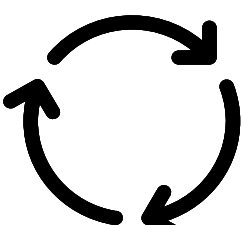
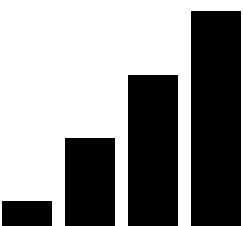


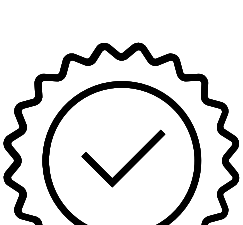
1. INTRODUCTION

Thermal imaging systems require stable and repeatable heat sources for testing and validation. Existing solutions can be complex or unsuitable for routine use. This project develops a simple, reliable and portable multi-channel thermal control system.

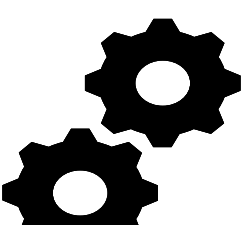
2. AIMS & OBJECTIVES
- 

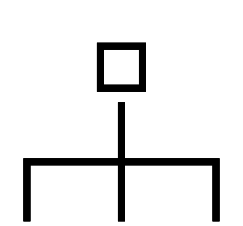
Develop a multi-channel thermal control system.
- 

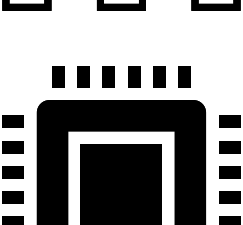
Provide selectable output configurations.
- 

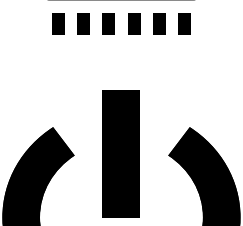
Ensure safe and reliable operation.
- 

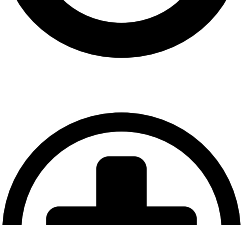
Validate thermal performance using real testing.

