

# SLAM Air Quality Monitoring Robot

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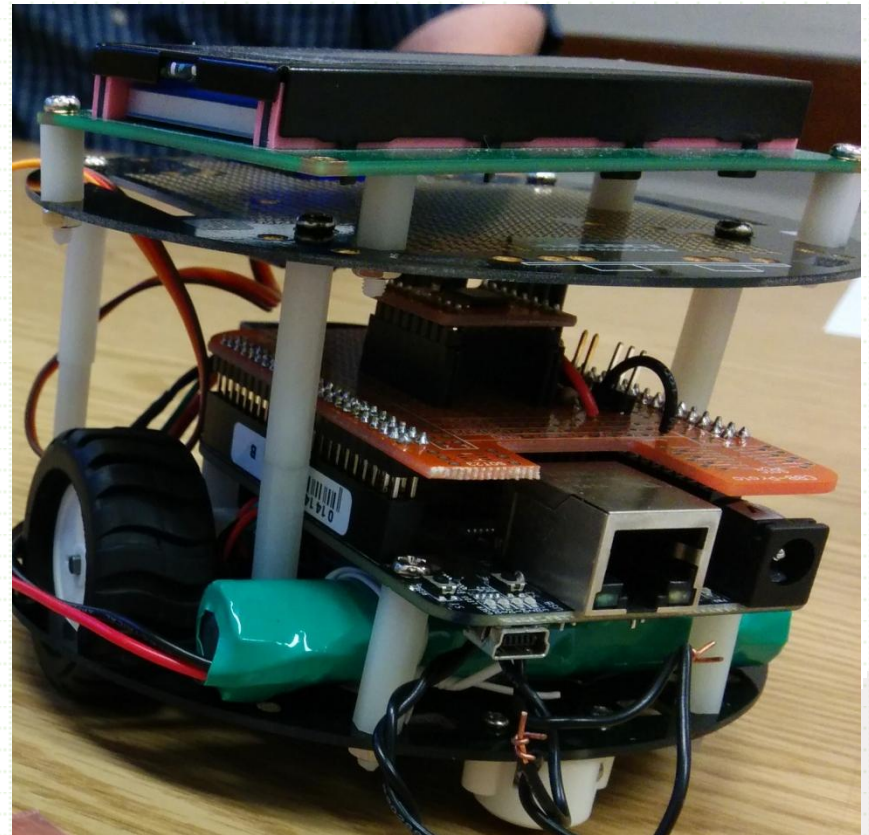
Software

# Outline

- Project definition
- Work done since report 1
- Future work
- Market research
- AZ fabs and cleanroom experts

# Project Definition

- Simultaneous Localization And Mapping
- Knows where it is, where it is going
- Map environment
- Map air quality in environment
- Small, modular



# Work done since report 1

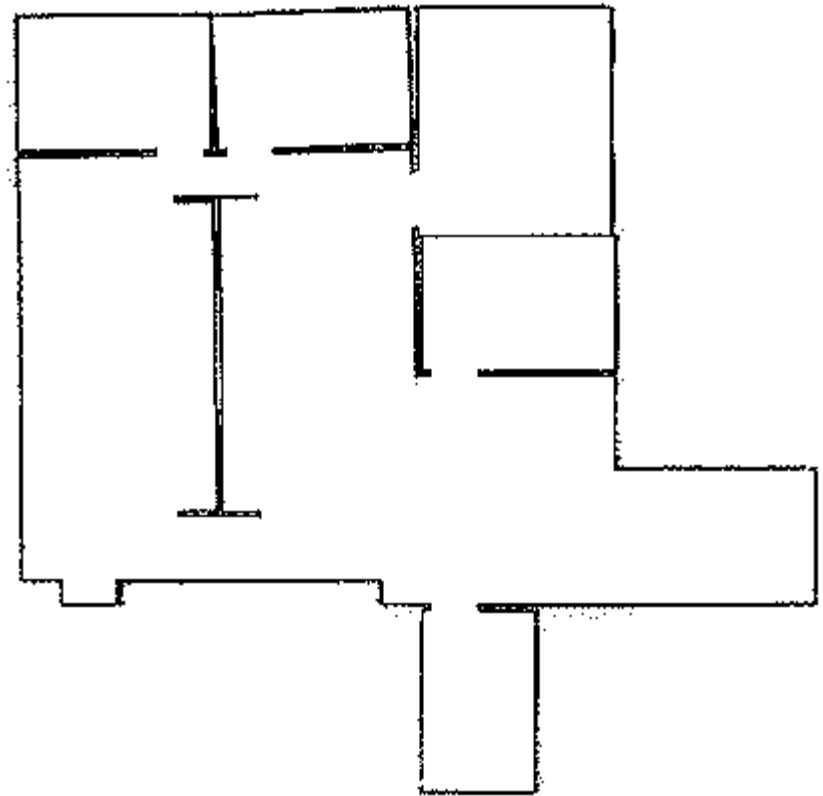
- Additional hardware assembly
- RC car with PS3 controller
- Optical encoders
- IR sensors and LIDAR
- Linux device tree
- Air quality sensor for prototype
- Research

# Future work for this semester

- Purchase LIDAR
- Scheduling
- Linux device tree
- Optical encoders
- IMU
- Research

# Work for next semester

- Orientation and speed
- Position
- LIDAR
- Display map on web interface
- Display air quality on map
- Research



Source: forum post from allenh1

<http://answers.ros.org/question/39132/improve-gmapping-results/>

# Market research

Vanessa

- Cleanrooms need accurate air testing
- Cost: \$180/ft<sup>2</sup> to \$2800/ft<sup>2</sup> (1)
- All design fabs are rated according to air quality
- You can not cook in a dirty kitchen!

• 1 <http://electroi.com/blog/2004/07/15-factors-that-influence-cleanroom-design-and-construction-costs/>



**ISO 5 Certified Class 100 Cleanroom**

TTR is one of the few companies working in this type of secure, clean environment. Working with hard drives inside a clean room is essential to ensure protection of the device from any further damage or contamination.

# What are fabs *saying*?

- There is a great interest in its ability to sweep out an entire area
- There is a consensus in the low cost being its most attractive point
- The common concern is stepping on the robot (the floor model) or it accidentally bumping into people (the airborne model)



- Class 100 research fab
- Previously outsourced; currently in-house
- Irregular testing(  $\geq 1$  test a year)
- Testing is inexpensive; does not impede work\*
- Owners unsatisfied with their testing
- The Airborne Particle Counter (APC) 942300
- 0.3 micron, portable, \$1500 (eBay)



Wazobia Enterprise

# Freescale Semiconductor



- (Class 1/ISO-3; commercial)
- In house by staff
- Data readings require training
- 24/7 air quality surveillance
- Satisfied, but interested in alternatives.
- Wall-mounted & portable sensors, cost \$30k+
- Lasair 110-2, 0.1 micron, Wall-mounted (pictured)
- Met-One GT321, 0.3 micron, portable

Thank you