# Department of Electronic and Telecommunication Engineering

## University of Moratuwa



## EN2160 - Electronic Design Realization

### Conceptual Design Report


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**200310E**

# 1. Introduction

Within our group, we have developed a multi-layered security system that incorporates several security levels to provide distinct notifications to the user. This system aims to ensure the user's prompt attention and action in response to significant human motion detected within a designated range.The highest security level, known as "fully trust," is activated when the system confirms the presence of significant human motion. In such instances, a series of actions are triggered to alert the user and prompt them to take immediate and serious action. The system employs a combination of SMS alerts and a buzzer to ensure the user's prompt attention.When the fully trust security level is activated, the system sends a real-time SMS alert to the user's designated mobile device. This alert provides crucial information about the detected motion and urges the user to respond promptly. Simultaneously, a powerful buzzer is activated to capture the user's attention audibly. By employing this dual notification approach, the system ensures that the user is promptly informed about the serious motion detected within the monitored area and encourages them to take appropriate measures.In order to make an informed decision about the design and implementation of our security system, we recognize the importance of seeking input from end-users. Their perspectives and insights are vital in ensuring that the chosen design not only satisfies their needs but also offers a viable solution in terms of functionality, usability, manufacturability, cost-effectiveness, and scalability.To gather these perspectives and insights, we have conducted a comprehensive user needs survey. This survey has provided valuable feedback and helped us gain a deeper understanding of the end-users' expectations and requirements. In this report, we will present a detailed evaluation of the various design concepts, taking into consideration the aforementioned criteria. This evaluation will guide us in selecting the most suitable design that aligns with the end-users' needs and preferences while also being feasible for production and market viability.

# 2. List of Members who contributed to the Design-driven Innovation

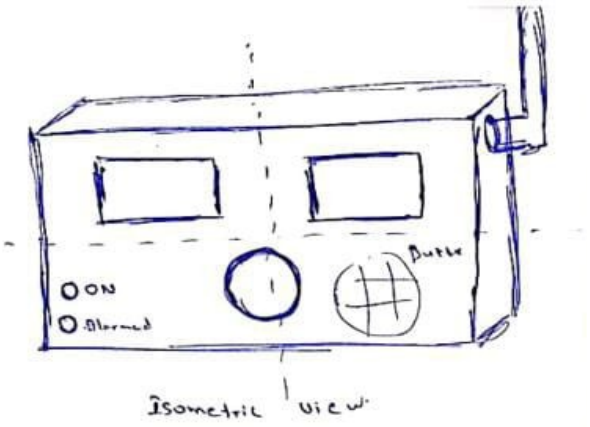
The following is a list of the names and corresponding index numbers of my team members who made valuable contributions to the conceptual design generation.

200123H - Dhanomika A.P.N
200072A - Bandara W.T.B.M.
200702H - Weerasinghe P.D.G.U.M.B
200318K - Kulatunga H.L.
200462U - Perera N.W.P.R.A.
200010J - Absar M.I.A.
200413X - Naotunna B.D.R.
200126U - Dharmasri N.T.S.
200310E - K.A.W.T Kodithuwakku