3. KEY DESIGN DECISIONS
- 

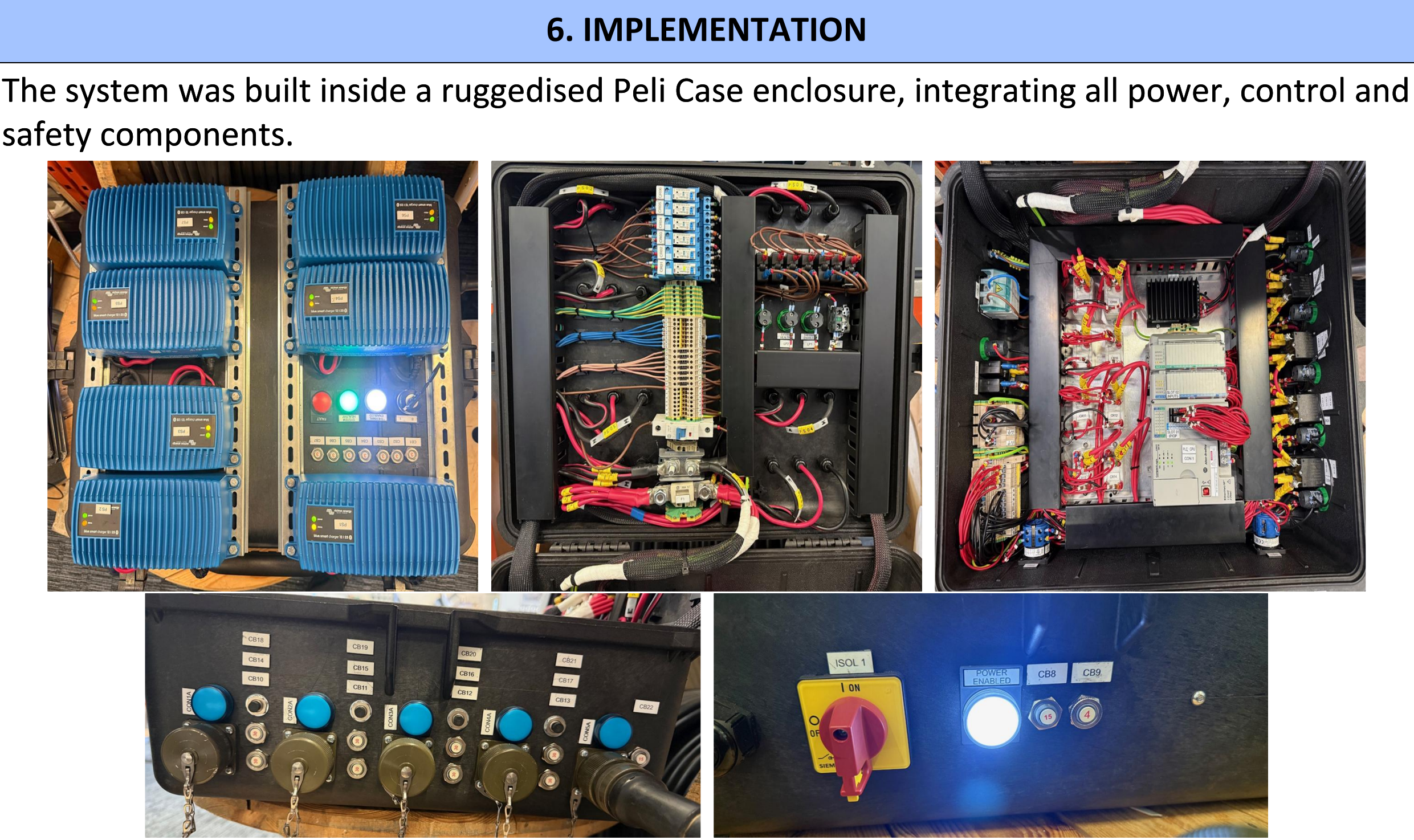
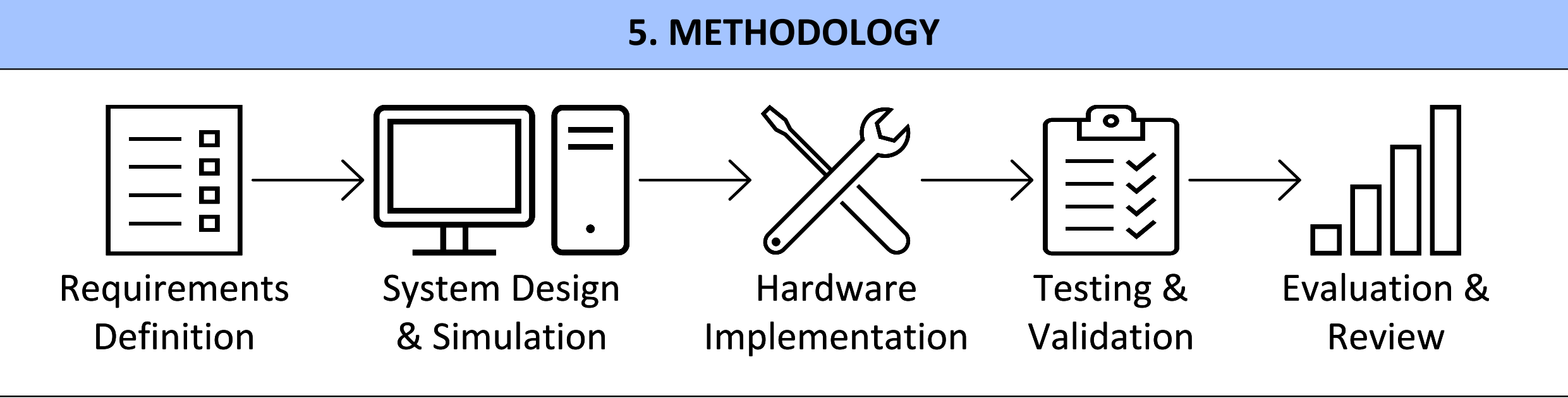
