Project Charter

This Project Charter serves to formally authorize the GrowHub project, define its objectives, and outline the key stakeholders, scope, deliverables, timeline, and resources required for the successful completion of the project. This document is a foundational agreement among stakeholders, providing a clear understanding of the project's vision and goals. Glossary of used terms, acronyms, and abbreviations is included at the end of the document.

Version: 001
Created: 30. 6. 2024 by Filip Vallo (Project Manager)
Approved: 30. 6. 2024

1. GENERAL PROJECT INFORMATION

Project name:
GrowHub

Project Manager: Filip Vallo
Email: filip.vallo@gmail.com

Expected start date: 8. 7. 2024
Expected completion date: 1. 9. 2024

2. PROJECT OVERVIEW

2.1 Description

GrowHub is an MVP IoT product designed to help indoor growers monitor and control their growing environments. The system will collect real-time data from various sensors and provide users with a web-based dashboard for monitoring and managing growing conditions. The product will include a set of fully programmable peripheral devices for irrigation scheduling, fertilizer injection, and power control. The dashboard will also allow to set alerts with notifications if any of the measured parameters exceeds set thresholds.

2.2 Purpose and Justification

The purpose of the GrowHub project is to develop an MVP IoT solution that provides hobbyists and professional growers with the tools to monitor and control their indoor growing environments. This solution aims to enhance plant growth by maintaining optimal conditions through automated and precise control of environmental factors.

2.3 Problem Statement

Indoor growers face challenges in maintaining optimal growing conditions for their plants. The lack of precise and automated control over environmental factors can lead to suboptimal plant growth and reduced yields.

2.4 Business Case

Developing the GrowHub MVP will demonstrate the feasibility of an IoT-based solution for indoor growing environments. This project has the potential to attract commercial interest, leading to further development and potential market entry. Successful implementation of the MVP will showcase the value of precise environmental control in improving plant health and yields.

3. PROJECT OBJECTIVES

3.1 Vision

Revolution of indoor growing through an innovative IoT solution that empowers both hobbyists and professionals to achieve optimal plant health and yields, by providing precise, automated environmental control and real-time monitoring.

3.2 Goals

- Manufacture a functional prototype of the monitoring IoT system using Raspberry Pi with integrated sensors to measure atmospheric, soil, and water conditions
- Manufacture connected programmable peripheral IoT devices for irrigation control, fertilizer injection, and power control
- Develop a fully operational website with dashboard for live and historical data visualization with notification system and environmental control system for managing growing conditions
- Manufacture embedded PCB that integrates all electronic circuits needed to process digital signals from all connected sensors and to control all custom IoT peripheral devices
- Test the MVP's commercial potential

3.3 Success Criteria

- Successful integration of sensors with Raspberry Pi for real-time data collection
- Reliable performance of peripheral devices in controlling the growing environment
- Fully functional web dashboard with user-friendly interface
- Positive feedback from initial users and potential interest from commercial partners

3.4 Metrics

- Accuracy and reliability of sensor data (measured by testing against known standards)
- Performance and reliability of peripheral devices (measured by controlled environment tests)
- User satisfaction with the features (measured by user feedback)

4. PROJECT SCOPE

4.1 Scope Statement

The GrowHub project encompasses the development, testing, and deployment of a fully functional MVP IoT system for indoor growing environment monitoring and management.

4.2 Functional Requirements

4.2.1 IoT device

- Real-time data collection from sensors connected to IoT compute unit: soil (moisture), atmospheric (temperature, humidity, CO2), and water (pH, conductivity)
- Fully programable peripheral IoT devices for irrigation control, fertilizer injection, and power control
- Embedded PCB with custom integrated electronic circuit that processes digital signals from all connected sensors and controls all peripheral devices

4.2.2 Web-based dashboard

- Real-time data collection from IoT device
- Historical data tracking and visualization
- Notification system for alerts when measured parameters exceed thresholds
- Environmental control system for managing growing conditions through peripheral devices

4.3 Non-functional Requirements

- High reliability and accuracy of sensor data
- Secure and responsive web dashboard
- User-friendly interface for both novice and experienced growers
- Scalability to handle multiple users and devices in the future

4.4 Outside of Scope

- Full commercialization and mass production (beyond MVP)
- User registration/authentication and user management system
- Advanced features not essential for the MVP
- Casing and product design

