

Coisa

10/11/2025





1 Goals and Timeline

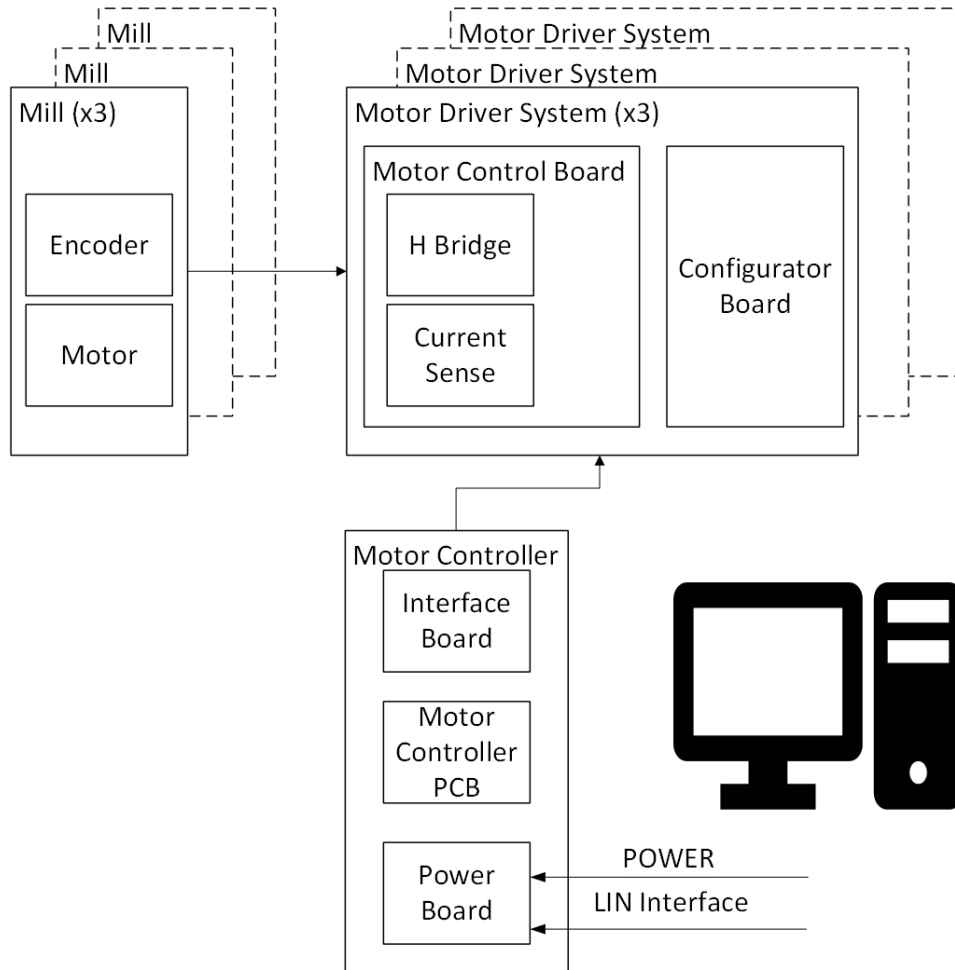
2 PC control software

3 Physical system

