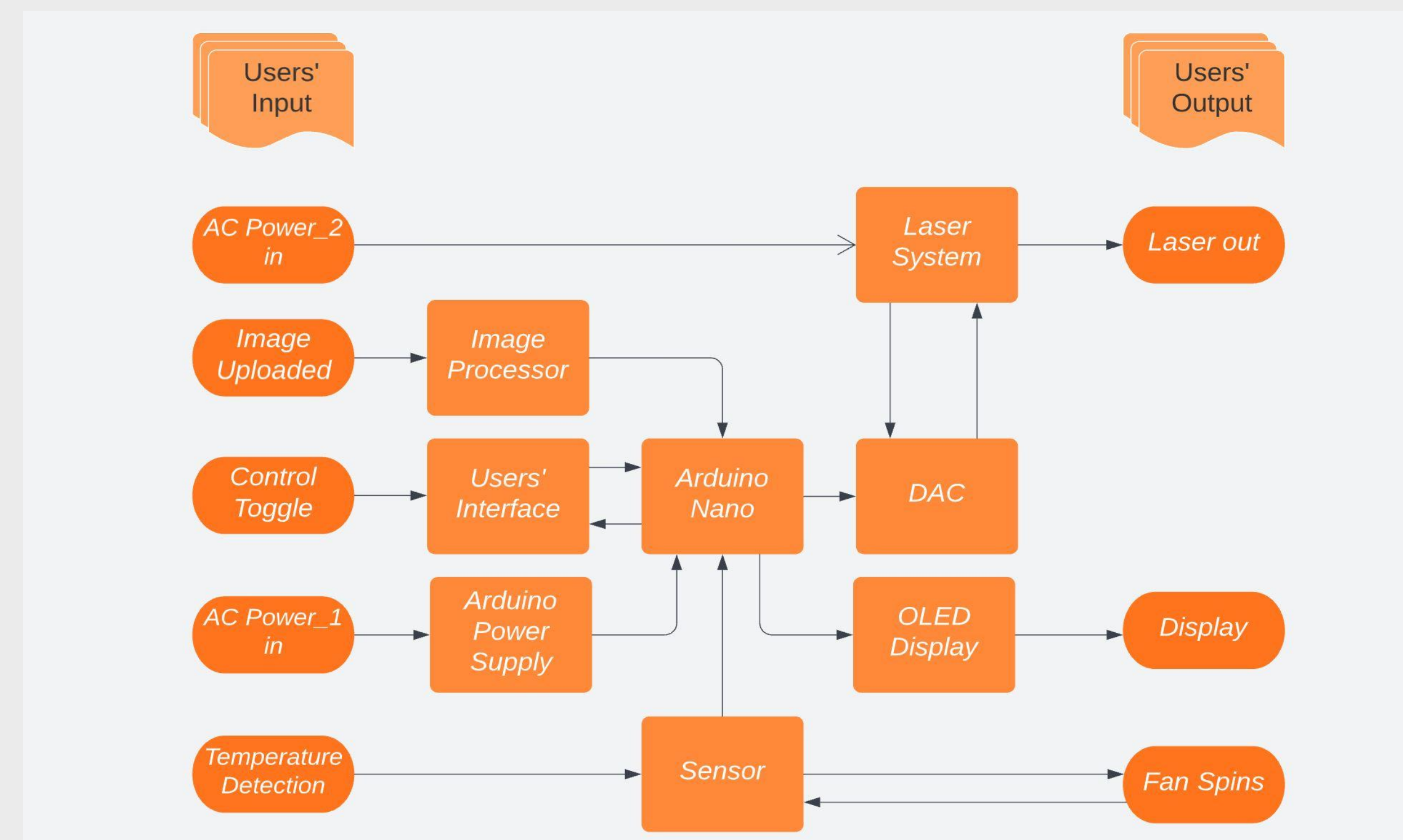
LASER PAINTER

Customer Requirements

The following functionalities were added to the system to meet customer requirements:

