

**Maintainability Program Plan for:**

**LFEV – SP17 – Y5**

**Version: 0.1**

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| Reviewed By: |  |  |
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# Overview

## Scope

This Reliability and Maintainability (R&M) Program Plan (RMPP) describes the necessary tasks, responsibilities, and controls that should be implemented in the Lafayette Formula Electric Vehicle Project.

The primary function of the R&M effort is to document the procedures; ensure both high operational readiness and availability; and minimize life‑cycle cost. The RMPP should address the aspects of the design and engineering in relation to:

* Management
* Schedule
* Analytical tasks
* Control tasks
* Evaluation tasks
* Design

## Purpose

The purpose of the RMPP is to:

* Define the R&M tasks to be accomplished
* Define the R&M organization and its interfaces to the engineering program and other support organizations
* Define the R&M management and control processes
* Identify, describe, and schedule the deliverable documentation
* Describe maintainability qualification testing
* Describe reliability qualification testing
* Identify reporting requirements necessary for logistic support analysis
* Describe the maintenance data collection and reporting system

# General Requirements

The vehicle for commitment to effective R&M engineering is the R&M program plan developed for the project. The RMPP should emphasize early participation commencing with requirements definition and system development, followed by a comprehensive test, corrective action, and demonstration program to identify and correct deficiencies as required. The RMPP should be implemented at the onset of a development and subcontractor/vendor selection process.

The R&M program should cover the following major elements:

1. How will the software be installed on new hardware? What happens if the hardware goes obsolete?
2. How are errors and exceptions handled? How are logs viewed? How are exceptions configured and modified as requirements change?
3. How is backup performed? What is the restore procedure?
4. How is a fresh system deployed and validated on new hardware?
5. Are system logs and data files automatically trimmed? On do they grow and require manual trimming or offloading? If so, how is this accomplished?
6. What is the design of the system API and how will this design support ongoing reliable operation, maintenance and expansion?
7. How is system configuration maintained? Will the system auto detect hardware configuration changes or will configuration maintenance be required? If the latter, what is the consequence of misconfiguration? How will the software function when only some of the system hardware is available? Are demo or simulation stubs available for major hardware?
8. How is system configuration checked? Are tools provided for generating valid configurations?
9. What tool chain will be used? Is the tool suite up-to-date and actively supported? Is the tool suite mature enough to have stable functionality? How is the tool chain installed in a new development system.
10. What third party software will be incorporated into the system? How will this be maintained, upgraded, or patched during the life of the system.
11. How are requirements in GPR007 met?
    1. All software source code must be maintained under configuration control. Release snapshots must be archived on the project website.
    2. The system must start from cold power-up and boot to full operational status without requiring user interaction beyond enabling power and safety procedures
    3. Any PC software must be packaged for installation with a SETUP.EXE, RPM, “make install” or equivalent installer allowing it to be installed easily on any compatible computer.
    4. Configuration parameters, calibration factors, preferences, and options shall not be hardcoded within the software source code. It shall be possible to alter these various factors without recompiling software or physically disassembling hardware. Altered configuration parameters must be persistent through power cycling and reboots. The system must have a function to initialize itself with sane (factory default) configuration content if requested.
    5. All data and configuration files must be in a generally supported format (e.g. XML) or the format required by a mature and well supported application (e.g. MySQL database files, Berkeley db, etc… ).  Files shall be accessible either through removable media or network file transfer or both.

## Software Installation on Hardware

Please consult the general requirements section and elaborate

## Errors, exceptions and logs

Please consult the general requirements section and elaborate

## Backup and Restoring

Please consult the general requirements section and elaborate

## Deployment on new Hardware

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## Log file trimming

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## System API

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## System Configuration Maintainability

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## System Configuration Checking

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## Tool Chain, Design Suite

Please consult the general requirements section and elaborate

## Third Party Software

Please consult the general requirements section and elaborate

## Requirements of GPR007

Please consult the general requirements section and elaborate

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