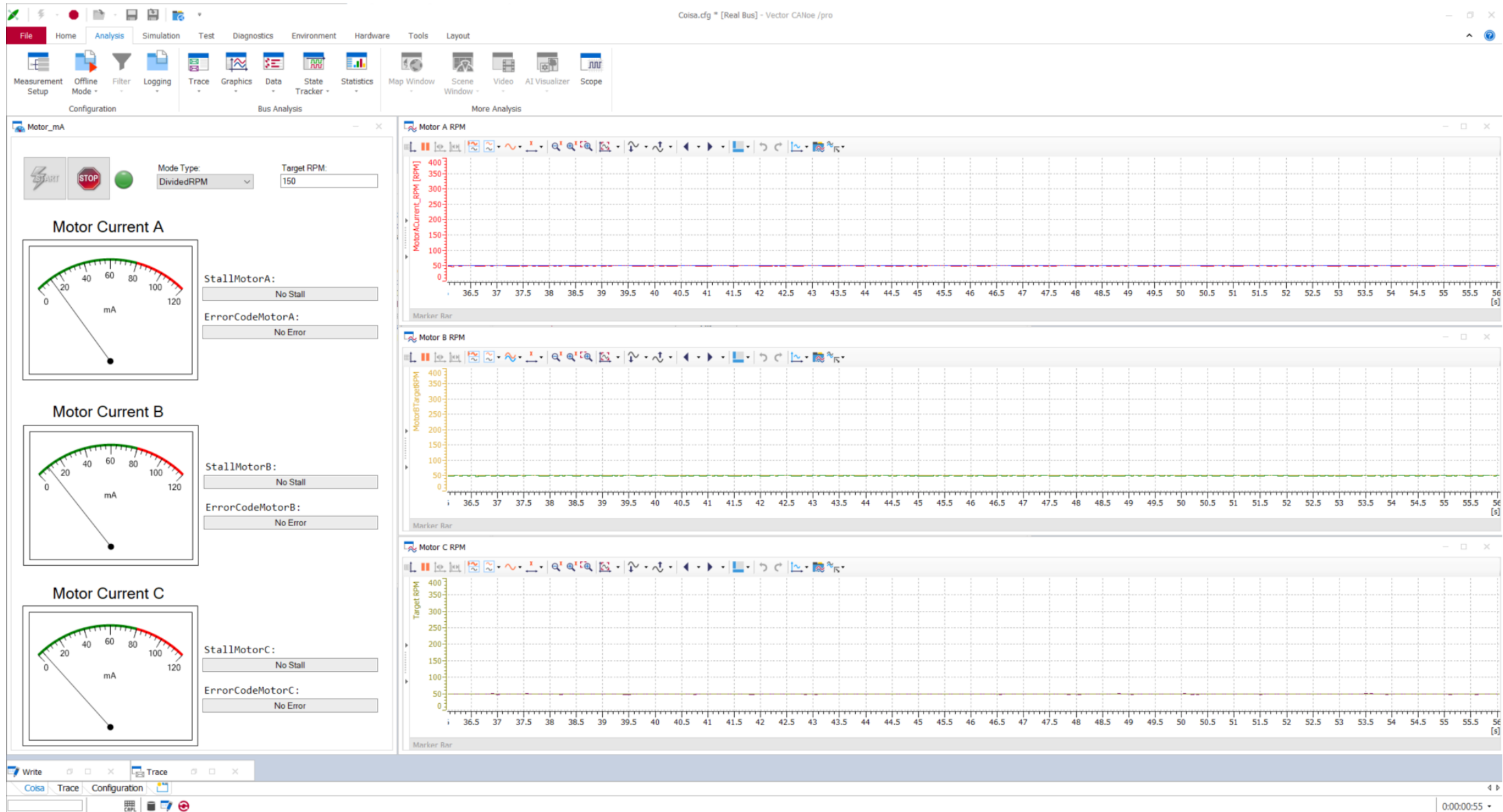
Lessons learned

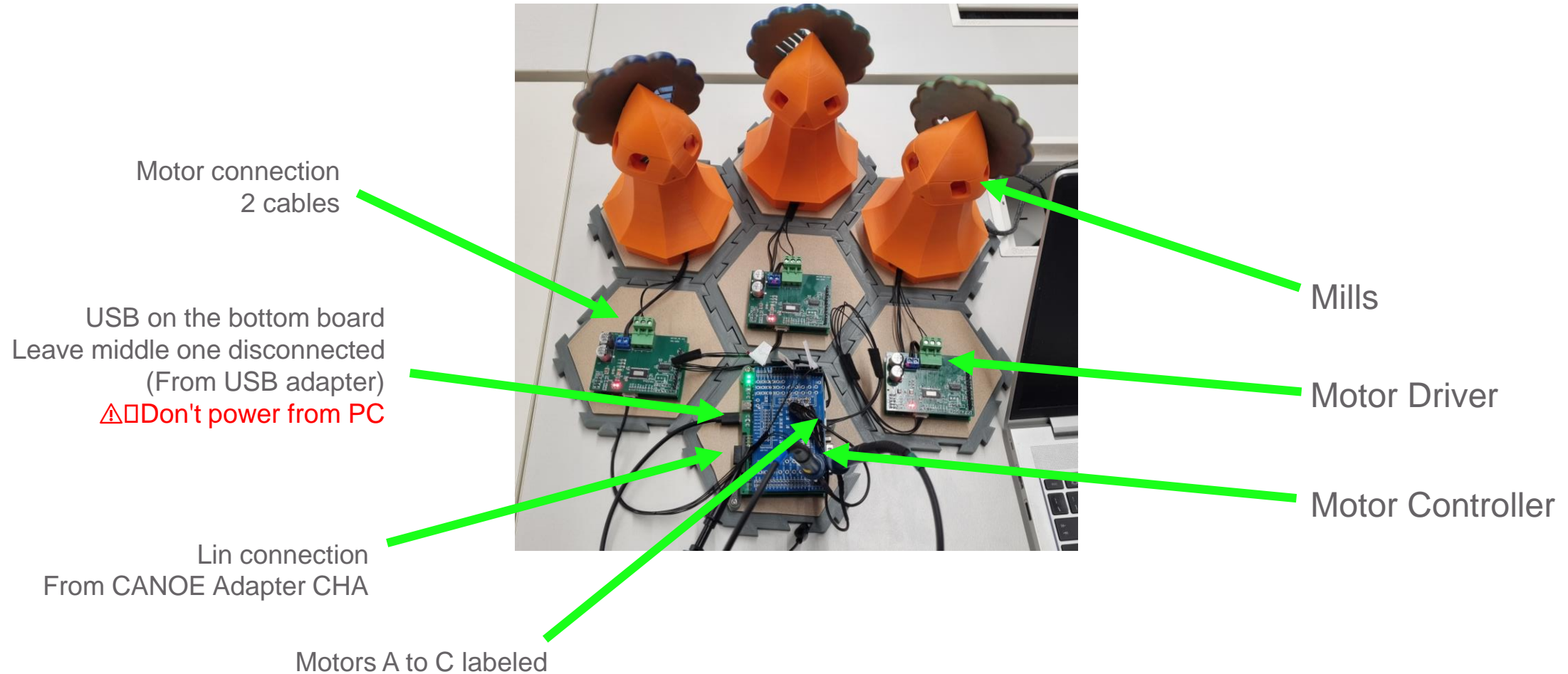
- Coisa shall present some type of physical movement;
- A user shall be able to interact with Coisa;
- Coisa shall attract the attention;
- Coisa shall present SWJ capabilities.