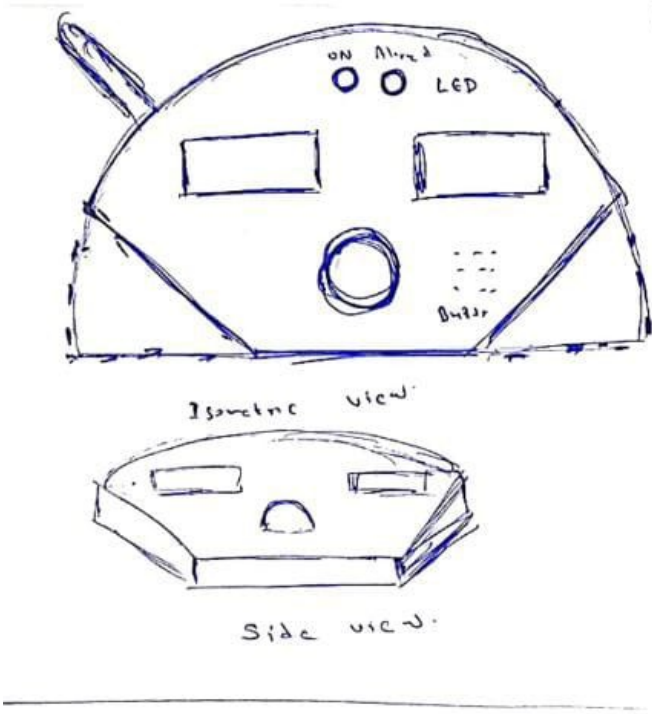
# 3. Enclosure Design

Three specific designs were selected for the review process after a variety of design possibilities were taken into consideration with the goal of finding the best solution.