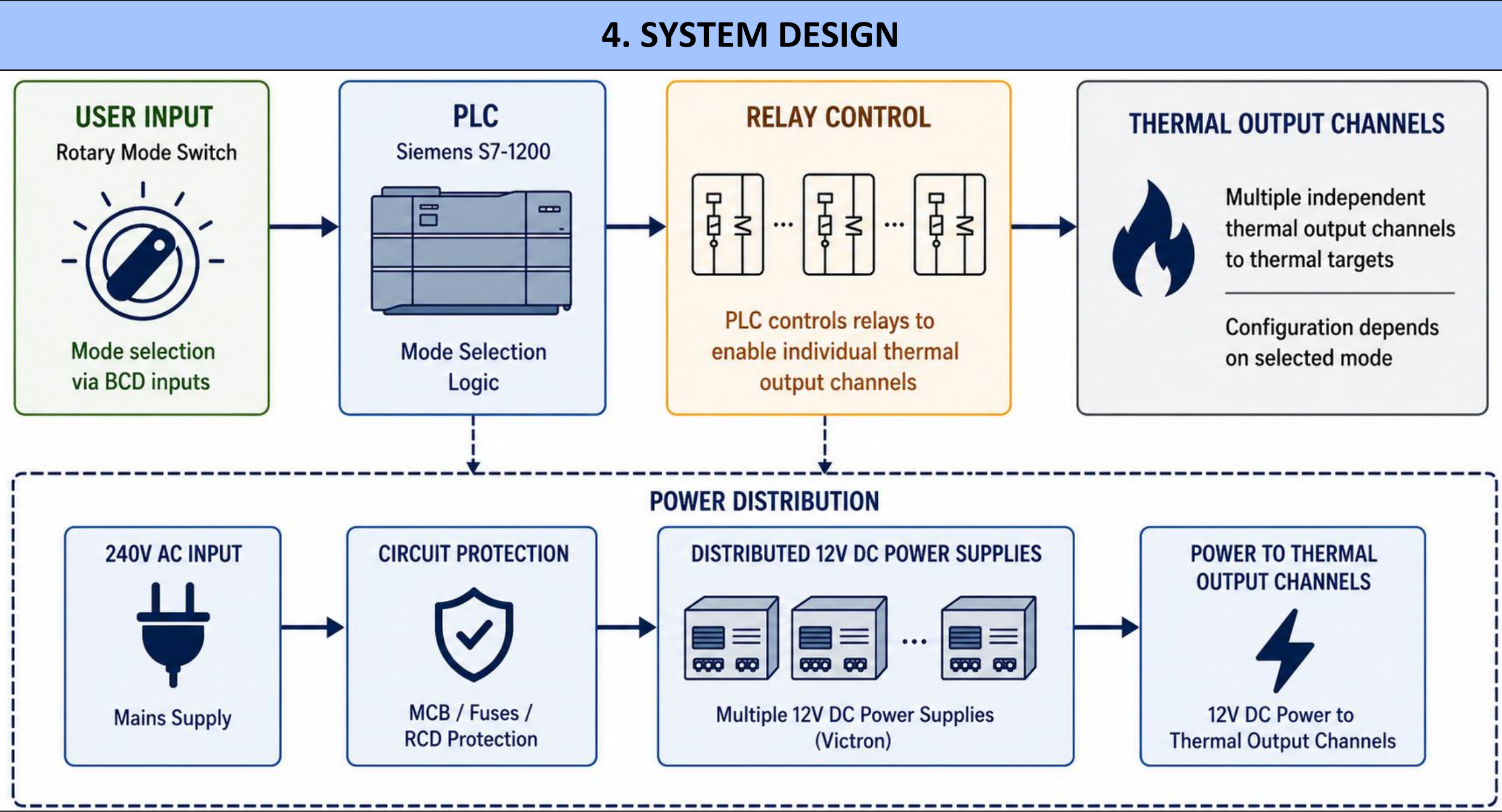
Open Loop Control
Fixed Outputs selected by user, making the system simple, reliable and cost-effective.
- 

