

Christmas Village Light Display: Executive Summary

Purpose of the Project

The Christmas Village Light Display project seeks to replace the incandescent light bulbs used in Department 56 Christmas Village Houses with multiple LED light fixtures which can be controlled wirelessly from a central box. These Christmas Village houses (called “buildings” from here on) are used by many during the holiday season as decoration. On every building, there is a small 1.03” hole underneath or on the side of each building, used to hold an incandescent light to illuminate the building. These incandescent lights are connected in a string via wires, and can be an eyesore for the user and costly for energy bills. While the former can be fixed by hiding cables, there is currently no wireless control option available for these buildings.

Management and Development Process

Throughout the project, the team was in constant communication with the client to ensure that we are building exactly what they are looking for. The client gave us feedback and recommendations based on his project vision, which were evaluated and implemented if it does not conflict with other aspects of the project.

In terms of team roles and responsibilities, the project had 2 hardware leads and 1 software lead. Zachary Watkins was in charge of the Enclosure, Fixture Processor, and Fixture Power blocks. Watkins’ work includes both the central box and fixture enclosures using Fusion360 and the PCB on every fixture using EAGLE. Jesus Aguilar was in charge of the Box Power, Central Processor, and Button Interface blocks. Aguilar’s contribution to the project was designing the button PCB in the central box in EAGLE. Michael Barnes was in charge of the Central Code, Fixture Code, and Music Processor blocks. Barnes developed the code for the fixtures and central box with the nRF SDK.

The project was split into 4 phases. They are, in order: the Design Phase, the Build Phase, and the Presenting Phase. The tasks throughout the project were divided into 4 categories: Project Conception and Initiation, Block Definition, System Integration, and Project Presentation (see Project Timeline). Currently, the Christmas Village Light Display project is undergoing a revision of the central box enclosure and implementing light bouncing into the system, neither of which were ready by Final System Check-Off.

Key Lessons Learned

Like many teams, our team learned that developing a project fully remotely was slower than in-person. For example, it was difficult to show the brightness and appearance of the light fixtures to the client, since videos did not accurately portray its appearance. Additionally, we found learning new tools, software, or technologies on a project should always include plenty of time to familiarize oneself with it. Notably, Barnes had never used Bluetooth nor the nRF SDK prior to this project, which slowed development and ultimately caused the Music requirement to not be met. Finally, our team discovered the importance of detailed note taking and

documentation. There were many instances where team members had differing understandings of what the client said, what a task called for, or the status of a block. These could have been avoided if proper meeting notes and regular, clear task updates were performed.

Christmas Village Light Display

UNIVERSITY	Oregon State University
DATE	5/19/21

