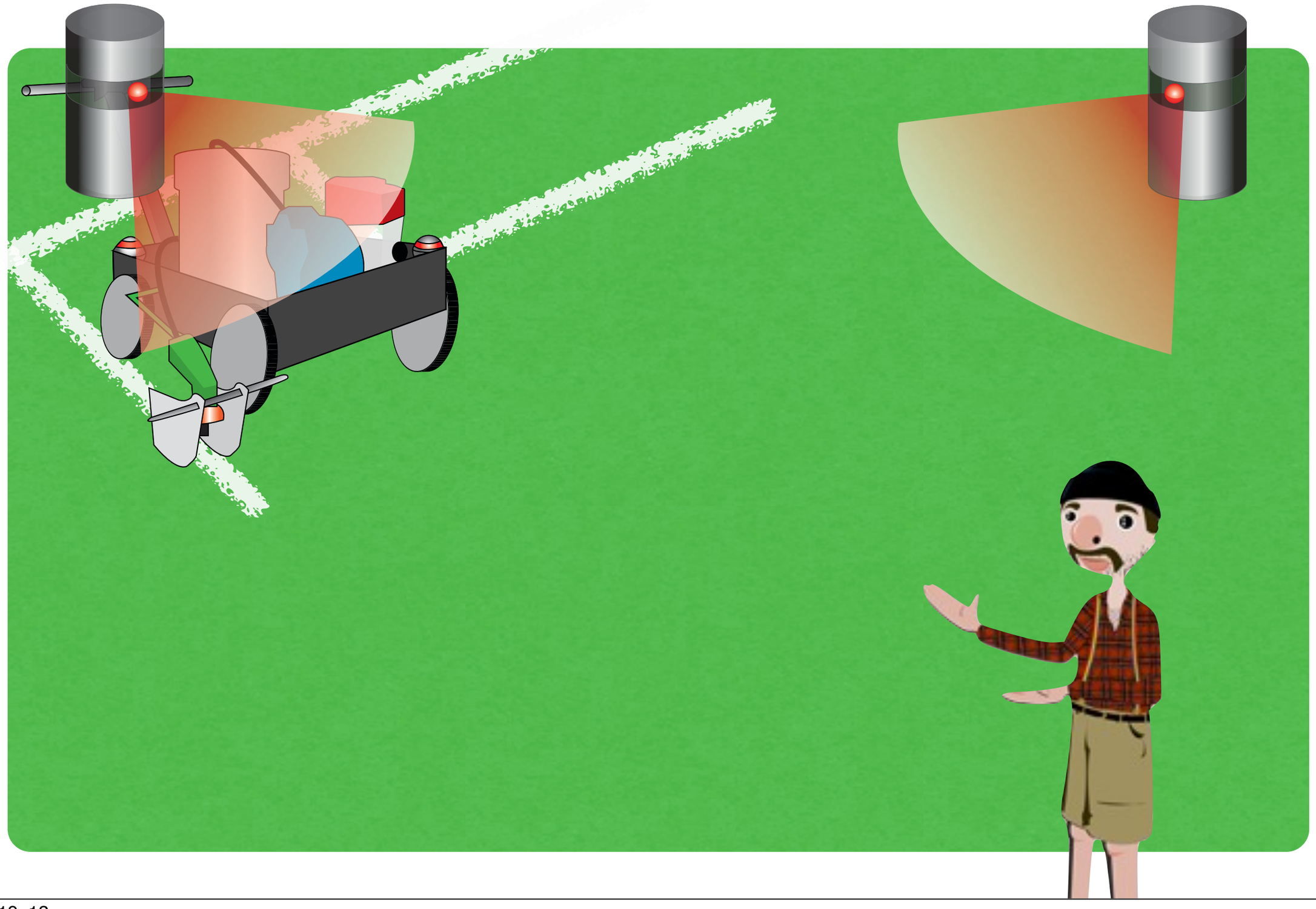
Linus

team silver b

Introducing Linus:

autonomous field liner with 2 home bases



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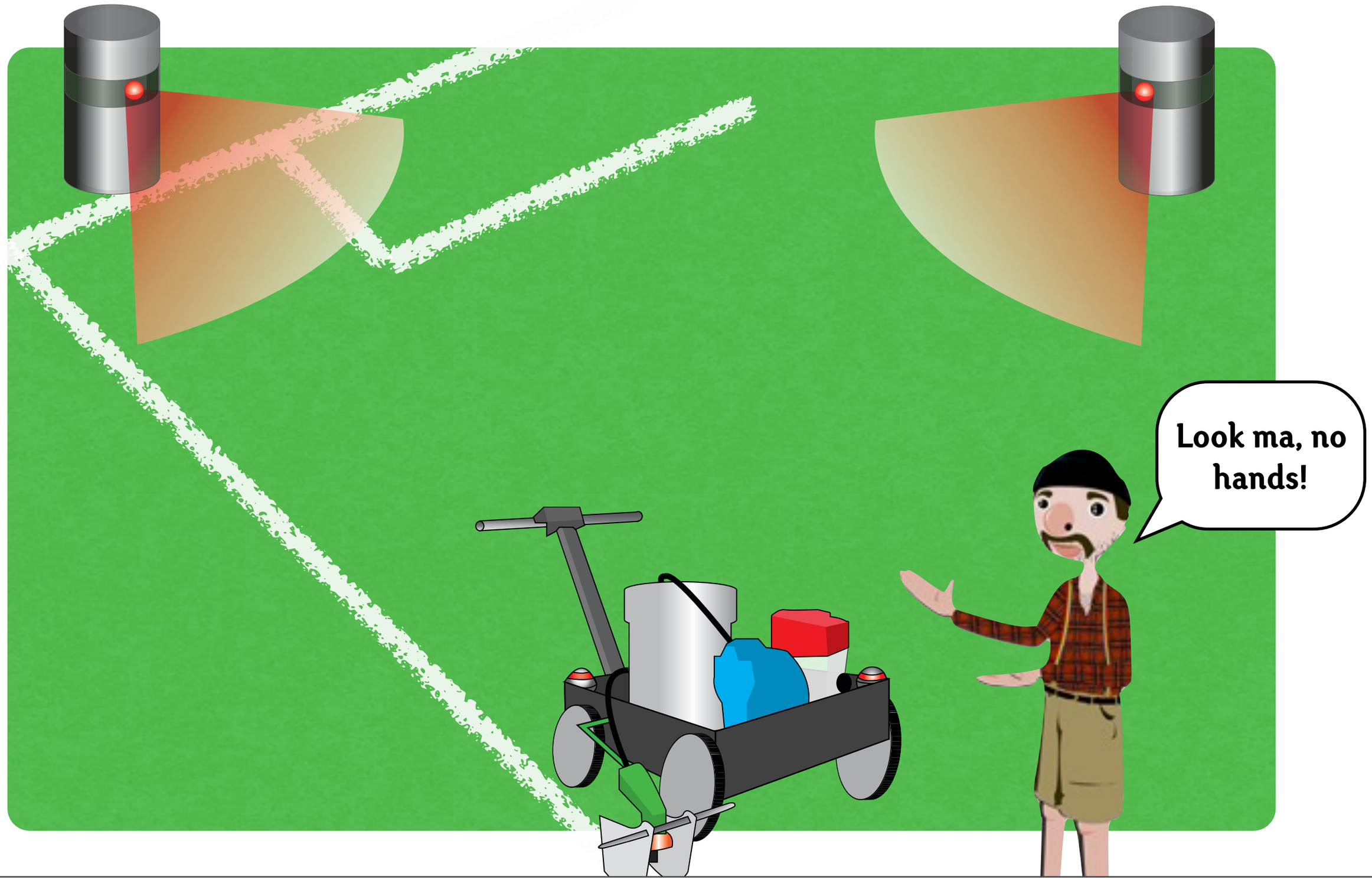

The Problems:
the hassle of field-lining

- time consuming
- human error
- labor intensive

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$3600 of labor costs/year

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$2500

Customer Feedback:

MIT Athletic Maintenance Staff: Christel

“...let’s set it and forget it.”

