

CS Capstone Design

Technical Demo Grading Sheet (100 pts)

TEAM ASTRAEA

Risky technical challenges:

Based on our requirements acquisition work and current understanding of the problem and envisioned solution, the following are the key technical challenges that we will need to overcome in implementing our solution:

C1: Programming Language. To demonstrate an understanding of the chosen language, C/C++, all programs written for the demo will be written in C/C++.

C2: GUI (Graphical User Interface). To demonstrate an understanding of the chosen GUI tool, Dear ImGui, a GUI will be implemented through which the demo will be controlled.

C3: Network Interface. BrainCon needs to communicate with devices over a network. To demonstrate this, the local machine will communicate with a Raspberry Pi through a local network.

C4: Limit Switch Feedback. The system needs to react to limit switch feedback. To demonstrate the ability to receive and act on feedback from the limit switches, a limit switch will be triggered, the feedback sent to the local machine, and confirmation that the signal was received will be displayed.

C5: Raspberry Pi Interface. The Raspberry Pi at each station needs to act on commands from BrainCon to ultimately drive a stepper motor. It also needs to keep track of steps and position of the motor. To demonstrate this, the Raspberry Pi will drive a motor in real time, while storing and outputting relevant data and sending it back to the GUI.

C6: Drive Stepper Motor. The Raspberry Pi will need to be capable of sending appropriate pulses to a Parker Compumotor E-AC stepper motor driver. This will involve wiring the driver to the Raspberry Pi and writing the software necessary to produce the inputs. The driver will then drive the stepper motor.

Challenges covered by demos:

In this section, we outline the demonstrations we have prepared, and exactly which of the challenge(s) each one of them proves a solution to.

Demonstration 1: GUI window with demo of control (AKA Hello Chili)

Challenges addressed: <List which of above challenges are addressed in this demo>

- C1.
- C2.
- C3.
- C4.
- C5.
- C6.

Flight Plan: Step-by-step overview of demo

1. First, an overview of the demo setup.
2. Second, a local machine will display the GUI.
3. Third, commands will be issued through the GUI and sent to the Raspberry Pi over ethernet.
4. Fourth, the Raspberry Pi will receive the signal and drive the stepper motor accordingly.
5. Fifth, relevant data will be sent back to the central computer and outputted.

Evaluation:

- ✓ Convincingly demo'd each of listed challenges?
- ✓ Other evaluative comments: