Dancing Roomba Swarm

Team Members:

Joshua Arment

Noah Kiel Devon Kooker

Adam Brandt Marcy Anderson

Greyson Jones Hunter May
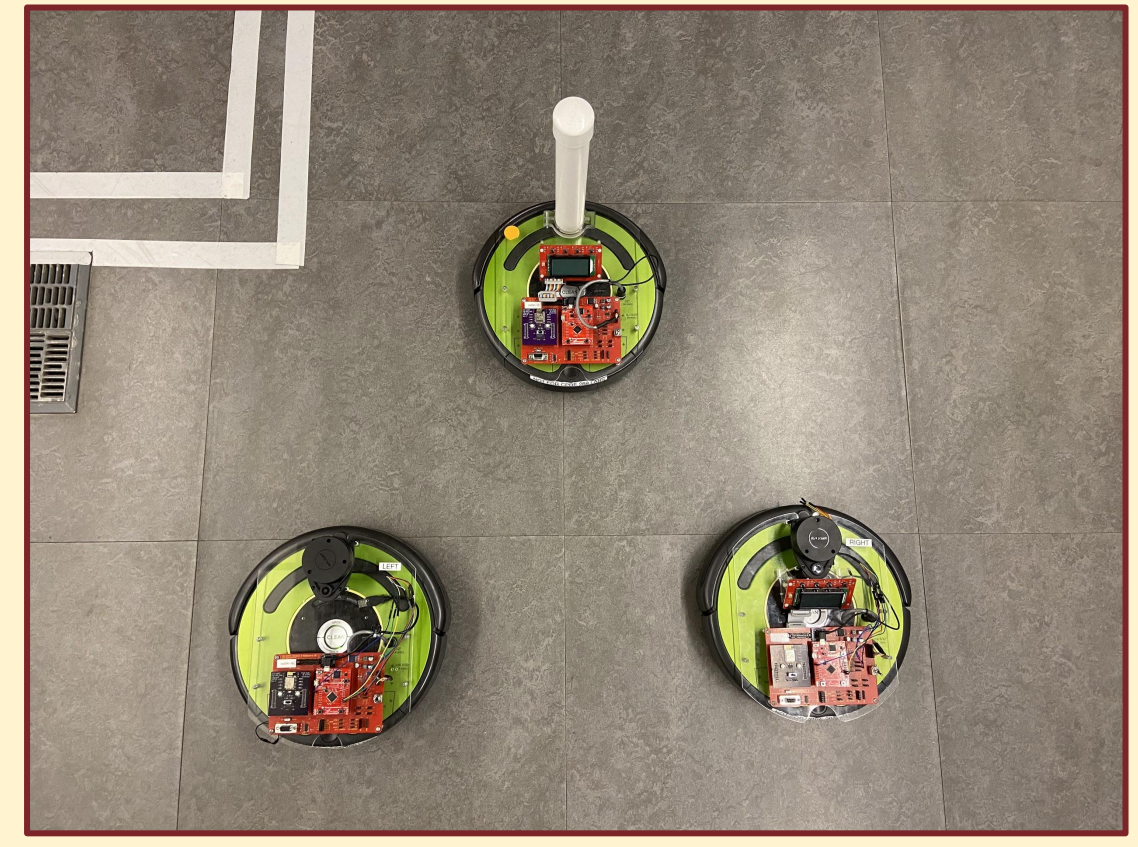
Client & Faculty Advisor:

Dr. Tyagi

Motivation

Design a collection of Roombas that will follow a lead Roomba that moves via song analysis based on certain specifications.

Use Cases

- Aerodynamic Trucking
- Organized mass cleaning
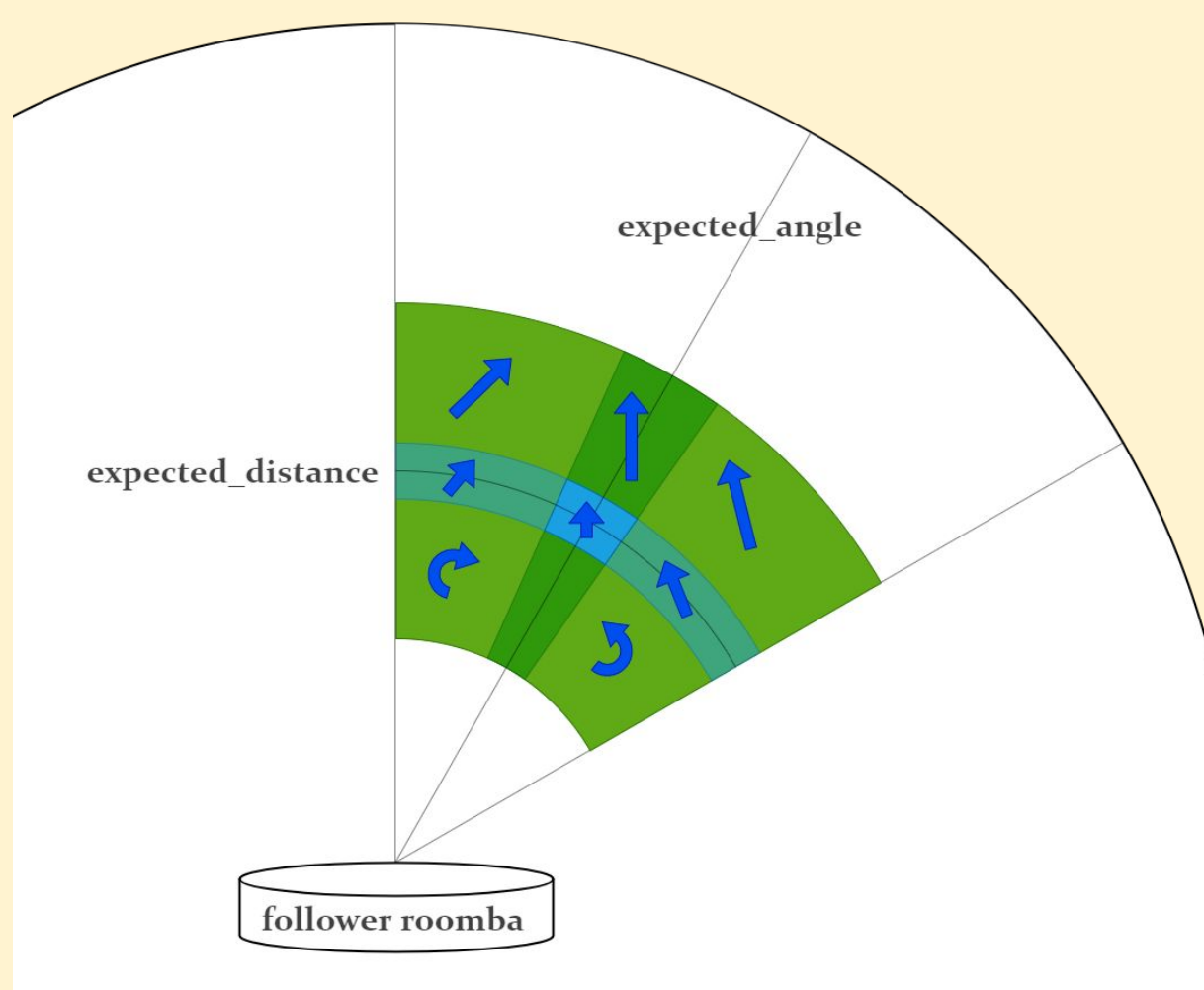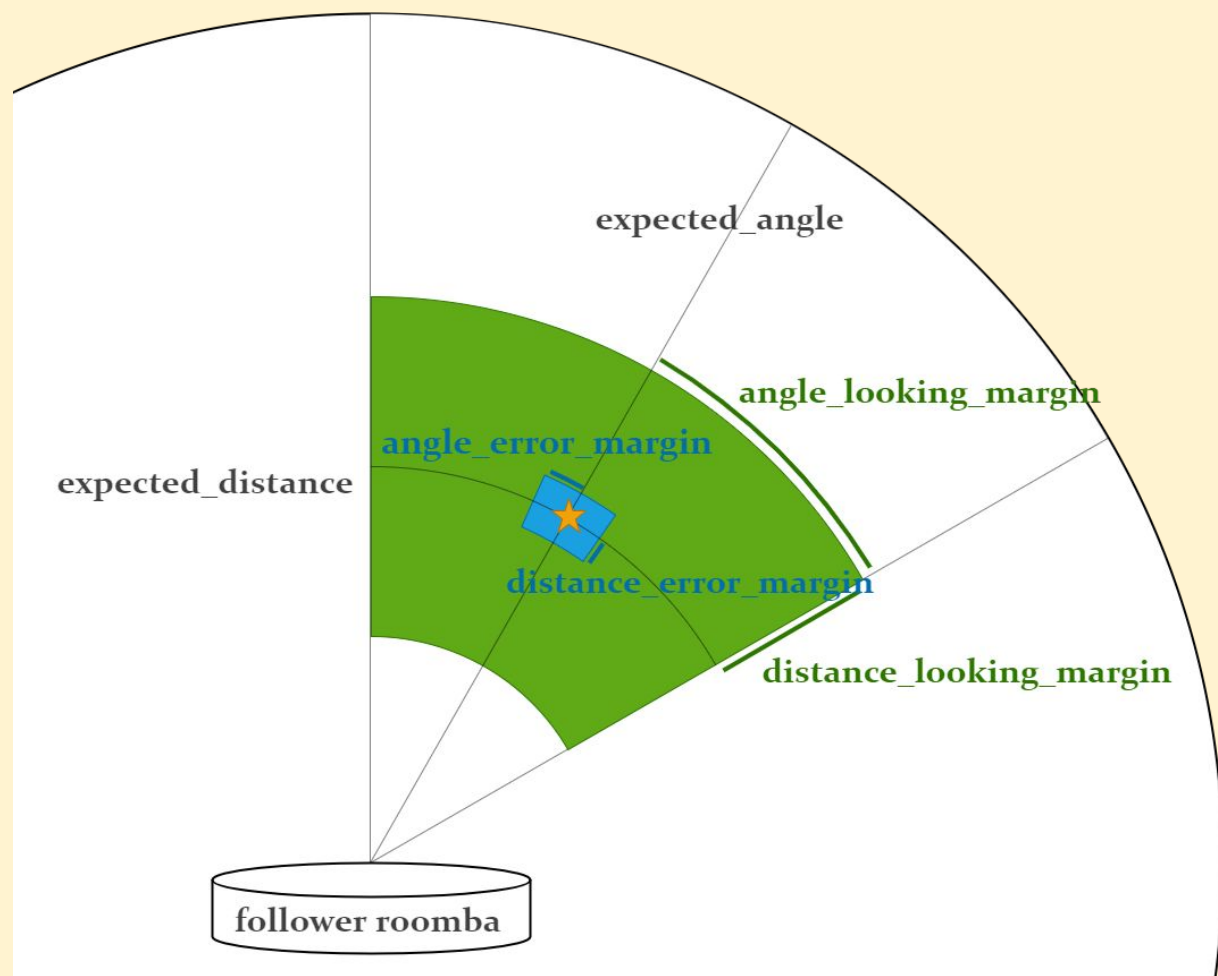- Fire Rescue Drones
- National Defense Systems
- Self Driving Cars