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Customer Needs

Intended Customers: Athletic Facilities Departments
Market: Sports Field Maintenance

Customer Need	Product Attributes	Engineering Specification
Easy and intuitive set-up	ease of use	5-10 minutes for full set up
Accurate, geometric field lines	accuracy	maximum error of 3 inches

The Risks:

components tested in the mock-up

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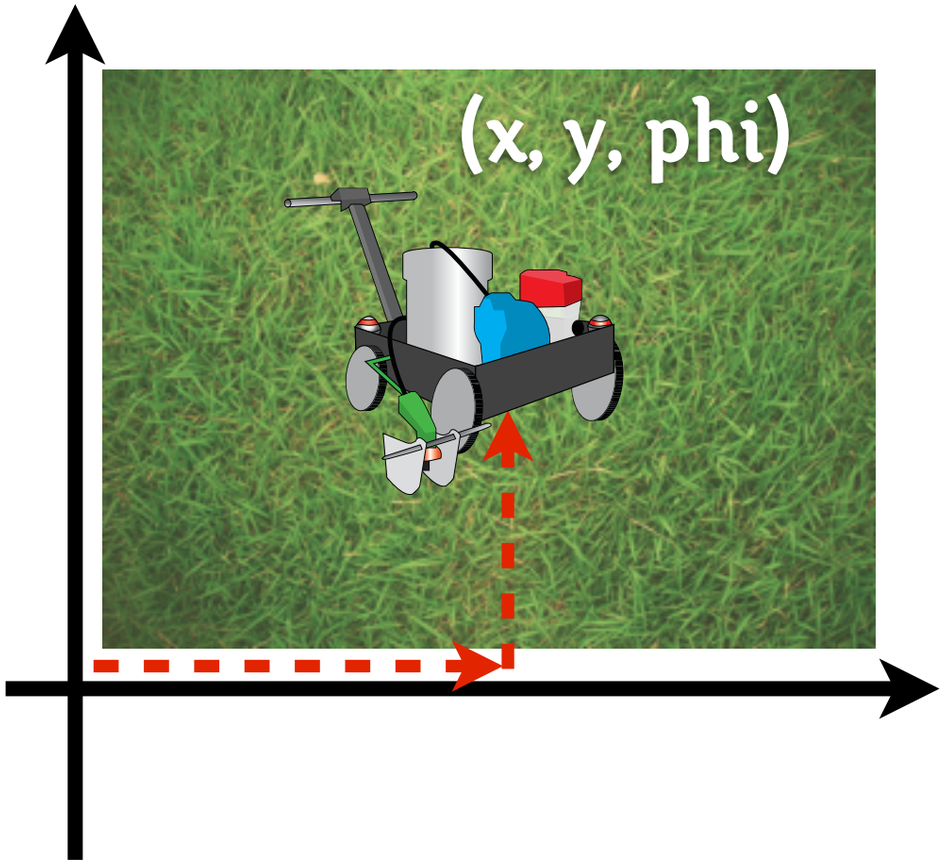
components tested in the mock-up

Accurate Positioning



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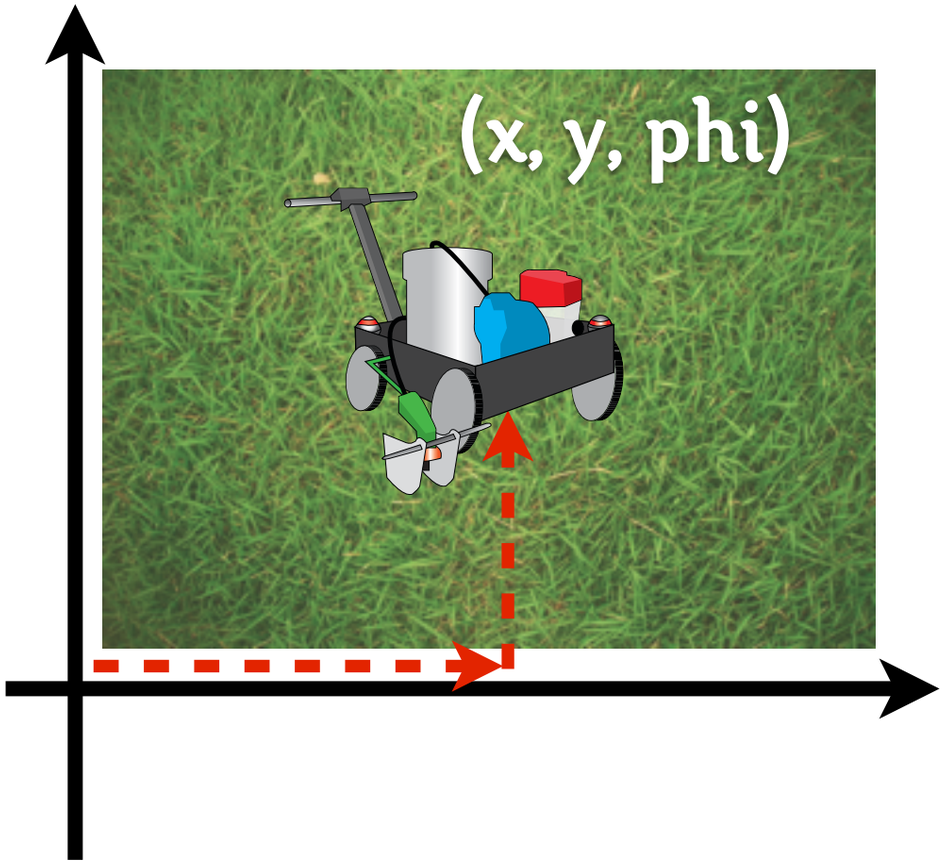
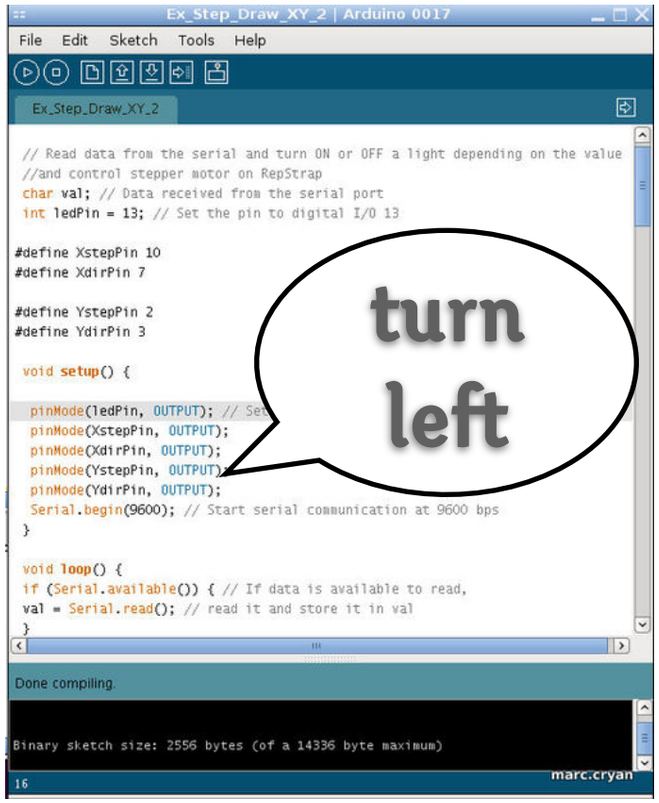


