Software Requirements Specification MECHTRON 4TB6: Formulate

Team 25, Formulate

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Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

1 Introduction

1.1 Project Description

1.2 Purpose

1.3 Project Scope

1.4 Table of Symbols

Symbol	Unit	Description
A_C	m^2	coil surface area

1.5 Abbreviations and Acronyms

Symbol	Description
SAE	Society of Automotive Engineers
DD	Data Definition
GD	General Definition
GS	Goal Statement
IM	Instance Model
LC	Likely Change
PS	Physical System Description
R	Requirement
SRS	Software Requirements Specification
DBTL	Design Build Test Learning
KPI	Key Performance Indicators

Monitored Variable, Description, Type, Units

2 User Characteristics

2.1 Stakeholders

2.2 Use Cases

2.3 User Consideration

2.4 Impact

3 System Description

3.1 Assumptions

3.2 Context Diagram

3.3 State Transition Diagram

3.4 Monitored and Controlled Variables

Monitored Variable	Type	Units	Description

Table 1.0: Monitored Variables

Controlled Variable	Type	Units	Description

Table 2.0: Controlled Variables

3.5 Functional Decomposition Diagram

4 Requirements

This section provides the functional requirements, the business tasks that the software is expected to complete, and the nonfunctional requirements, the qualities that the software is expected to exhibit.

4.1 Functional Requirements

Formulate consists of 3 main components, each with its own functional requirements. The hardware section addresses the sensors and physical device which interacts directly with the user, the desktop application is the means for the user to select modes and submit data and

the data analytics platform is for the user to view old test case data to check if KPIs are met.

4.1.1 Priority 1

FR 1: The base device should contain a rechargeable battery

> **Rationale:** The base device needs its own independent power source which will allow for it to be placed in areas without a power socket.

FR 2: The base device should have a screen to display the current status to the user

FR 3: The base device should easily mount to the Formula SAE car

FR 4: The base device should connect to a PC wirelessly and wired to transmit data

FR 5: The base device should alert the user if any tests exceed the operating condition of the car

> **Rationale** If at any point during the test it exceed operating conditions, the base devices should make it obvious to the user

FR 6: The base device should have 5 connection ports to add module sensors to it

> **Rationale** Each connection port will make the device more modular and allow for users to add more sensors in the future for other tests.

FR 7: The modular sensors should have a snap on mounting mechanism to connect to the base

> **Rationale** Modular sensors need to have a rigid connection with the base board with minimal movement to get the most accurate values from the sensor

FR 8: The base device should have a start button which activates the telemetry between the PC and device and starts reading values

FR 9: The base device should have a stop button which stops the telemetry between the PC and device and stops reading values

4.1.2 Priority 2

FR 10: The application should show live raw data from the sensors

FR 11: The application should allow users to preview the data after a test

FR 12: The application should allow the user to send the data to the database

FR 13: The application should allow the user to trim the data before sending it to the database

FR 14: The application should allow the user to configure the base device's settings

> **Rationale:** The base device will need to have the wifi setting configured which will be done in the application

4.1.3 Priority 3

FR 15: The website should only allow users who have access to view the data

FR 16: The website should have the option to filter out the data by test conducted

FR 17: The website should show whether the tests passed according to threshold values

FR 18: The application should allow the user to trim the data before sending it to the database

FR 19: Any data pushed to the database should not be editable by the user

4.2 Nonfunctional Requirements

NFR1: **Maintainability**

NFR2: **Portability**

4.3 Likely Changes

LC1: Starting and stopping the device to get data using hardware

> **Rationale:** When the device is connected to the computer we can remote start and stop it using software

LC2: The base data we are collecting (Vibration, Shock, Temperature, Humidity)

> **Rationale:** Since the device is set to be modular we might change those initial values we are testing with other ones

4.4 Unlikely Changes

ULC1: The sensors will remain modular to adapt to different tests that need to be conducted

> **Rationale:** The product should be expandable in the future to be able to test different values

5 Development Plan

References

[The following is not part of the template, just some things to consider when filing in the template. —TPLT]

[Grammar, flow and LATEXadvice:

- For Mac users `*.DS_Store` should be in `.gitignore`

- LATEX and formatting rules

  - Variables are italic, everything else not, includes subscripts (link to document)
    * Conventions
    * Watch out for implied multiplication
  - Use BibTeX
  - Use cross-referencing

- Grammar and writing rules

  - Acronyms expanded on first usage (not just in table of acronyms)
  - "In order to" should be "to"

—TPLT]

[Advice on using the template:

- Difference between physical and software constraints

- Properties of a correct solution means *additional* properties, not a restating of the requirements (may be "not applicable" for your problem). If you have a table of output constraints, then these are properties of a correct solution.

- Assumptions have to be invoked somewhere

- "Referenced by" implies that there is an explicit reference

- Think of traceability matrix, list of assumption invocations and list of reference by fields as automatically generatable

- If you say the format of the output (plot, table etc), then your requirement could be more abstract

—TPLT]