**GNG1103 Project**

Group A12

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Deliverable G

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**Prototype II**

This prototype continued the development of our solution because now we know the flexibility of the walls. Before we were unsure of how flexible the walls would be in-case of strong winds or other interferences that potentially could have. This allows us to potentially change the width of the 3D print in order to have our design less flexible.

For our design, we made the assumption that bowie would have its arm raised similar to the picture provided. We based the designs inner dimensions on that.

The materials that were used are cardboard. The prototype is just a representation of the dimensions of final product.

In this prototype, the functionality of wireless charging has been added. Bowie will be able guide itself to the charging pad when it is out of charge, which will be set inside the house. The power pack can be stored on the above deck.

Figure: Prototype II from different angles.



**Wireless Self-charging**

Being said our primary objective is to make Bowie less vulnerability to human needs and make it more efficient, Bowie needs to be able to charge itself when necessary and that too quickly.

For the prototype, we have used a wireless phone charger backed up by a power pack to demonstrate the feature. By making small changes to Bowie’s batteries and forming a simple circuit, Bowie will be able to guide itself to the charging pad to recharge when required. The charging pad will be placed on the far inside of the house and the power pack will be stored in the deck above, which can be accessed whenever necessary.

Figure: Storing deck for power pack.

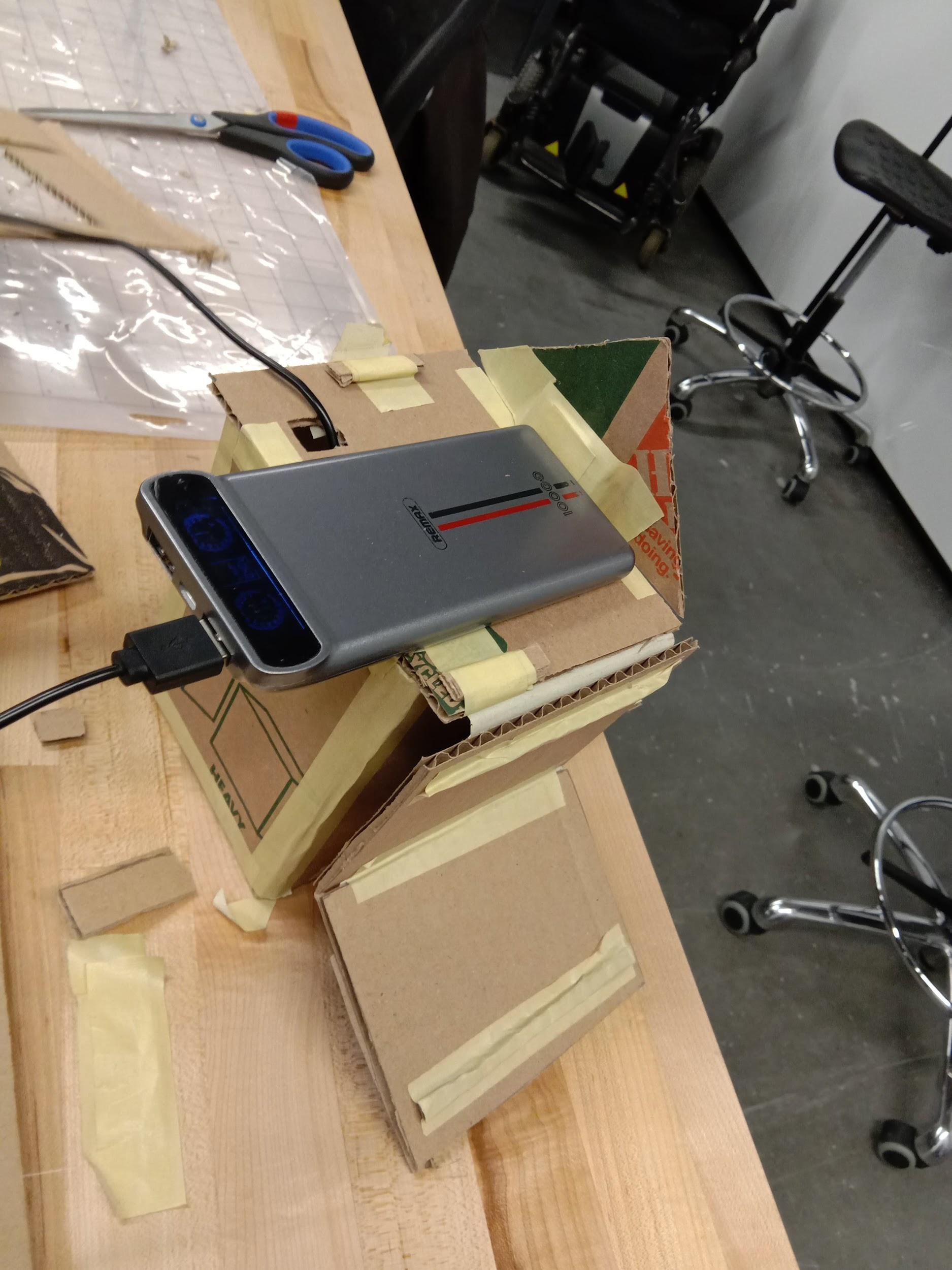


Figure: A phone being charged wirelessly.