Motor Controls



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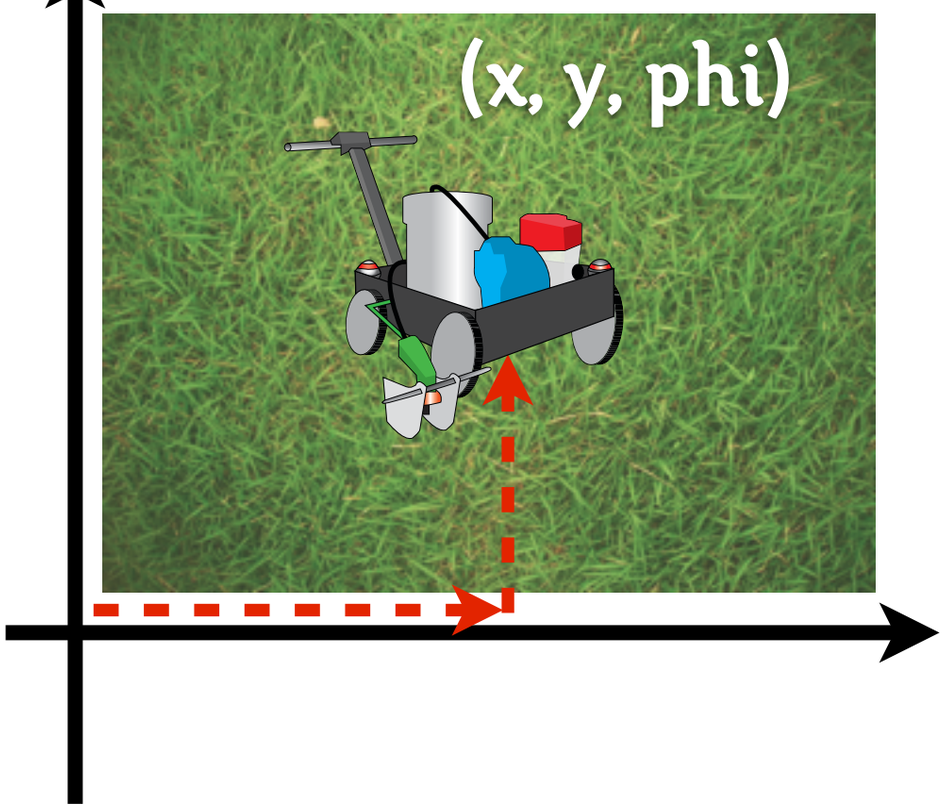
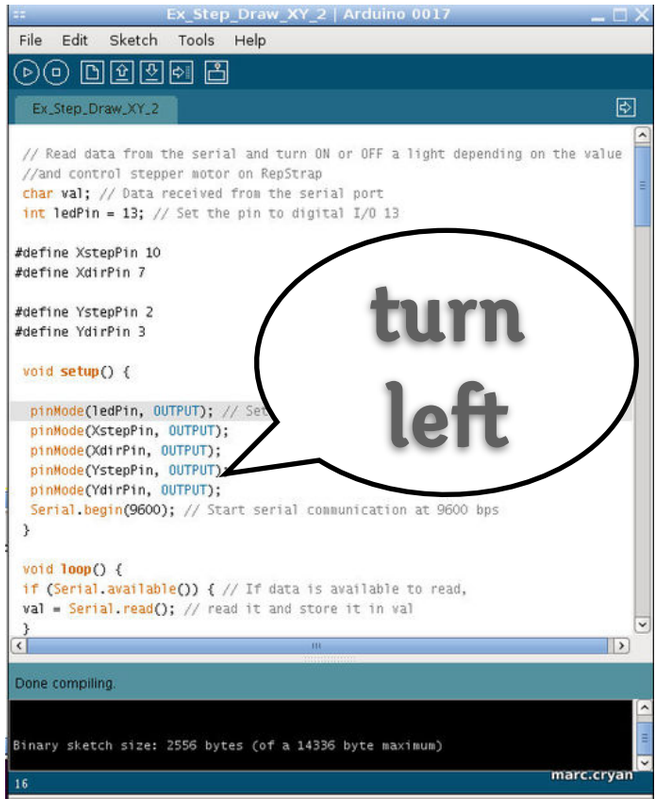