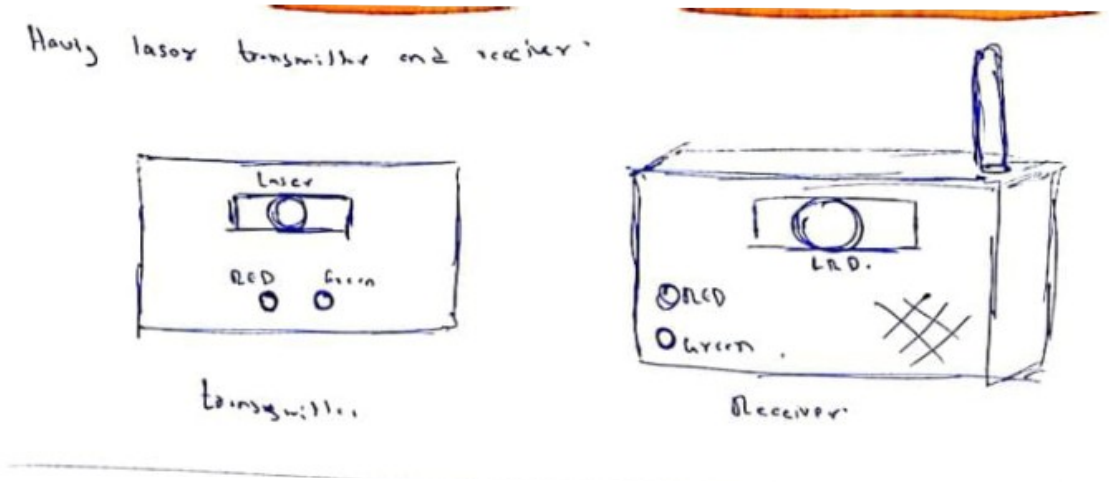
Design 1




Design 2



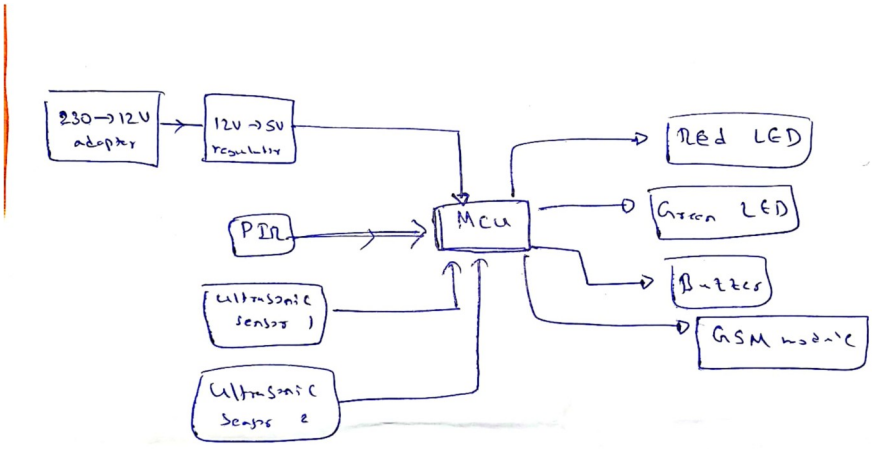
Design 3



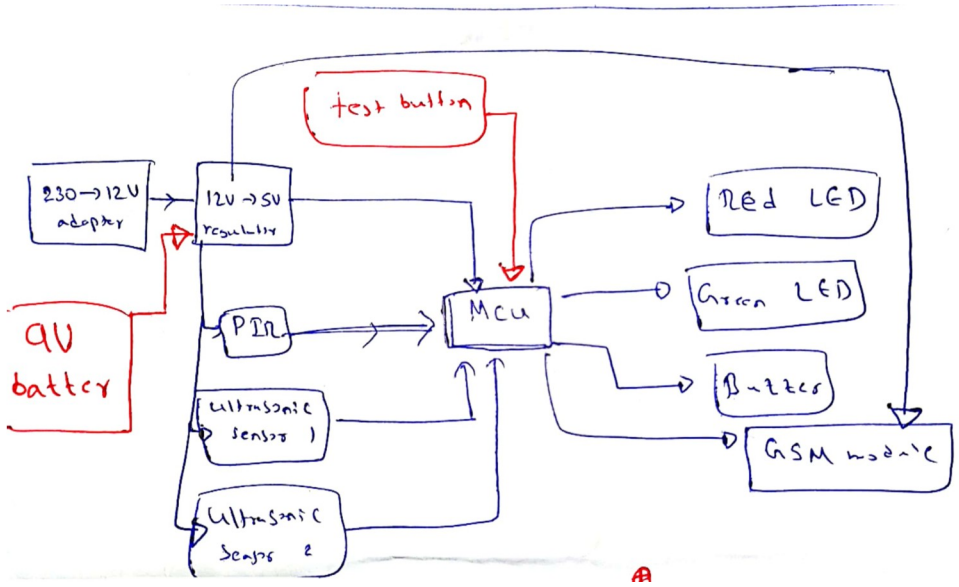

## 4. Functional Block Diagram

In terms of the digital ruler design, there were 3 main options to consider regarding the enclosures, my team members implemented 3 schematic designs for the above designs.

