

SLAM Air Quality Monitoring Robot

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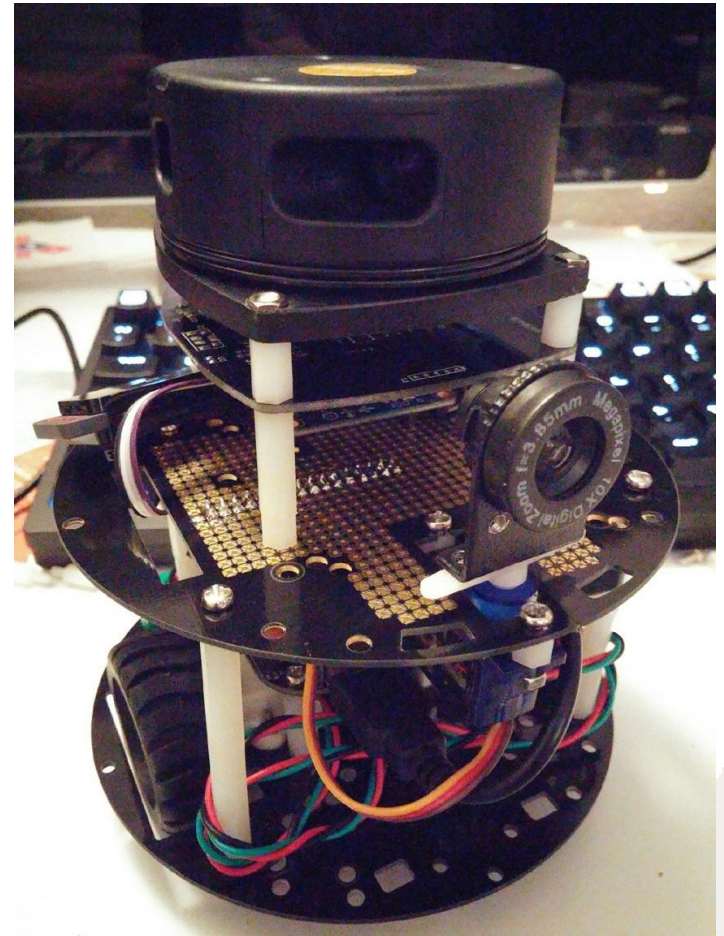
Software

- Project Definition (Prototype)
- Schedule & Budget
- Ideal Final Product
- Looks-like prototype
- Software progress since report 2
- Hardware progress since report 2
- Remaining work

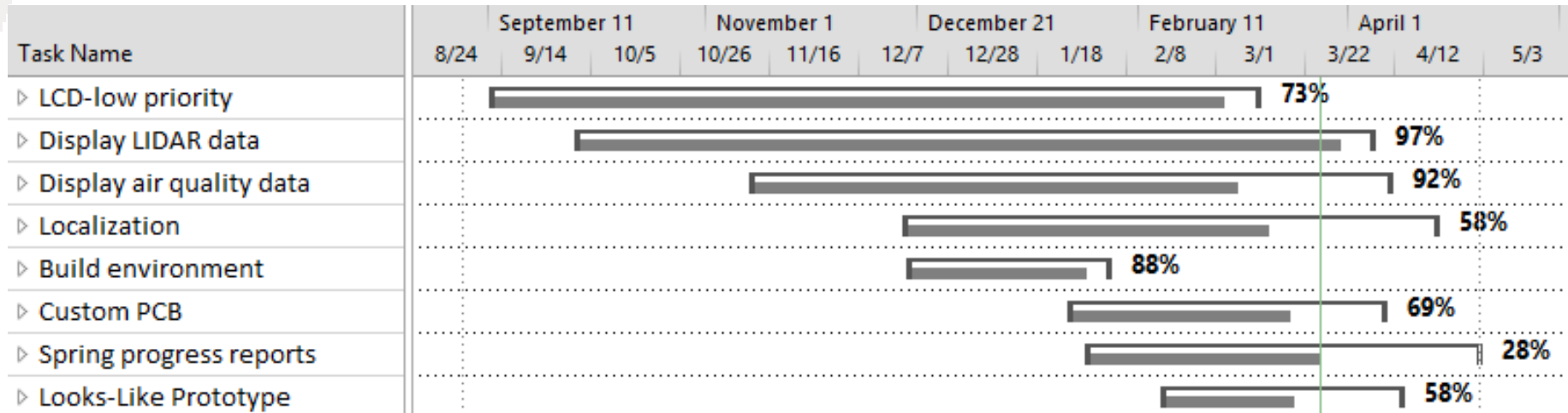
Project Definition

Vanessa

- Simultaneous Localization and Mapping
- Knows where it is, where it is going
- Monitors and maps air quality
- Small, modular
- Only in pre-known environments