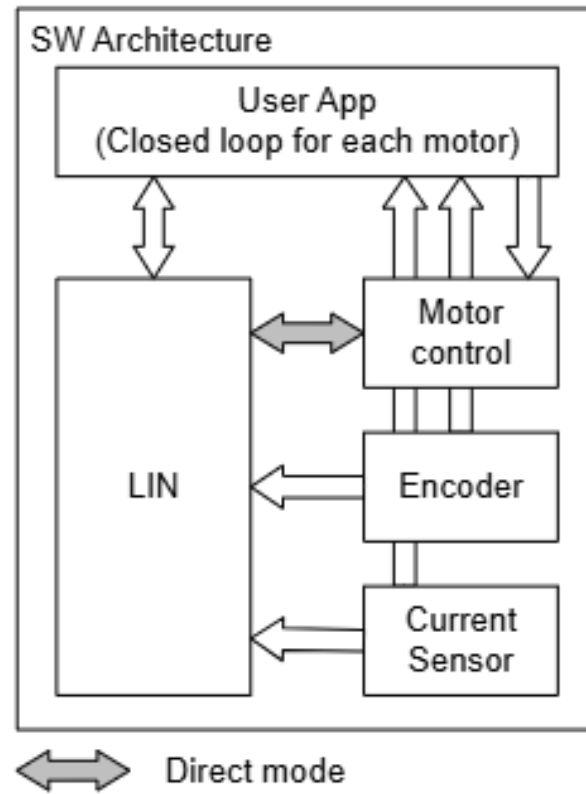


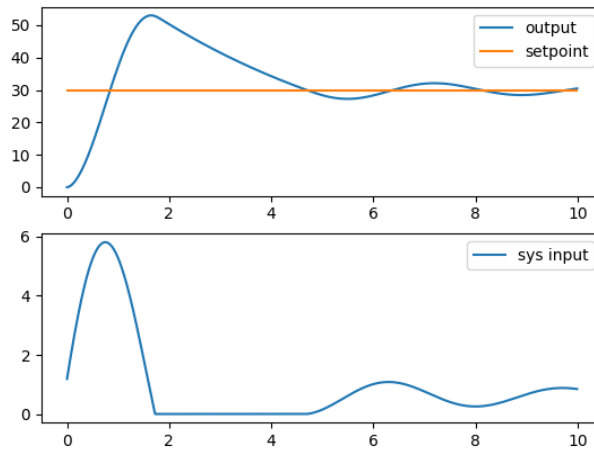
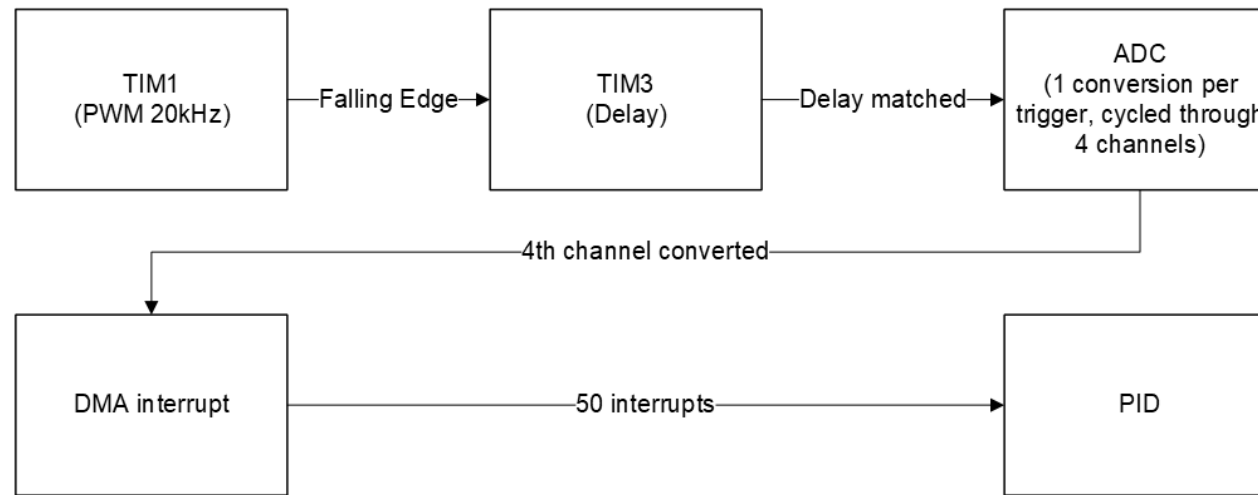


- The visitor is invited to touch the mills to test the system response;
- PC controls the high level behavior, mills interaction;
- The motor controller controls each mill individually to a setpoint of speed.