Distributed Power Architecture
Multiple power supplies reduce the impact of a single point failure.
- 

PLC Control
Industrial PLC chosen for robustness, flexibility and ease of future expansion.
- 

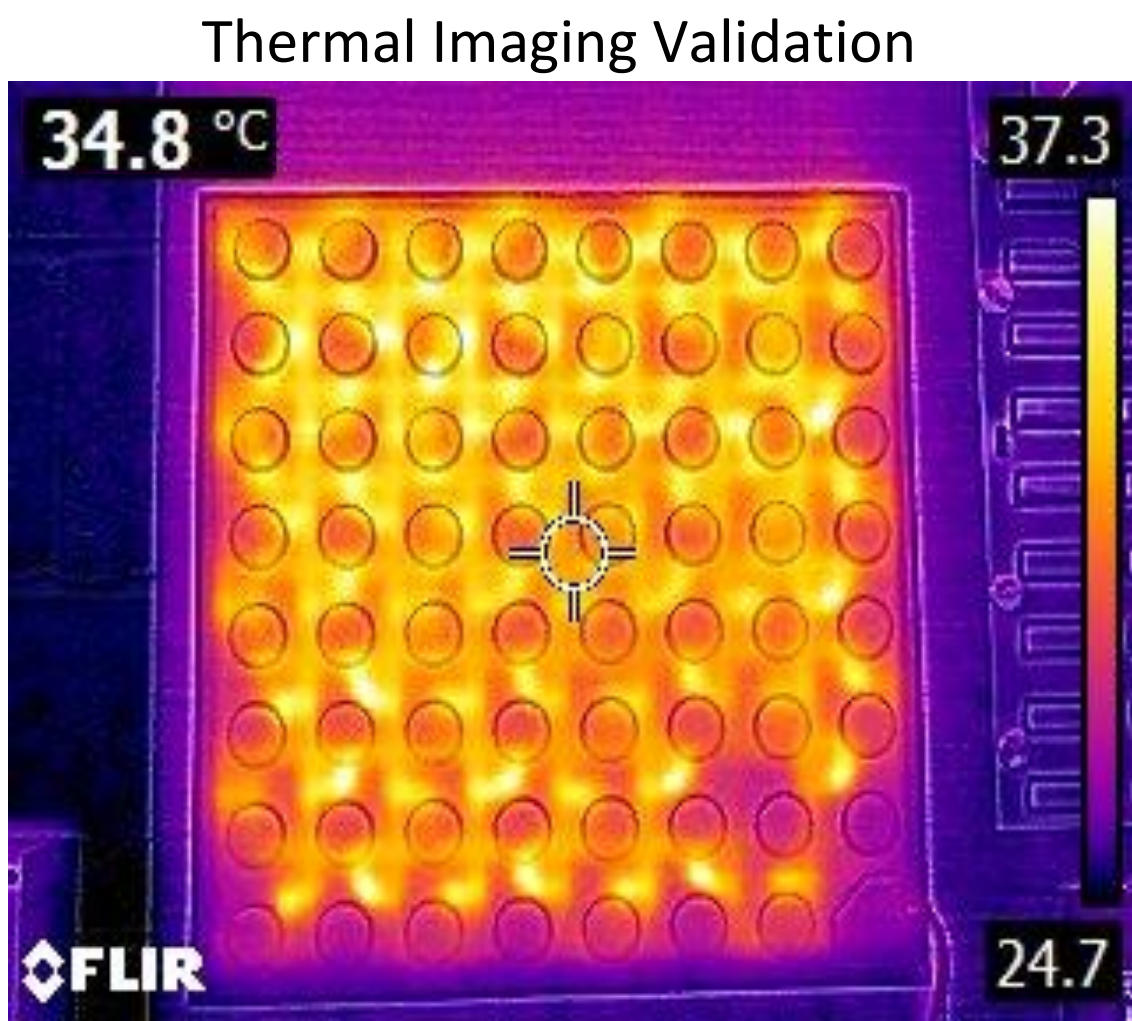
Discrete Power Levels
Variations of selectable power levels designed for a variety of thermal pad sizes.
- 

Safety First
Circuit breakers, fuses and an isolator ensure safe isolation and compliance.



7. TESTING & RESULTS

Testing was carried out to check the functionality of the system under full load conditions. Thermal imaging confirms consistent heat output across all active channels.



Requirements Validation Summary

Objective	Target	Achieved	Result
Multi-Channel Control	5 independent channels	Yes	Pass
Power Levels	Variable power levels suitable to thermal pad size	Yes	Pass
Operating Modes	Multiple operating modes to accommodate different test scenarios	Yes	Pass
Full Load Test	All channels operating simultaneously	Yes	Pass
Thermal Detection	Detectable by thermal imaging	Yes	Pass
Protection	Safe operation, no faults	Yes	Pass

8. EVALUATION
- 

All functional requirements were successfully achieved.
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System operated reliably under full load with stable voltage.
- 

User interface was kept simple and effective through the use of a rotary switch and LEDs.
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Distributed power architecture maintained reliable and stable outputs.
- 

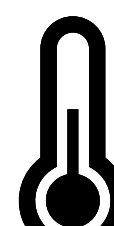
Safety components provide adequate protection for both the system and the user.

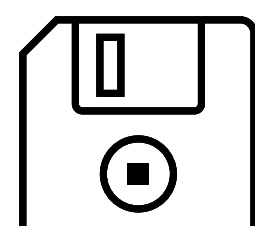
9. CONCLUSION

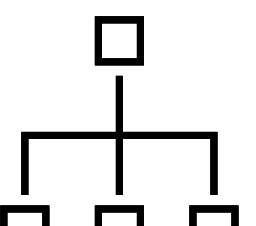


A reliable, safe and portable thermal target control system has been successfully designed, built and tested.

The system provides selectable and repeatable heat outputs, meeting the needs of the thermal imaging device validation in real-world applications.

10. POTENTIAL FUTURE WORK
- 

Integrate Temperature Sensing & Feedback Control
- 

Add Data Logging and Monitoring Capabilities
- 

Expand To Support Additional Channels and Power Levels