Schedule & Budget



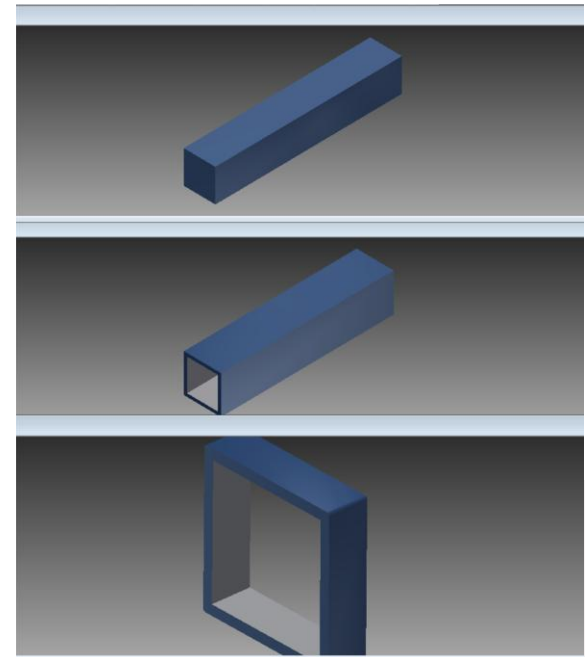
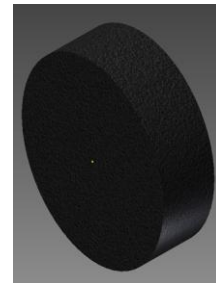
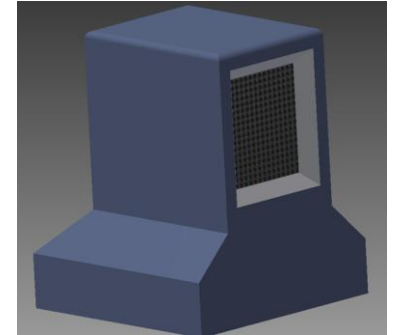
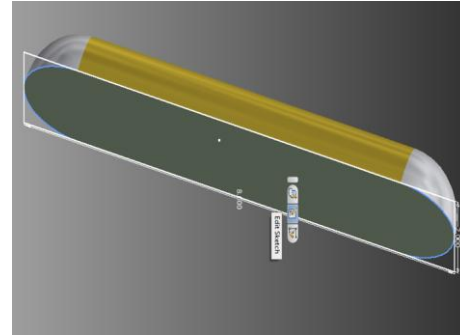
- LIDAR: \$400
- Electronics+Mechanics: \$300
- Environment: \$75
- 3D printing: \$25

Ideal Final Product

- Map & remember new environments
- Autonomous
- Influenced by industry feedback, concerns
- Cleanroom safe
- Better/more versatile air quality sensor (\$\$\$)

Looks-like Prototype (pictures not to scale)

- 2x1.5x2' chassis
- Extendable arm: readings can be taken $\leq 6.5'$ off the ground
- Flashing alert light: yellow (580nm)
- LIDAR unit
- Charging interface at front



New Software

- Calculate heading from magnetometer
 - Hard+Soft Iron, Magnetic Declination
- Calculate estimated position
 - IMU, optical encoders, speed control
- Built web interface with map and data displays
- Display robot position, and LIDAR readings