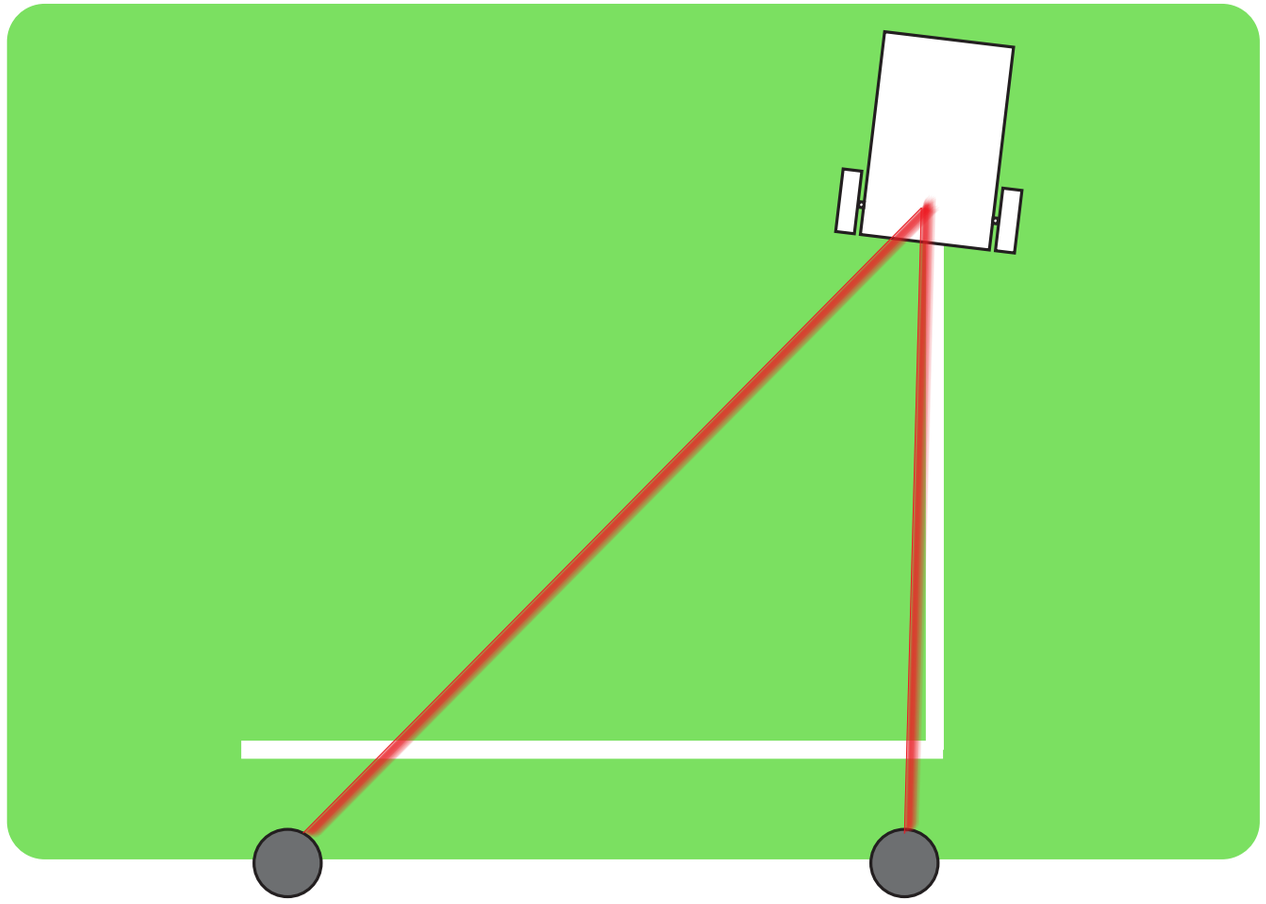
Communication

Motor Controls



Risk 1: Communication

using XBees and Arduinos



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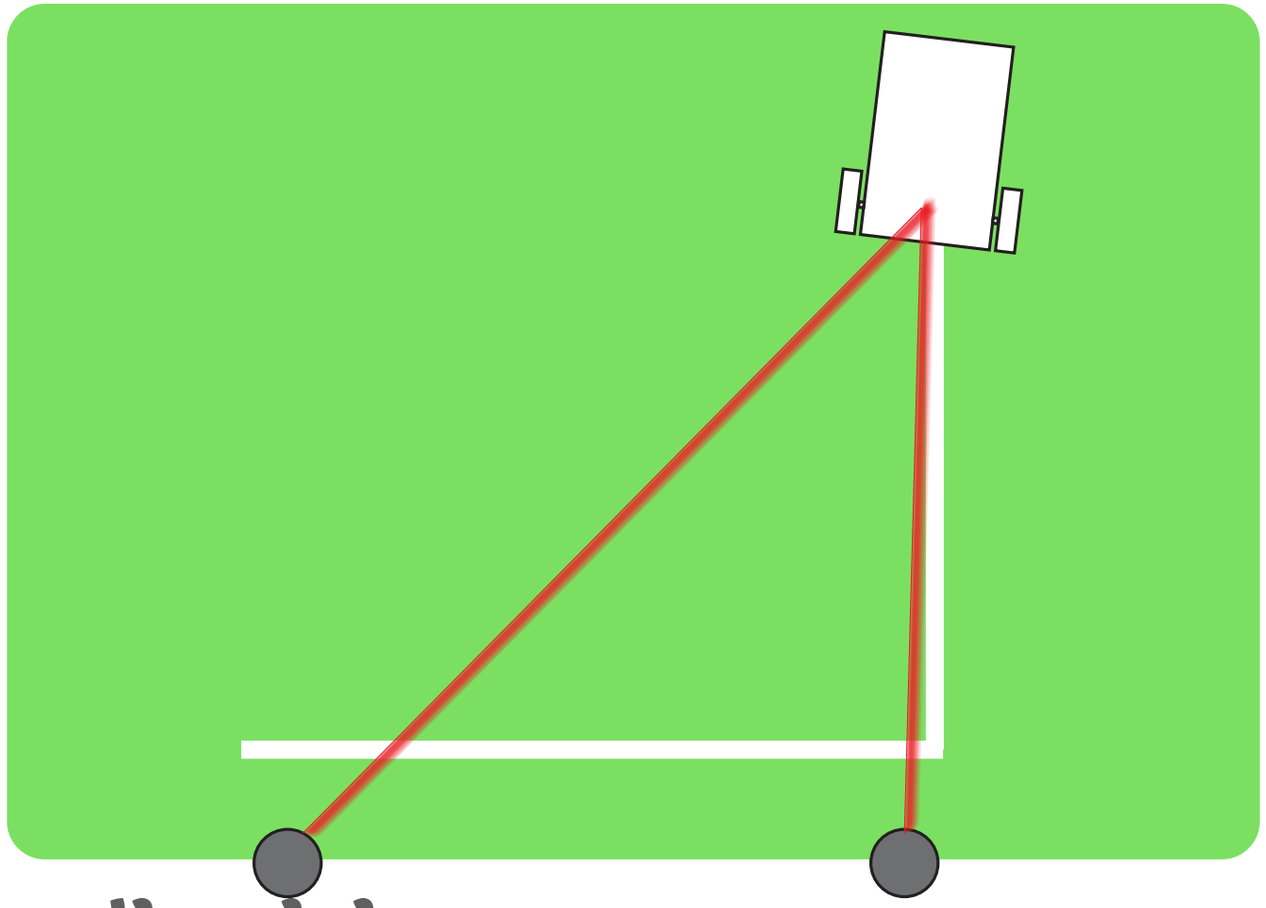
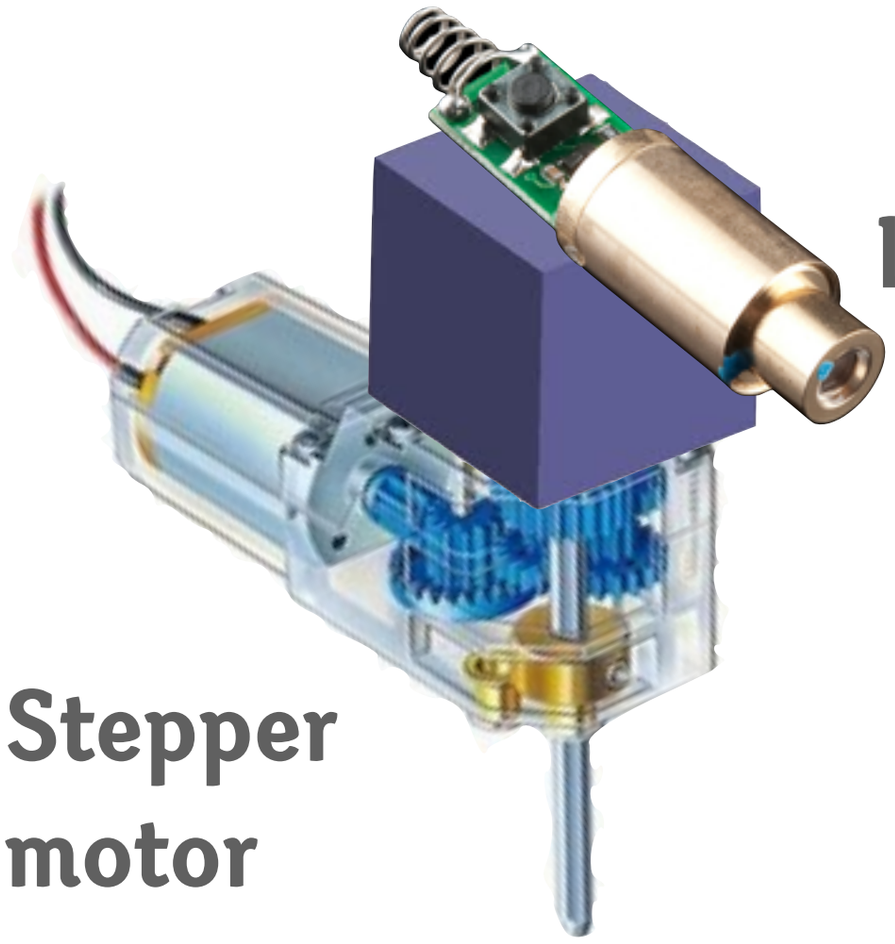


Complex feedback loop

Linus: “Home Base, What’s my angle?”
Home Base : “You’re at 2 degrees.”
Linus : “Ok, Motor Controls, get me back to 0 degrees.”