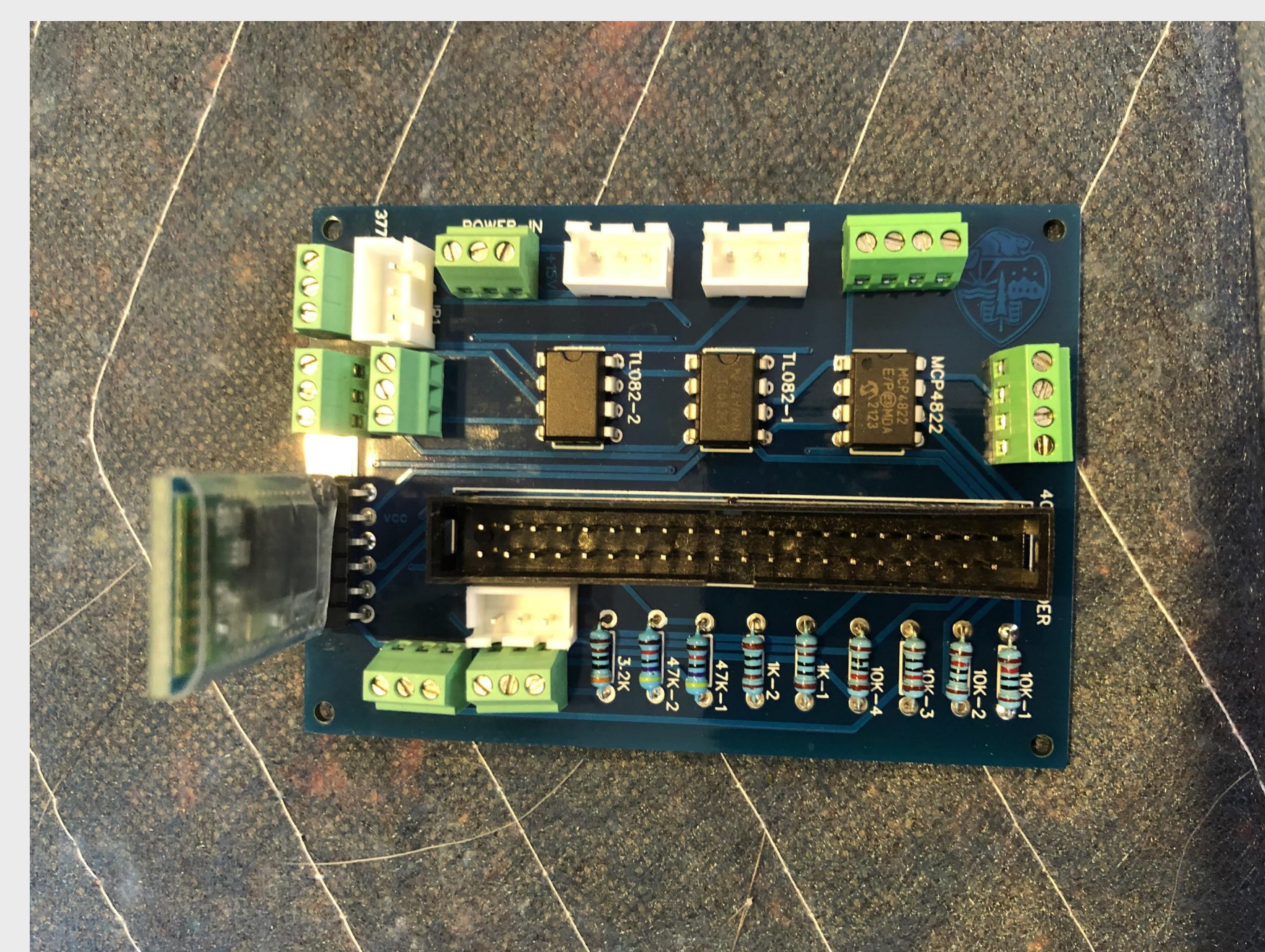
- A timer to govern how long the image was projected
- To ensure the safety of the users and the people around the device, a receptor that runs parallel to the laser source is used to detect if an object crosses the laser's path
- The automatic power-off function was also installed to ensure energy efficiency. Having the laser painter operate the entire time when left unattended could possibly cause the system to overheat and waste energy.
- A cooling fan has been implemented which activates when the system becomes too hot.

