E1.09-Intelligent Lighting Control System

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-Sponsors -
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NASA – Dr. George Salazar

Overview

- Proof of concept designed to improve on an existing system and show that one can maintain the circadian rhythm of both astronauts and plant life using a specific wavelength of artificial light
- Accessible terminal with a GUI unifies system
- Visual and audible warnings for degradation in light intensity as well as color spectrum shifting
- Easily serviceable parts including a 3D printable fixture, cut to size LED strips, and solder butt connectors

Improvements

- More fixtures have been added and are coalesced into one ecosystem
- Feedback systems provide live color and brightness correction
- GUI provides soft controls which can be accessed remotely from the fixtures eliminating the need to adjust each one
- The LED fixtures used to grow plant life are an extension of the human habitat with higher wattage LEDs

Future Tasks

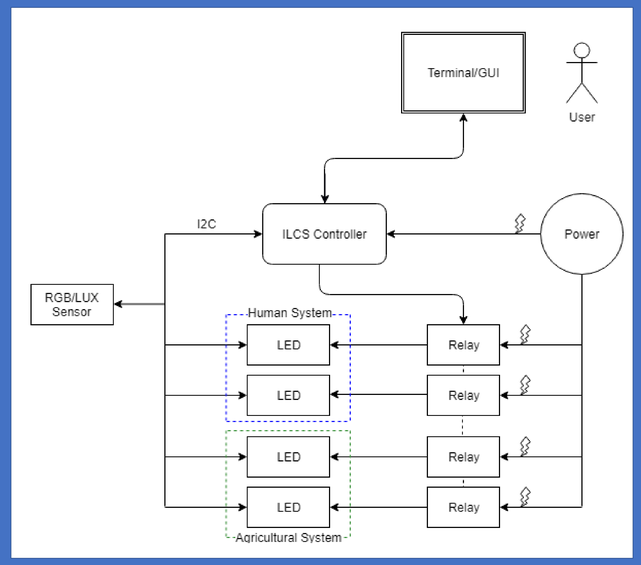
- GUI with access to parameters such as brightness, hue, and the ability to save profiles and enable communication between all devices
- A 3D printable control center that can house both the touch screen for the GUI and the system of relays
- Test RGB and LUX sensors and calibrate them with an environment similar to the ISS

Meet the Team

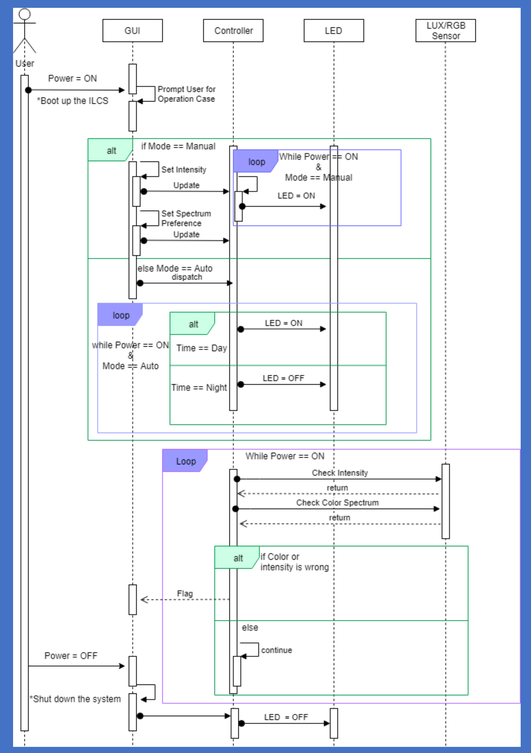
- Zachary Fox [PM] – Electrical Engineering – Micro and Nano Systems and Devices
- Ignacio Gomez – Electrical Engineering – Micro and Nano Systems and Devices
- Kazuyuki Witt – Electrical Engineering – Computer Science and Engineering
- Krystopher Frederick – Electrical Engineering – Network and Communications Systems

Left to right: Krystopher Frederick, Ignacio Gomez, Zachary Fox, & Kazuyuki Witt

System Flow Chart

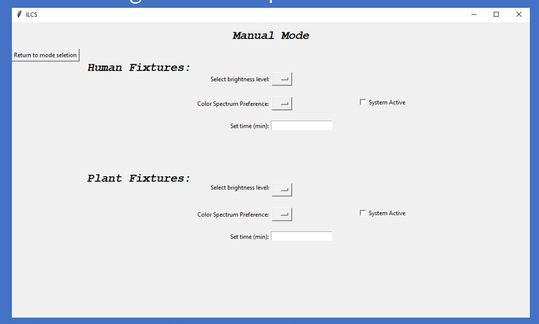


Case Diagram



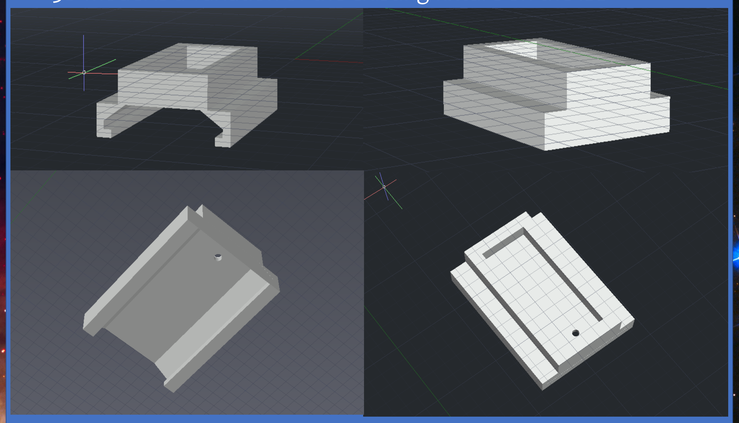
User Interface

- Allows the user to select from an automated or manual lighting control
- The user can adjust brightness, light time shifting, and a way to store these setting under a unique name



3D Printable Model

- Scalable AutoCAD model that can be printed at the ISS
- Model features a slat for an acrylic diffuser, as well as thru-holes for neat cable management.
- 3D model is a variation of the existing fixture on the ISS



Installation currently in use on the International Space Station