Risk 2: Accurate Positioning

triangulation with stepper motors and laser sweeps



Laser

Stepper motor

Linus' Photoresistor

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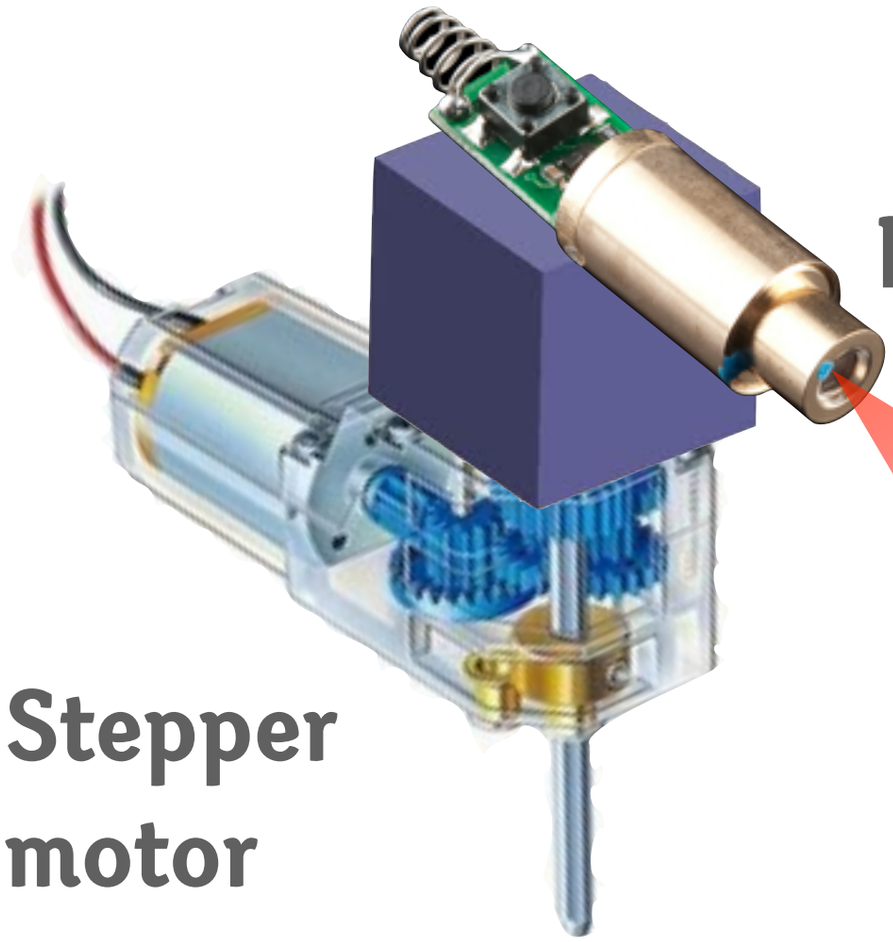

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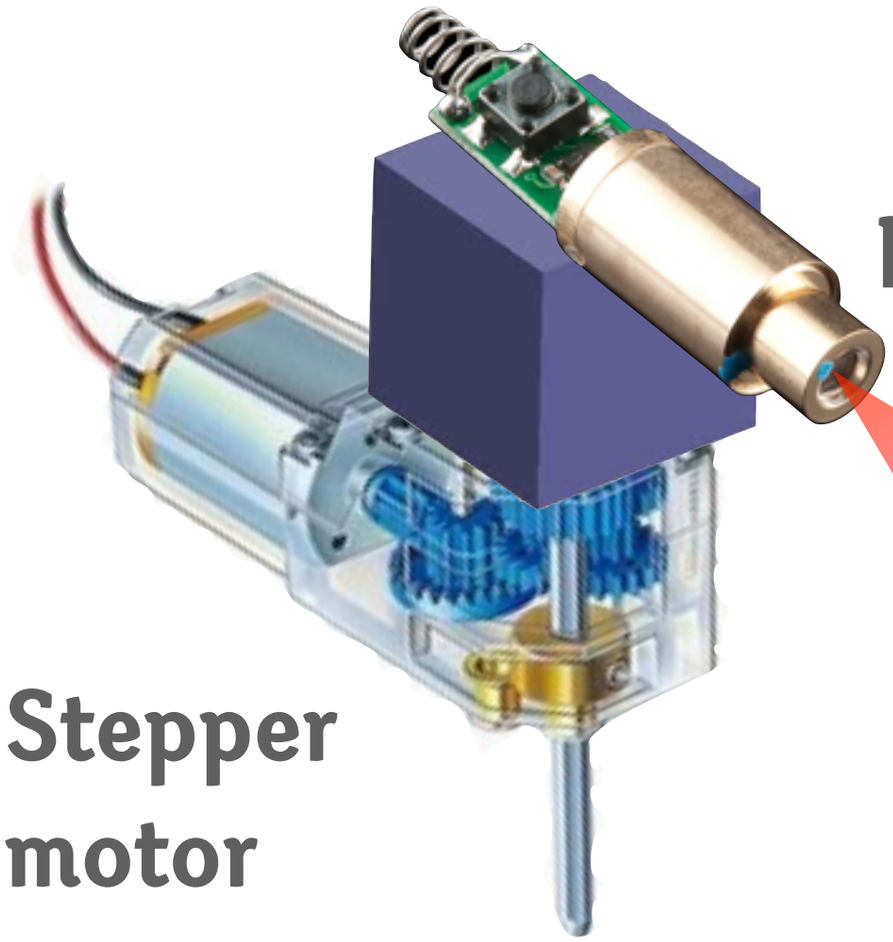

