**LinuxCNC for Rose Engine**

**Task Automation**

**Project Design Document**

**Version 0.01**

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# Project Overview

This project is to develop a standardized approach for the use of LinuxCNC to automate repetitive tasks on a rose engine.

# Project Scope

## Items in Scope

1. This system is designed to allow for the automaton of tasks, especially those tasks which might be tedious.
2. This system is designed to facilitate simultaneous and smooth movement on all the designed axes.

## Items Out of Scope

1. This system is not designed to facilitate high-speed movement.
2. This system is not designed to allow the user to design a component off-line and have the system complete the design.

# Project Requirements

## General Requirements

|  |  |
| --- | --- |
| G001 | The system shall use as many off-the-shelf components as possible. |
| G002 | The system shall be implementable by someone with a reasonable level of skills |
| G003 | The system’s cost should be minimized. |

## Functional Requirements

|  |  |
| --- | --- |
| F001 | The system shall use text files with movements encoded using G-code to automate the tasks. |
| F002 | The system shall drive movement on the rose engine using stepper motors. |
| F003 | The system shall allow the rose engine user to disengage the stepper motor and freely move along (or rotate about) any given axis. |

## Movement Requirements

A diagram of a cylinder

Description automatically generated

Figure - Lathe Axes

The system shall have the ability to control movement along standard lathe axes:

|  |  |
| --- | --- |
| M001 | Movement across the bed of the lathe.  This is denoted as the X axis. |
| M002 | Movement above the bed of the lathe.  This is denoted as the Y axis. |
| M003 | Movement along the bed of the.  This is denoted as the Z axis. |
| M004 | Spindle rotation (i.e., rotation about a line which is parallel to the Z axis).  This is denoted as the C axis. |
| M005 | Rotation about a line which is parallel to the spindle’s axis of rotation.  This is denoted as the C1 axis.  This axis of rotation is foreseen as needed for   * Rotation of a rosette at a different speed from the spindle * Use of a reciprocator, but not driving the motion using a linkage integrated with the spindle. * Use of an undulator, but not driving the motion using a linkage integrated with the spindle.   This axis of rotation is foreseen as also needed for   * Rotation of a rosette at a different location from the spindle (i.e., the rosette barrel is not on the spindle) |
| M006 | Rotation about a line which is parallel to the Y axis.  This is denoted as the B axis.  This axis of rotation is foreseen as needed for   * Rotation of a spherical rest. * Rotation of an item held in a dome chuck or a pencil chuck. |