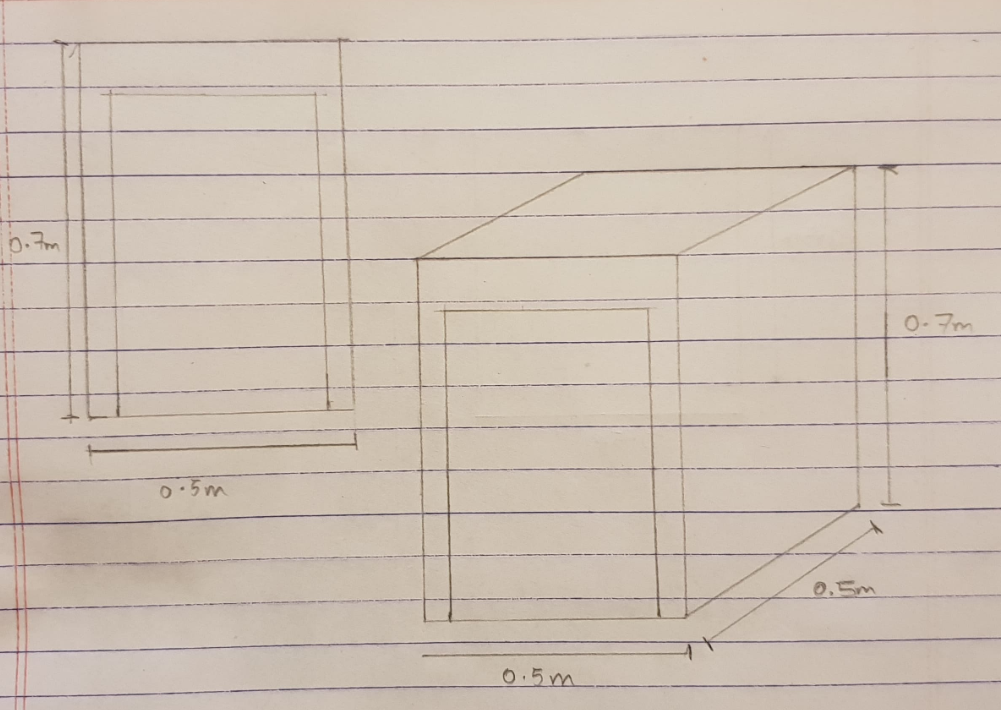
**Main Body**

With the addition of the roof and solar panels some extra height will be added. The upper area underneath the roof will store the battery and any circuitry we need for the charging station. There will also be some overhang for the roof for aesthetic reasons, and will also provide more surface area to put solar panels on. We also think that there should be a removable panel in that area to provide access to the batteries in case they need to be replaced.

**Dimensions for the Main Body of the Charging Station**

|  |  |  |  |
| --- | --- | --- | --- |
| Dimensions | Bowie (m) | Actual Sized Design (m) | 1/5 Scaled Down Design (cm) |
| Width | 0.3 | 0.5 | 10 |
| Length | 0.3 | 0.5 | 10 |
| Height | 0.5 | 0.7 | 14 |

Figure: Dimensions of design excluding roof



**Roof Of The House**

The plastic we decided on was PLA. This is because its a fairly common, durable material. It has the benefit of durability, which is a must when it comes to the charging station itself. It’s also frequently used in 3D printing, meaning that it will be readily available in any Maker-Space. The other reason we chose PLA was because Bowie is primarily made from PLA.

Since the material we’re using is fairly durable, and from experience and data seen online, we decided that a thickness of 0.5 cm across all of the parts would be ideal.

**Dimensions of One of the Two Roof Panels**

|  |  |  |
| --- | --- | --- |
| Dimensions | Actual Sized Design (m) | 1/5 Scaled Down Design (cm) |
| Width | 0.45 | 9 |
| Length | 0.6 | 12 |

Figure: Individual Panel

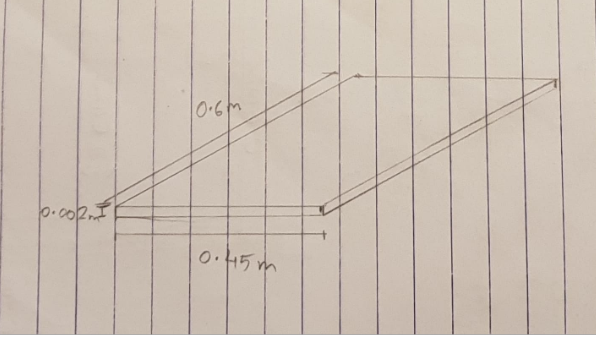
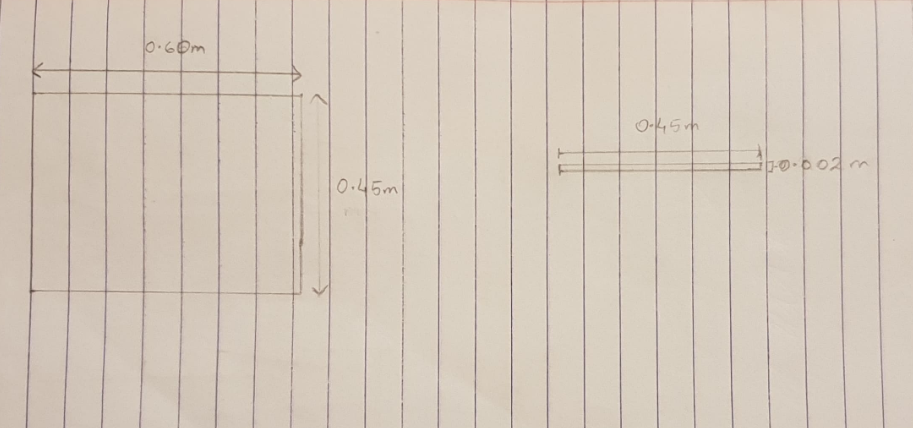
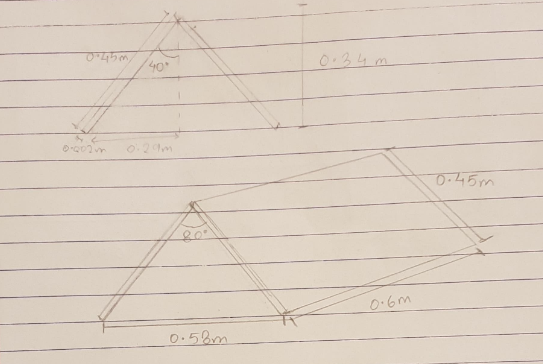
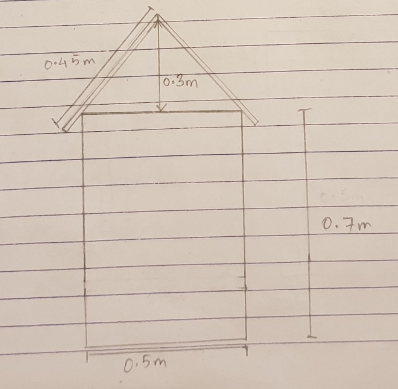


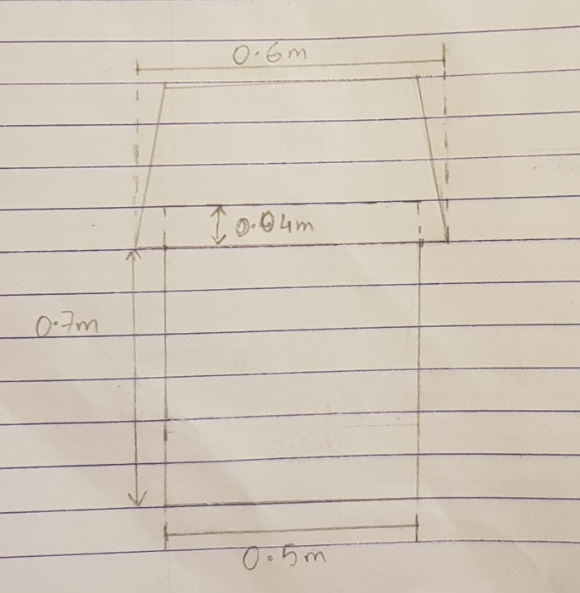
Figure: Combined Panels on Roof



Front-view:



Side-view:



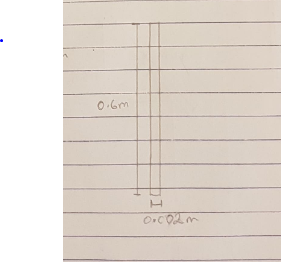
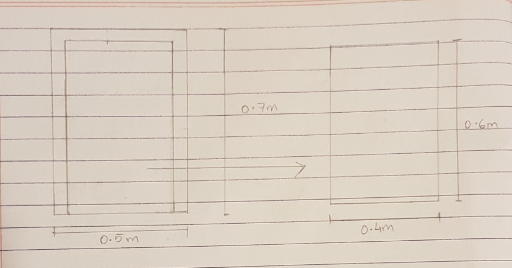
**Door**

The door and entrance of the station will be slightly smaller than the body of the house itself. The door will have a slot for a lock, and space to add hinges onto the door to attach it to the station.

**Dimension Of The Door**

|  |  |  |
| --- | --- | --- |
| Dimensions | Actual Sized Design (m) | 1/5 Scaled Down Design (cm) |
| Width | 0.4 | 8 |
| Length | 0.6 | 12 |
| Thickness | 0.01 | 0.2 |

Figure: Different Dimensions Of The Door



**Test Results:**

|  |  |  |
| --- | --- | --- |
| Criteria | Results | Testing objectives |
| Battery charging |  | 5 hours |
| Circuit functionality |  | Yes |
| Durability of Station |  | Will be able to withstand a reasonable amount of force |
| Weather resistance |  | Should not rust and should be able to withstand different environmental conditions |