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2 home bases →

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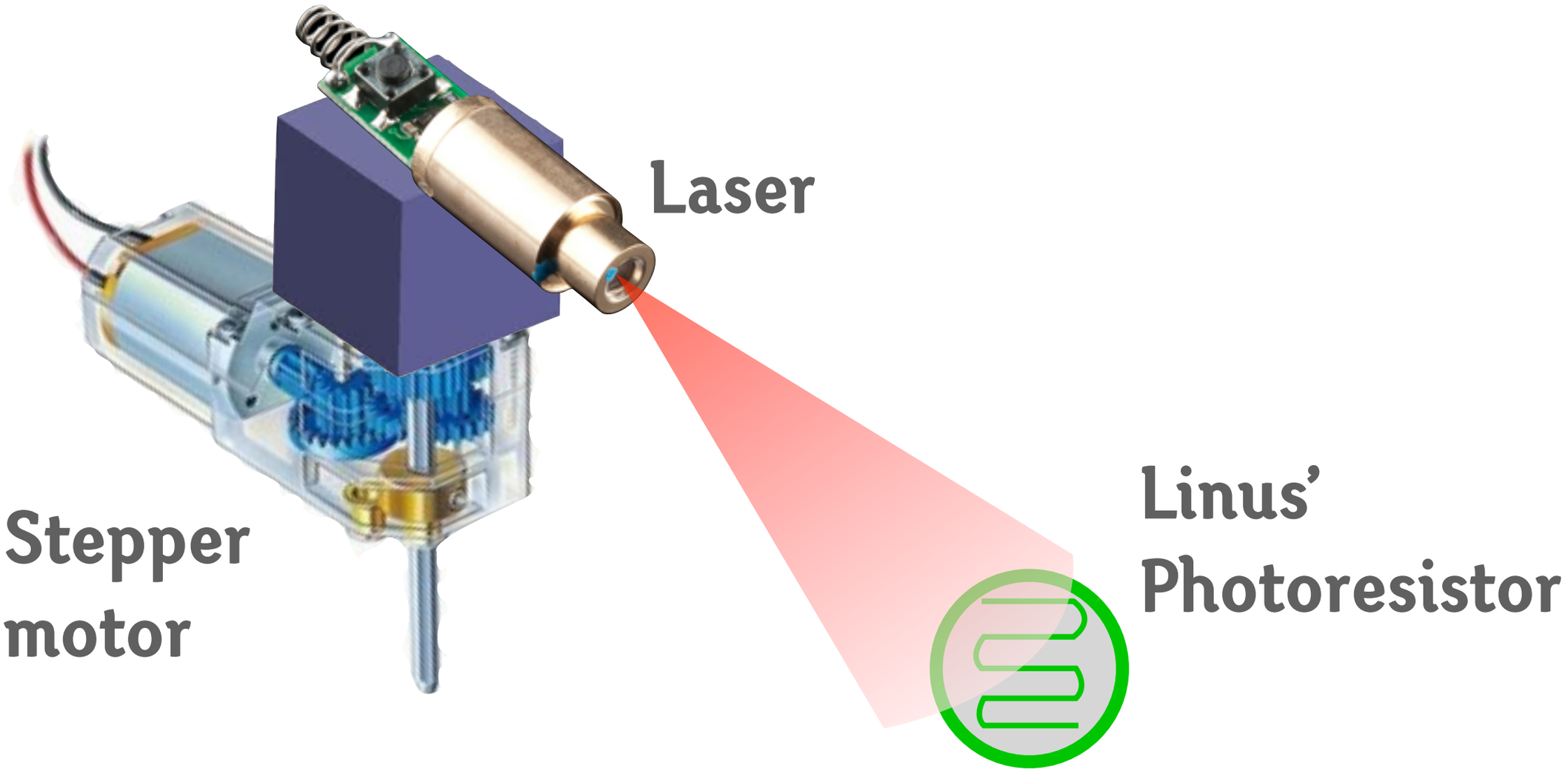

2 home bases → 2 angles →

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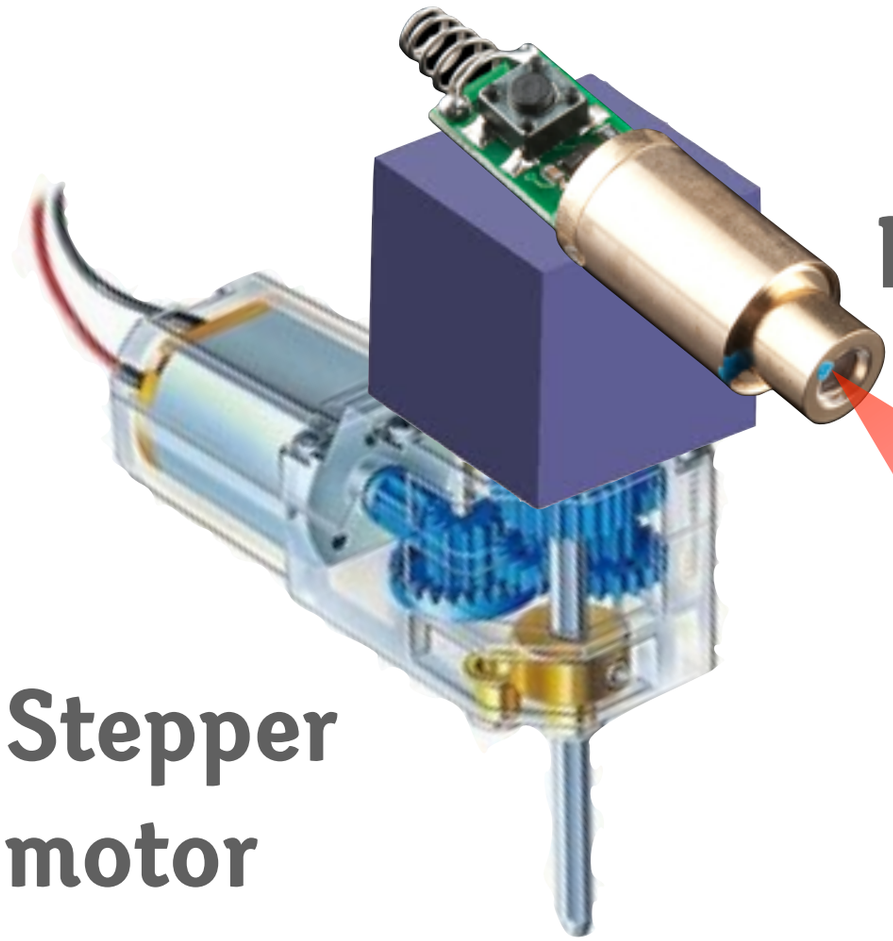