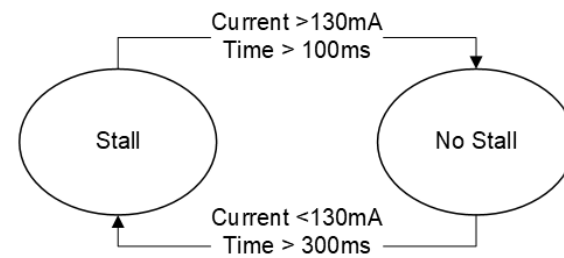
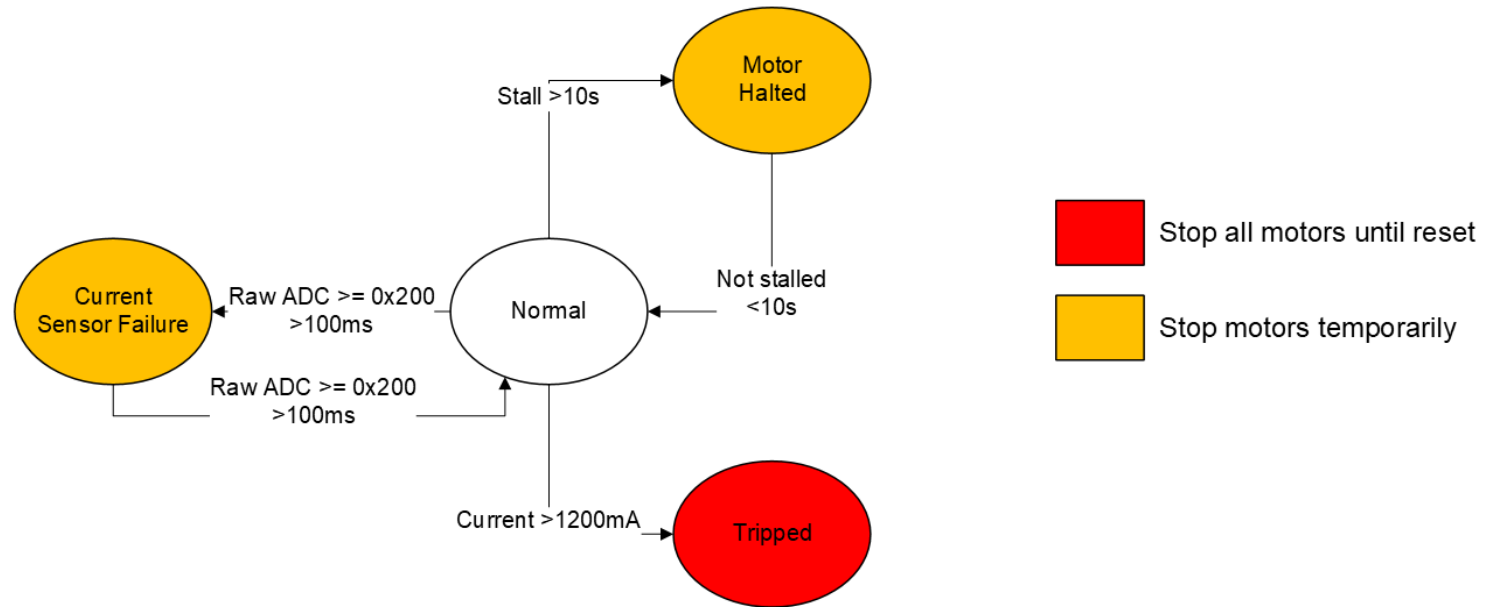






```
Folder as Workspace
pid
Figure_1.png
pid.c
pid.h
pid_controller.dll
test_pid.py

1  """
2  Compilation command to generate dll (cygwin64 in windows)
3  C:\cygwin64\bin\gcc -shared pid.c -o pid_controller.dll -Wl,--add-stdcall-alias -D __PID_TEST__
4
5  This saved me hours of work:
6  https://stackoverflow.com/questions/59330863/cant-import-dll-module-in-python
7
8  For the motor model
9  https://www.monolithicpower.com/en/learning/mpscholar/electric-motors/dc-motors/fundamentals
10 https://ctms.engin.umich.edu/CTMS/index.php?example=MotorSpeed&section=SystemModeling
11
12 """
13
14 import os, sys
15 import ctypes
16 import time
17 import matplotlib.pyplot as plt
18 import numpy as np
19
20 #timing parameters
21 TIME_STEP = 0.01 # s
22
23 #simulation parameters
24 MOTOR_VOLTAGE = 12 # V
25 MOTOR_INERTIA = 0.01 # Kg.m^2
26
27 #motor parameters
28 MOTOR_K_E = 0.195 # V/rad/s
29 MOTOR_K_T = 0.163 # N.m/A
30 MOTOR_R_A = 16.7 # Ohm
31 MOTOR_L_A = 1 # Henry
32
33 # Load the shared library
34 PID_LIB = ctypes.CDLL(r'..pid_controller.dll', winmode=0)
```



- Hardware
 - Usage of protection mechanisms.

