

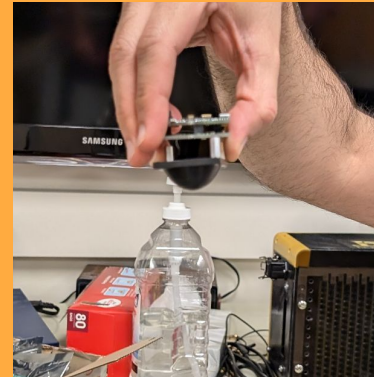
Lightning Talk 5

Project planning
SDMay25-15

Luke Post, Nate Reff, James Peterson, Daniel Ripley-Betts

Project Overview

- Millimeter wavelength **Armed Voron (MAVinator)** scanner
 - Voron 3D printer platform
- 3D Scanner design
 - Stepper motor
 - Belt driven gantry
- User interface
 - Web enabled application
 - Python
- Predetermined path to cover the scan bed

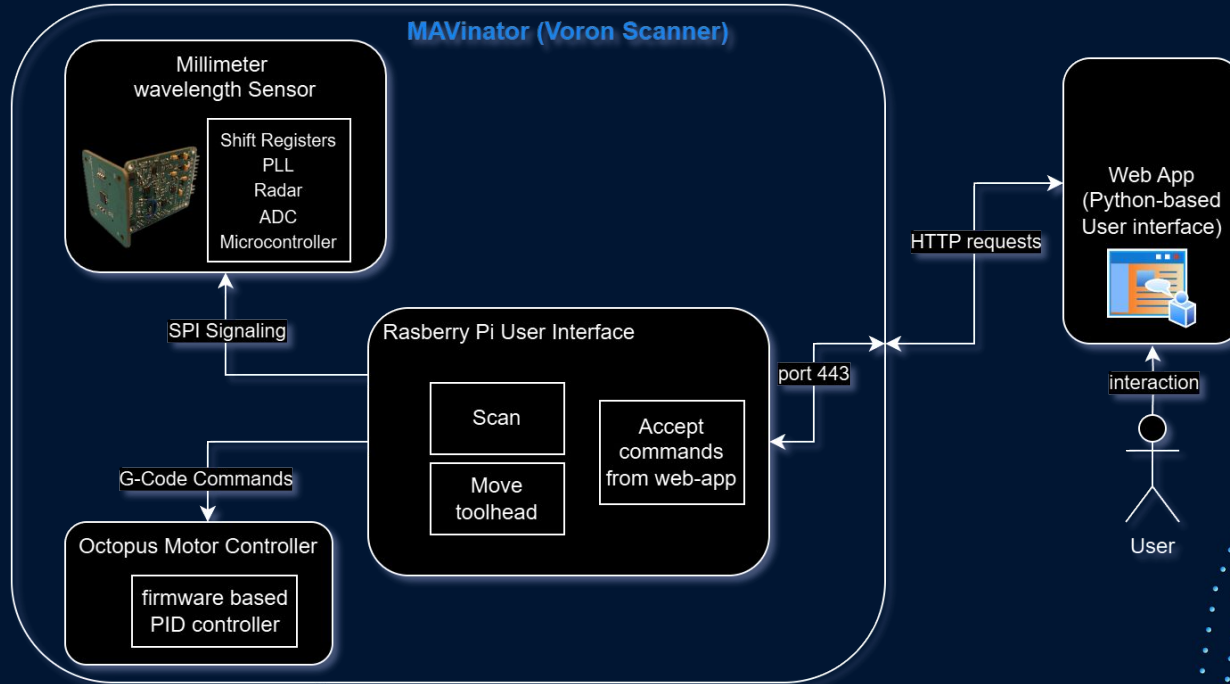


Problem Statement

- Time consuming process
- Not enough scanners
- Expensive
- Build cheaper scanner
 - Large scan volume
- Simple user interface
 - Remotely accessed
- Better than ever



Detailed Design and Visuals



Functionality

- Technical
 - High accuracy millimeter wavelength scanning
 - Render 3D image using Synthetic Aperture Radar (SAR) algorithms to process the scan
 - Scan an area 30cm X 30cm X 30cm
- Human
 - User friendly interface controls motion system and sensor seamlessly
- Economic
 - Affordable modification to Voron system
 - Reasonable scan times



Technology Considerations

- Voron 2.4 Printer
 - 3D printed parts VS Traditional manufacturing
 - 3D printer parts makes it cheaper
 - 3D printer parts will match other printed parts, lab has 3D printing capabilities
 - This allows for faster replacement/repair
 - 3D printed parts are lighter
 - Traditional manufacturing parts are consistently stronger
 - Requires more work to build as opposed to prebuilt motion system



Technology Considerations

- Motion system firmware
 - Klipper VS Marlin
 - Klipper is easiest for quick updated modifications
 - Marlin has better support for odd use
 - Klipper is more actively supported today
 - Klipper documation might be out of date
 - Klipper has a web interface
 - Pre-existing basic marlin firmware provided



Areas of Concern and Development

- PCB Testing
 - Aware of problems in beta development and attempting to steer away from them
 - Initial power issue in board with component shorting out
 - Possibly fried the oscillator and one of the ICs
- Linear Rail Bearings in the Z-axis and X-axis
 - Lost a couple of bearings in each of the rails
 - Could cause rougher movement than desired and additional wear
- Timing Concerns
 - Slightly behind on physical build schedule
 - Want to finish before Thanksgiving break



Conclusions

- Building a high accuracy millimeter wavelength scanner
 - Easy to operate
 - Reasonable scan times
- 3D printed Voron parts for scanner body
- Klipper firmware for the GUI and sensor operation
- Possible areas of concern:
 - PCB functionality
 - Linear Rail Bearings
 - Project Timeline



The background is a dark blue gradient. It features two large, curved, particle-like trails on the left and right sides, composed of many small white dots. These trails are illuminated by bright orange and yellow light sources at their outer edges, creating a sense of motion and energy. Diagonal streaks of light in shades of blue and orange cross the frame, adding to the dynamic feel.

Thank you