Laser

Stepper motor

Linus' Photoresistor

2 home bases ⟶ 2 angles ⟶ **Calculate coordinates**

Risk 3: Motor Controls

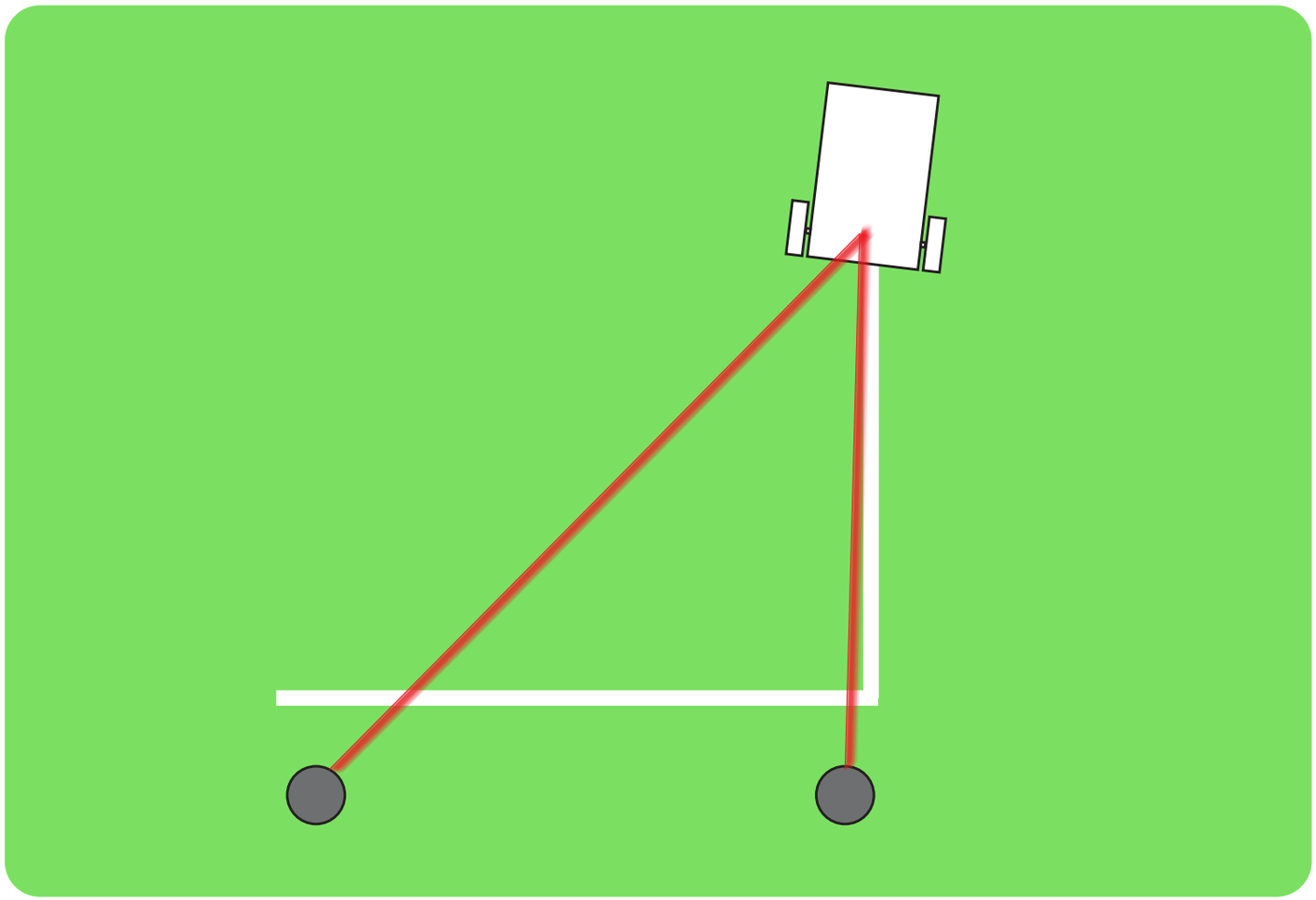
Getting from point A to point B

Position

Orientation

→

Controls velocity of wheels



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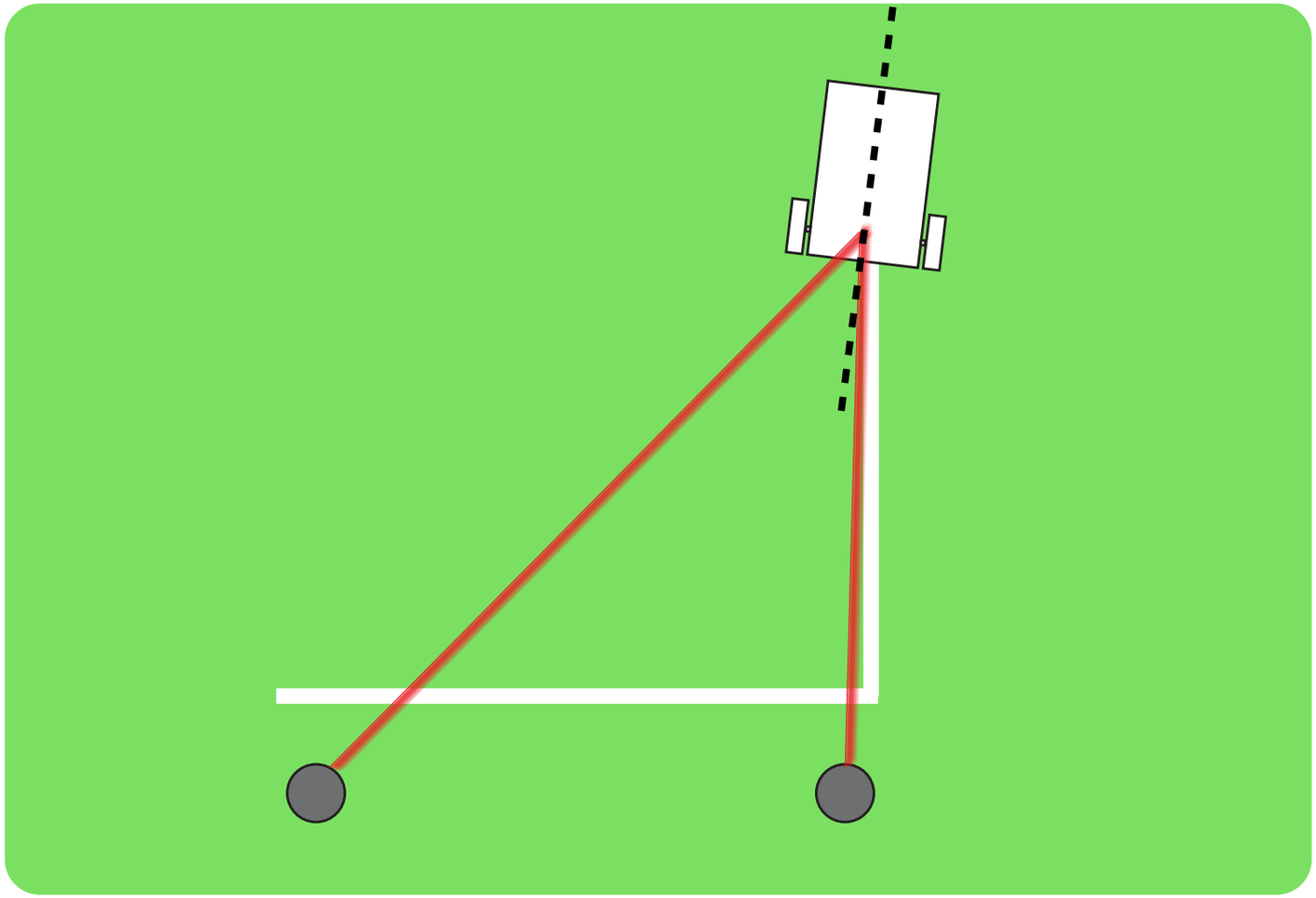