Web Interface

Paul

SLAMAQBot v0.0.1

Load: 1.64 | CPU: 82.6 % | RAM: 30.5 MB | Lag: 1.3 ms

Speed Visualization



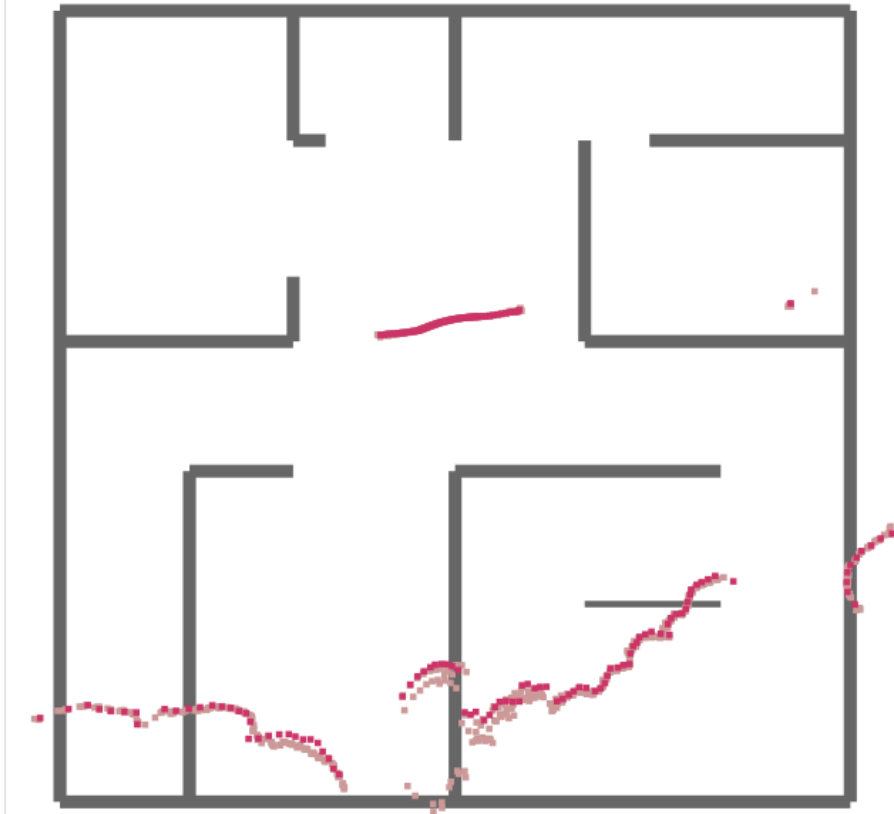
Overall Speed/Direction

	Speed	Direction
Desired	0	0
Actual	0	0

Motor Speeds

	Left	Right
Desired	0	0
Actual	0	0

Map



Enable Flags

Motor Driver

IMU

Heading: -155°

Temperature: 22°C

Air Quality

TODO. Sample display:

Last 3 readings:

300 (30s ago)

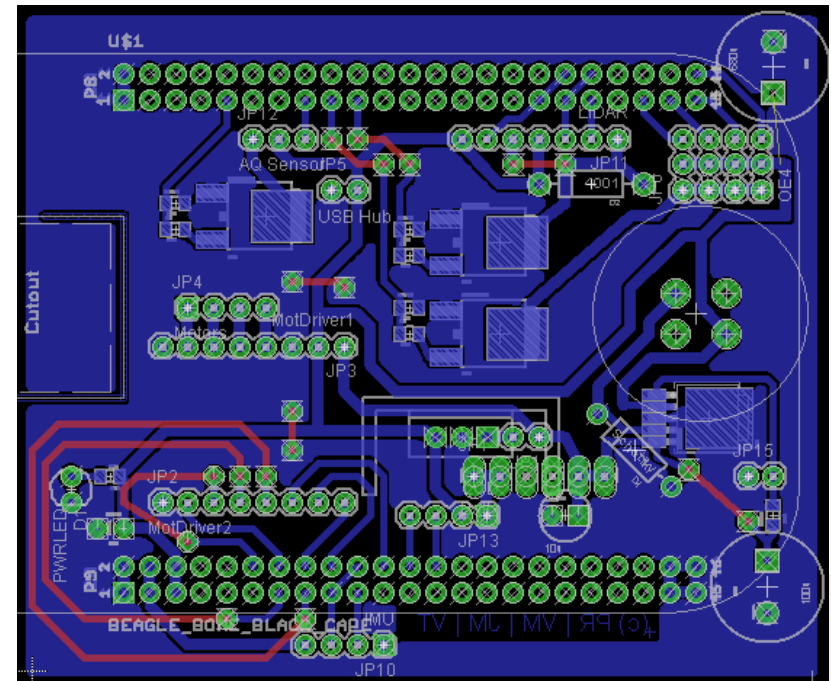
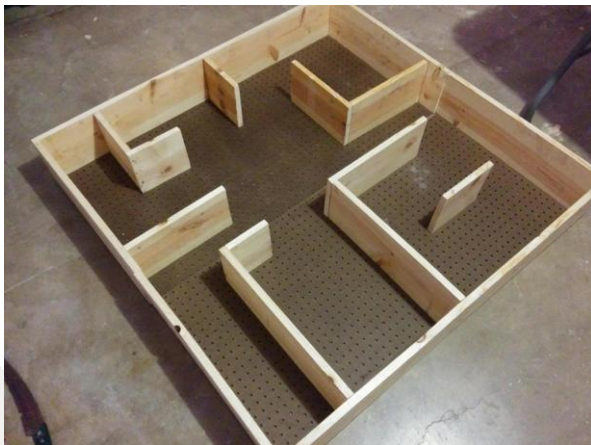
350 (1m ago)

210 (2m ago)

All readings in particles per liter

New Hardware

- Built test environment
- Replace IR sensor with LIDAR
- AQ sensor
- Custom PCB



Remaining Work

- Finish looks-like prototype
- Localization
- Implement custom PCB
- Troubleshooting and testing IMU
- Display AQ heat map on web interface
- Documentation

Thank You