Block Diagram



Designed PCB

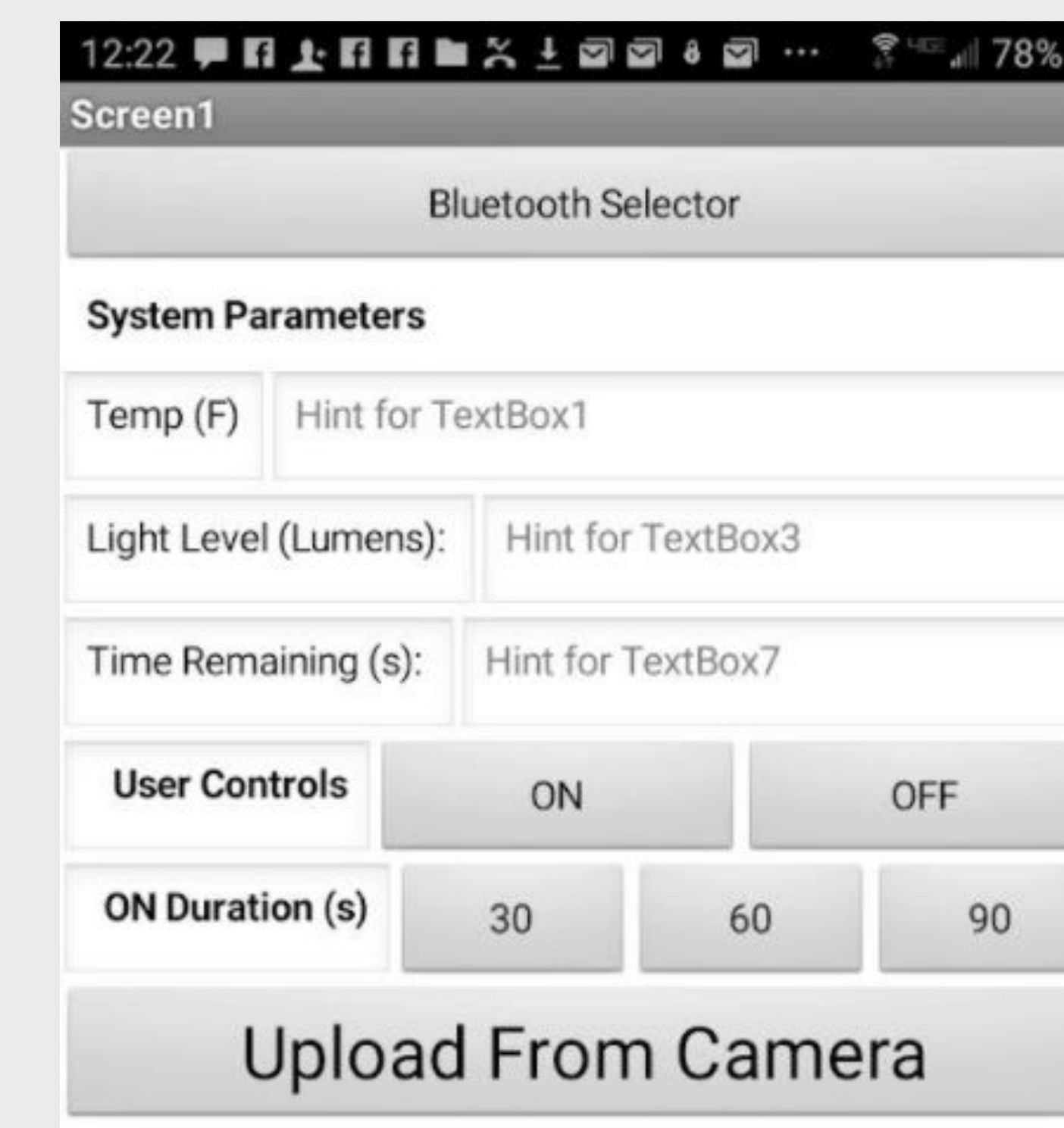
DAC, Sensors, Bluetooth, Arduino, Power Supply



Display



Android Application



Core Components

Users' Interface

The users' interface is an Android phone APP the user can upload photos from.

Image Processor

The Image Processor block processes the user uploaded image into a word for the system to display.

OLED Display

An OLED display shows distance in centimeters, the internal temperature in fahrenheit, and the total system run time since start up.

Sensor Block

A fan is implemented in our system to assist in regulating the temperature. There is also a distance sensor used for detecting if an object is in the laser system's path.

DAC

The DAC (Digital to Analog Converter) block is to convert the digital signal generated by an Arduino into an analog signal and input the analog signal to the laser system.

Laser System

The Laser System block includes an AC/DC switching power supply, a motor driver, a galvanometer, and a laser source.

Arduino Power Supply (5V)

This block will provide a stable 5V DC voltage to the Arduino Nano.

Arduino Nano

The Nano takes data from external sensors (temp, distance) and adjust the system accordingly. It also receives display information from the Android App.

Team Members



Middle Right
Alex Greiner
greinera@oregonstate.edu

Middle Left
Greg Stapley
stapleyg@oregonstate.edu

Far Left
Yuhao Su
suyuh@oregonstate.edu

Far Right
Nathan Raschkes
raschken@oregonstate.edu

Physical Product