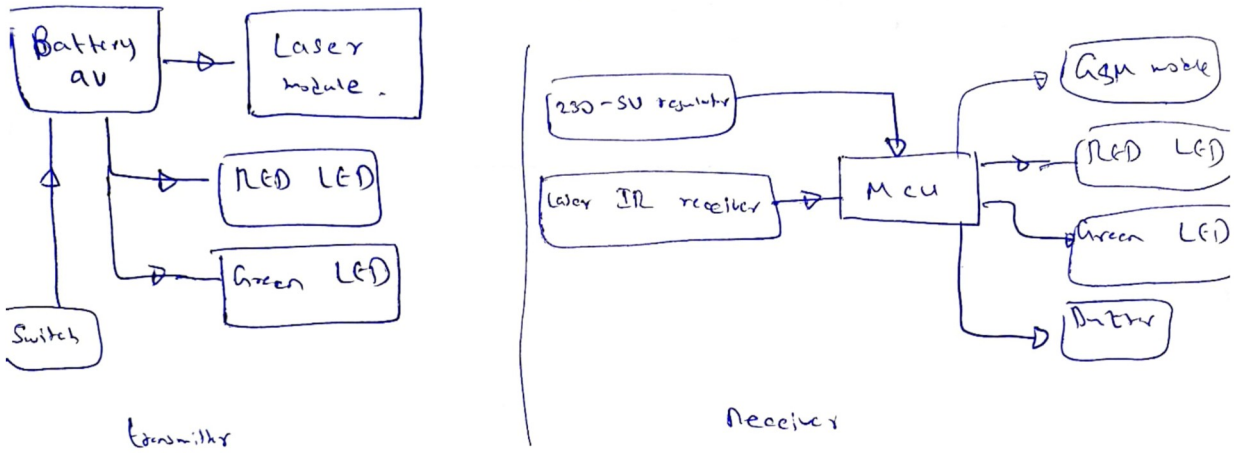
Design 1



Design 2

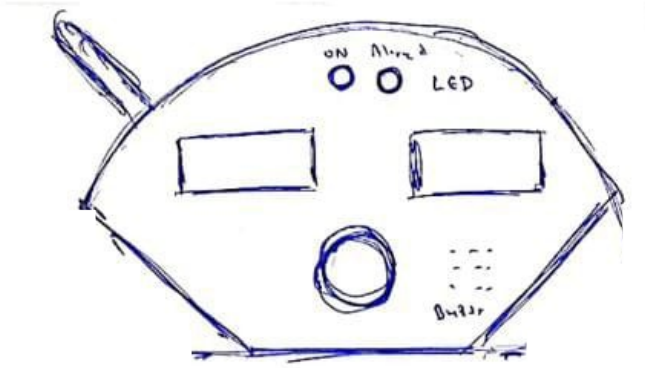



Design 3

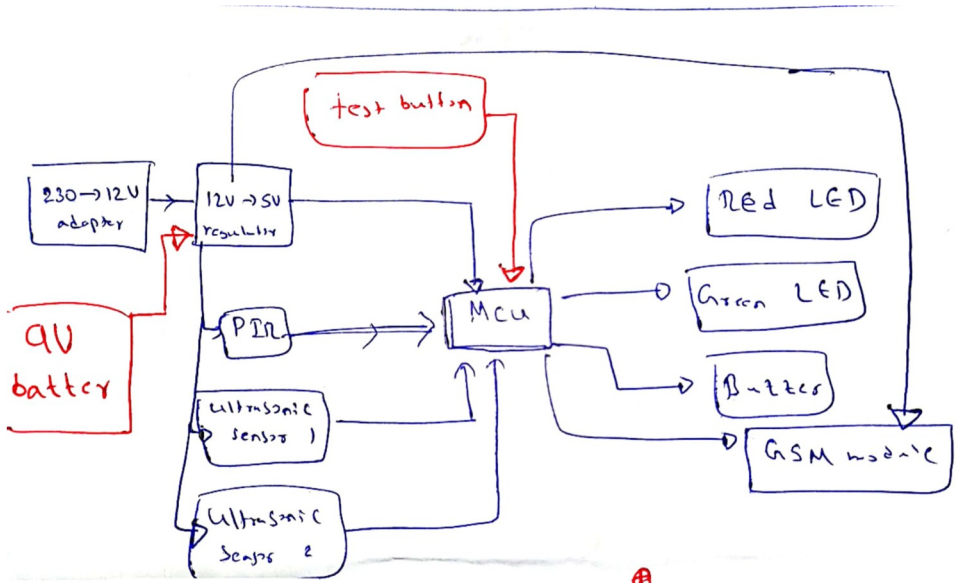


# 5. Modified Designs After User Survey

## 5.1. Enclosure (Design 4)




## 5.2. Functional Block Diagram (Design 4)




# 6. Selection Matrices

| Criteria | Design 1 | Design 2 | Design 3 | User survey design |
|---|---|---|---|---|
| Functionality | 6 | 7 | 5 | 7 |
| User Experience | 5 | 6 | 5 | 6 |
| Precision and Accuracy | 6 | 5 | 4 | 5 |
| Data Visualization | 6 | 7 | 6 | 7 |
| Data Storage and Sharing | 7 | 8 | 5 | 8 |
| Durability and Reliability | 7 | 8 | 6 | 8 |
| Cost-effectiveness | 6 | 6 | 7 | 6 |
| Power Efficiency | 5 | 5 | 4 | 5 |
| Aesthetics and Design Appeal | 6 | 6 | 3 | 6 |
| Feasibility | 5 | 5 | 5 | 5 |
| **Total** | **59** | **63** | **50** | **63** |

# 7. Selected Design

**According to the above results Design 4, which was implemented considering user input, has got 63 marks out of 100 (10 criteria 10 marks per each). Therefore, the selected design is Design 4.**