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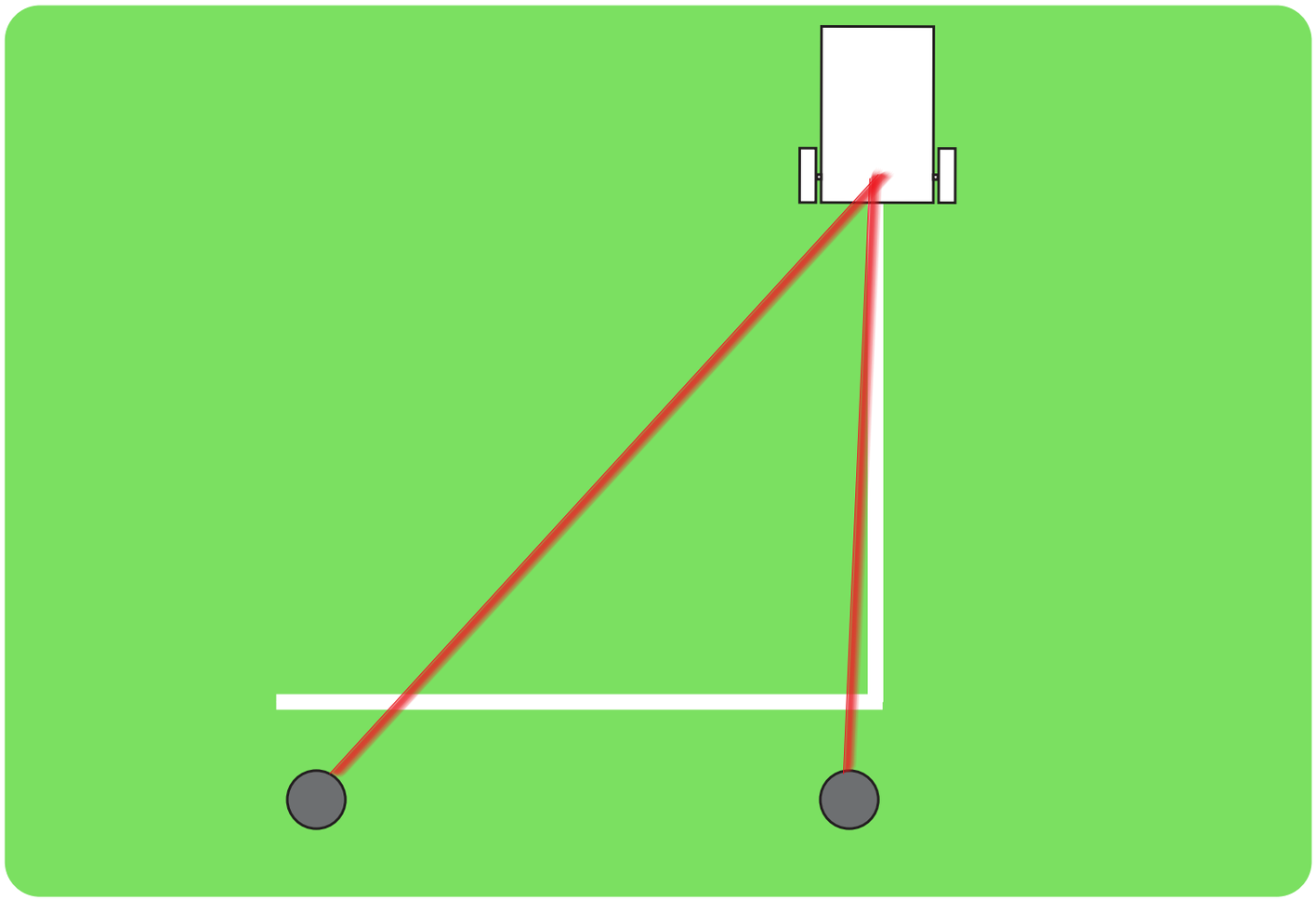

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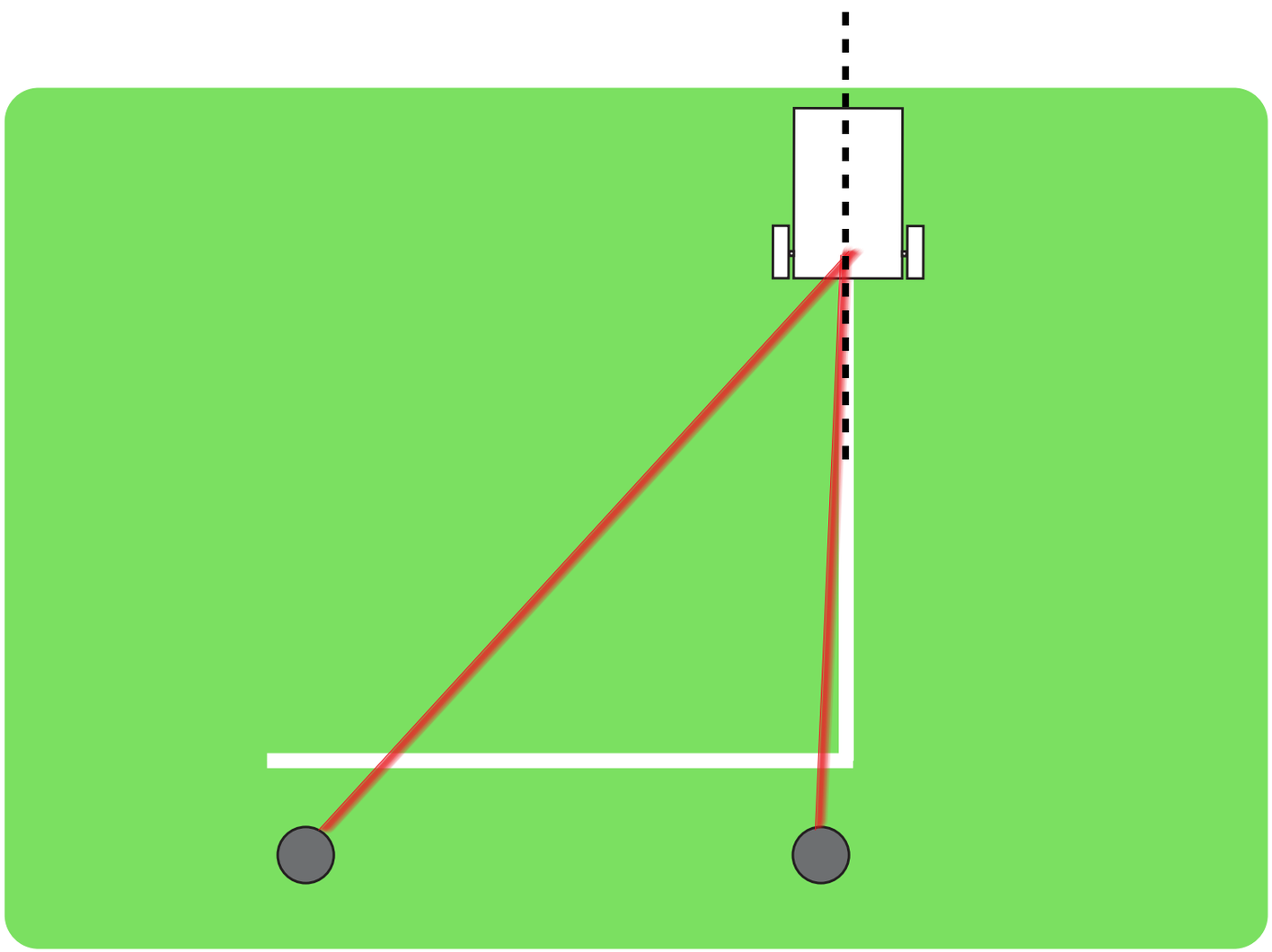

What we learned & future steps

Findings	Future Steps
sweep too slow	higher speed or high resolution stepper motors
laser too dim at long distances	more reflective material for laser sweep
need accurate orientation reading	Gyroscope or 2 photoresistors on Linus

Thanks!

See you in lab!

Thanks!

See you in lab!

-silver b