Technical Details

Technologies:

- RP LiDAR sensor
- iRobot Create 2
- Tiva Launchpad
- C coding language
- Code Composer

Limitations:

- Roomba battery size
- Accuracy of sensor
- Processing power of Tiva launchpad

Design Requirements

Functional Requirements:

- The follower Roombas should not receive any controls and should rely only on their own sensor data
- Lead Roomba will interpret songs to create a dance routine

Non-Functional Requirements:

- Components purchased for the Roomba will cost no more than $500
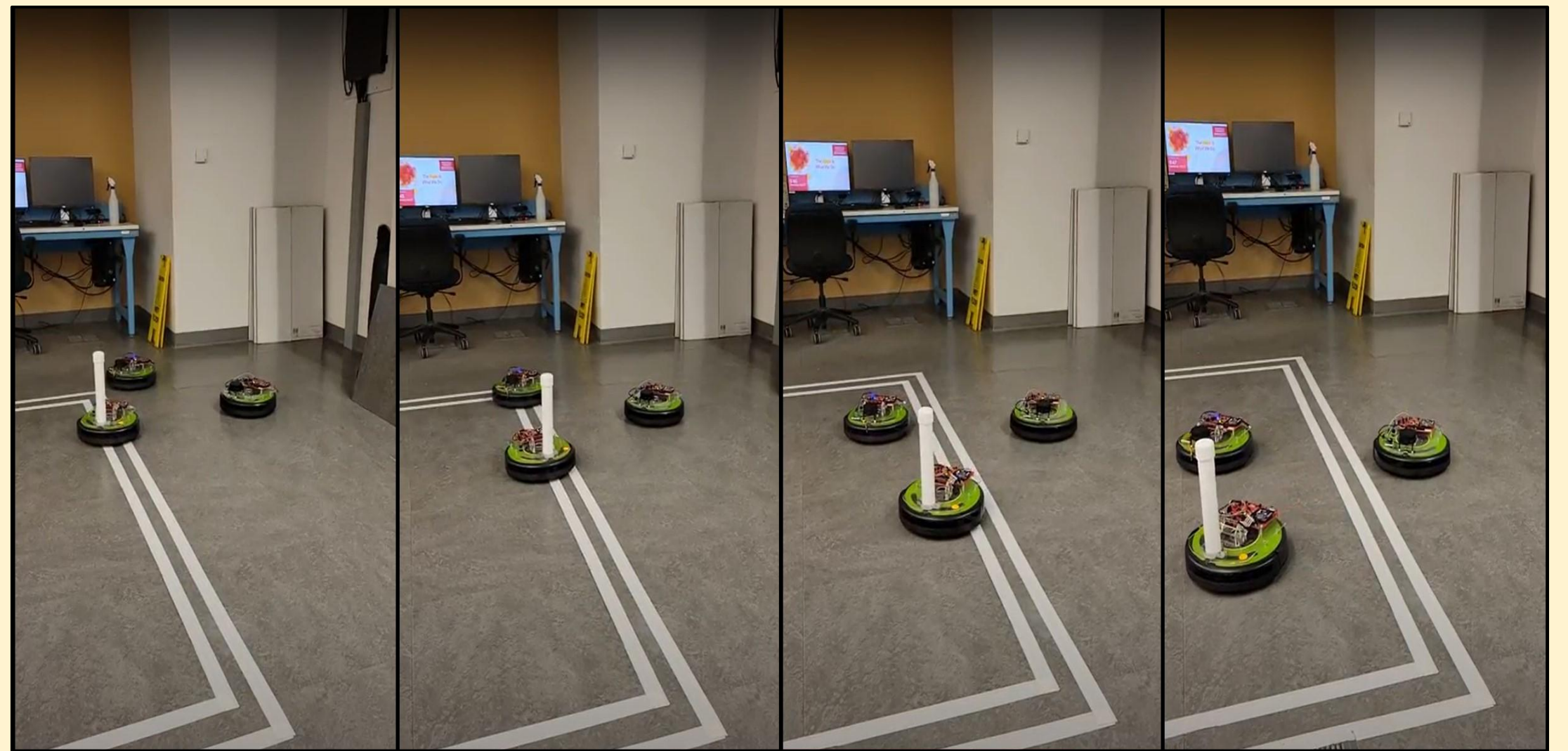
Engineering Constraints:

- Follower Roombas must follow behind the lead Roomba at a distance of 70cm
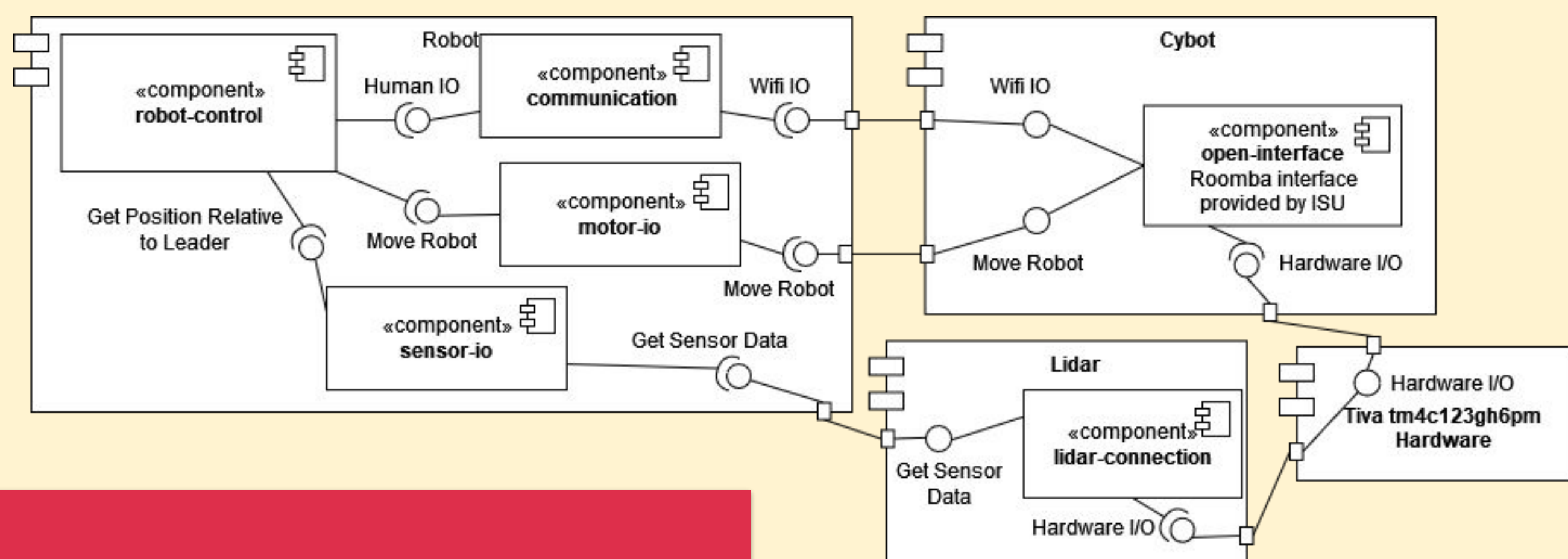
Operating Environment:

- Roombas should be able to follow each other in an area with no obstacles

Relevant Standards:

- IEEE 802.11 - Wireless Networking
- IEEE 754 - Floating point arithmetic specifications

Design Approach

Testing

We used regression, system, and acceptance testing to verify that the follower Roombas accurately tracked the lead Roomba and that changes integrated successfully into the system

scan to see videos