

Requirements Management Plan

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Description: PMBOK Requirements Management Plan

Requirements Management Plan

1. Introduction

This document outlines the requirements management process for the "Self-Charging Electric Vehicle" (SCEV) project. The SCEV project aims to develop a revolutionary electric vehicle that significantly reduces reliance on traditional charging infrastructure by harvesting ambient energy through integrated solar, kinetic, and thermal energy recovery systems, managed by an AI-powered Energy Management Unit (EMU). This plan details how requirements will be elicited, analyzed, documented, tracked, and managed throughout the project lifecycle.

2. Project Goals and Objectives

The primary goal is to develop a functional prototype of a self-charging electric vehicle demonstrating the viability of the core technologies. Specific objectives include:

- Successfully integrating advanced photovoltaic body panels, a regenerative suspension system, and a thermoelectric generation system.
- Developing a functional EMU capable of predicting energy generation, optimizing energy flow, and providing user feedback.
- Achieving a demonstrable increase in vehicle range through energy harvesting.
- Completing the defined project milestones within the allocated timeframe and budget.

3. Scope

This requirements management plan covers all aspects of requirements elicitation, analysis, specification, validation, and verification for the SCEV prototype development. It excludes the complete design and manufacturing of a production-ready vehicle.

4. Stakeholders and Roles

- **Project Manager:** Responsible for overall project management and requirements tracking.
- **Engineering Team:** Responsible for designing, developing, and testing the hardware and software components.
- **AI/Software Developers:** Responsible for developing and implementing the EMU software.
- **Materials Scientists:** Responsible for sourcing and testing materials for the photovoltaic body panels.
- **Testing Team:** Responsible for verifying and validating requirements.

5. Requirements Elicitation

Requirements will be elicited through a combination of techniques:

- **Stakeholder Interviews:** Interviews with potential customers, engineers, and other stakeholders to understand their needs and expectations.
- **Market Research:** Analysis of existing electric vehicle technologies and market trends.
- **Technical Feasibility Studies:** Assessment of the technical feasibility of different energy harvesting technologies.
- **Prototyping and Experimentation:** Building and testing prototypes to validate assumptions and refine requirements.

6. Requirements Analysis

Once elicited, requirements will be analyzed to ensure they are:

- **Complete:** All necessary functionalities are captured.
- **Consistent:** No conflicts or contradictions exist.
- **Unambiguous:** Requirements are clearly stated and easily understood.
- **Feasible:** Requirements can be implemented within the constraints of time, budget, and technology.
- **Testable:** Requirements can be validated and verified through testing.

7. Requirements Documentation

Requirements will be documented using a combination of techniques:

- **Use Case Diagrams:** To describe the interaction between the user and the system.
- **Data Flow Diagrams:** To illustrate the flow of data within the system.
- **System Requirements Specification (SRS):** A formal document outlining all functional and non-functional requirements.
- **Traceability Matrix:** A table linking requirements to design, code, and test cases.

8. Requirements Tracking and Management

A requirements management tool (e.g., Jira, Azure DevOps) will be used to track requirements throughout the project lifecycle. This tool will allow for:

- **Change Management:** A formal process for managing changes to requirements.
- **Version Control:** Tracking changes and versions of requirements documents.
- **Status Reporting:** Monitoring the progress of requirements implementation and testing.
- **Risk Management:** Identifying and mitigating risks associated with requirements changes.

9. Requirements Validation and Verification

Requirements will be validated to ensure they meet stakeholder needs and expectations. Verification will ensure that the implemented system meets the specified requirements. Techniques include:

- **Reviews and Inspections:** Formal reviews of requirements documents by stakeholders.
- **Prototyping and Testing:** Building and testing prototypes to verify requirements.
- **System Testing:** Comprehensive testing of the complete system.

10. Tools and Technologies

- **Requirements Management Tool:** Jira or similar.
- **Modeling Tools:** UML modeling tools for creating diagrams.
- **Simulation Software:** Software for simulating the performance of the energy harvesting systems.

11. Communication Plan

Regular meetings will be held with stakeholders to communicate progress and address any issues. A communication log will be maintained to document all communications.

12. Change Management Process

Any changes to requirements will be formally documented and approved by the project manager and relevant stakeholders. The impact of changes will be assessed before implementation.

13. Risk Management

Potential risks, such as technology limitations, budget constraints, and schedule delays, will be identified and mitigated through proactive planning and contingency measures.

This Requirements Management Plan will be reviewed and updated regularly throughout the project lifecycle to ensure it remains relevant and effective.