5. PROJECT SCHEDULE

5.1 Expected Deliverables

- **Phase 1**: Prototype of monitoring IoT device with sensors
- **Phase 2**: Web-based dashboard with data collection from sensors, historical data tracking, visualization, and notification system
- **Phase 3**: Prototypes of peripheral devices for irrigation control, fertilizer injection, and power control; integrated embedded PCB
- **Phase 4**: Web-based dashboard with environmental control system for managing growing conditions through peripheral devices

5.2 Key Milestones

- **30. 06. 2024** - Project scope | Project Charter
- **07. 07. 2024** - Project plan | Design Document | Resource gathering
- **21. 07. 2024** - Phase 1: Prototype of monitoring IoT device with sensors
- **04. 08. 2024** - Phase 2: Web dashboard with monitoring and notification functionalities
- **18. 08. 2024** - Phase 3: Prototypes of peripheral IoT devices and embedded PCB
- **01. 09. 2024** - Phase 4: Environmental control system integrated into web dashboard
- **06. 09. 2024** - Project Summary Report | Close out

6. PROJECT RESOURCES

6.1 Project Team

- **IoT HW Engineer**, **SW Architect**, **SW Developer**: Filip Vallo *[personal project]*

6.2 Support Resources

[TBD in Design Document]

- **Vendors**: External PCB manufacturer

6.3 Special Needs

[TBD in Design Document]

- **Software**: Access to software development tools, cloud services, and project management tools
- **Hardware**: Raspberry Pi microcomputer, various sensors (temperature, humidity, CO2, moisture, pH, NPK)
- **Supplies**: Wiring, breadboards, soldering materials, various microelectronic components and connectors
- **Tools and Machinery**: Workstation, soldering stations and testing equipment
- **Facilities**: Controlled environment to test the sensors and peripheral devices

7. PROJECT BUDGET

7.1 Initial Budget

- **Labor**: Project team *[personal project]* – 0 EUR
- **Development and Management tools**: *[TBD in Design Document]* – 200 EUR
- **Cloud services**: *[TBD in Design Document]* – 200 EUR
- **Hardware components**: *[TBD in Design Document]* – 500 EUR
- **Supplies**: *[TBD in Design Document]* – 200 EUR
- **Tools and Machinery**: *[using personal tools]* – 0 EUR
- **Outsourcing**: *[TBD in Design Document]* – 200 EUR
- **Miscellaneous**: *[TBD in Design Document]* – 200 EUR

Total initial budget: € 1500
Project Sponsor: Filip Vallo

8. PROJECT STAKEHOLDERS

8.1 Key Stakeholders

- Project team
- Potential investors or commercial partners
- External PCB manufacturer
- Cloud service provider

8.2 Final Customers

- Hobbyists or professional indoor grower of plants or mushrooms

8.3 Expected Benefits

- Improved plant health and yields through precise environmental control
- Increased convenience and efficiency for growers
- Demonstration of commercial potential for further development

9. PROJECT RISKS

9.1 Risks

- Technical challenges in integrating sensors and developing the dashboard
- Limited budget and resources
- Delays in hardware procurement
- Delays in custom PCB manufacturing from the external vendor
- Quality issues with the manufactured PCB

9.2 Constraints

- Limited budget for hardware procurement and development
- Tight timeline to complete the MVP within the four planned phases
- Dependence on third-party services for cloud hosting and data storage
- Dependence on external vendor timelines for custom PCB manufacturing

9.3 Assumptions

- Availability of necessary hardware components
- Access to development tools and platforms for building the website
- The external vendor will meet the specified quality and timeline requirements for the custom PCB circuit
- Initial funding is sufficient to develop the MVP

10. GLOSSARY OF TERMS

- **Internet of Things** (**IoT**): The network of physical objects embedded with sensors, software, and other technologies that connect and exchange data with other devices and systems over the internet. These objects, or "things," can range from everyday household items to sophisticated industrial tools.

- **Minimum Viable Product** (**MVP**): The most basic version of a product that is still functional and usable by early adopters. It includes only the essential features needed to meet the initial user needs and provide feedback for future development.
- **Printed Circuit Board** (**PCB**) - Flat board made of insulating material, typically fiberglass, with conductive pathways or "traces" etched or printed onto it. These traces connect various electronic components such as resistors, capacitors, and integrated circuits, which are soldered onto the board.
- **Raspberry Pi**: A series of small single-board computers developed in the UK by the Raspberry Pi Foundation. It's widely used in IoT projects due to its low cost, modularity, and open architecture.
- **Sensor**: A device that detects and responds to some type of input from the physical environment. The output is generally a signal that is converted to human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.