

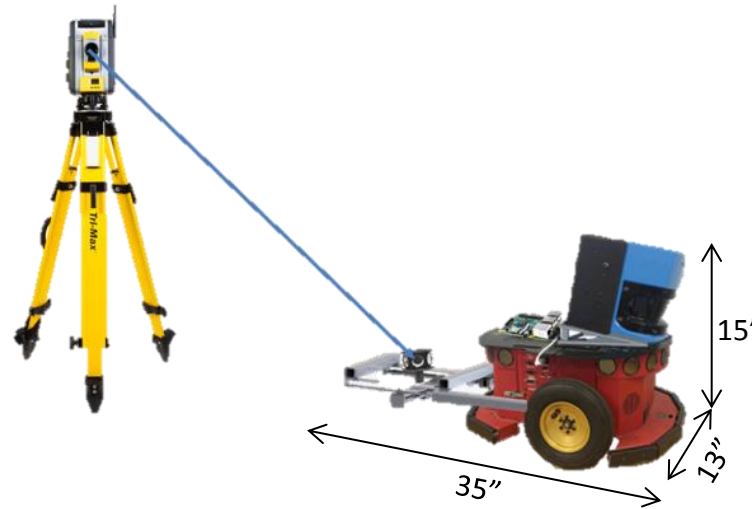
Aim: Implement a 'proof of concept' high precision marking robot that will lay out the floor plan of a construction site

Background:

Construction is one of the last major industries that has been reluctant to integrate the robotic technology into their process. This project seeks to rectify this by introducing a construction marking robot that will increase the productivity and efficiency of the construction process.

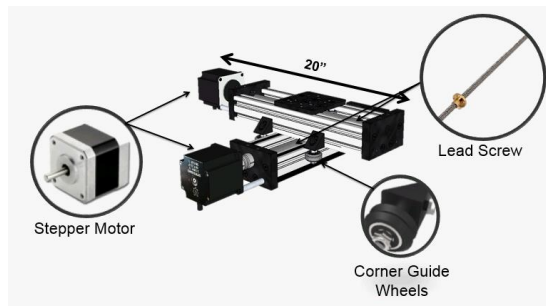
Objectives:

- Add functionality to robot to receive a CAD file of a floor plan and convert it into useable coordinates
- Design, fabricate, and implement a marking mechanism
- Make the robot able to navigate autonomously, avoid obstacles, and generate an error report

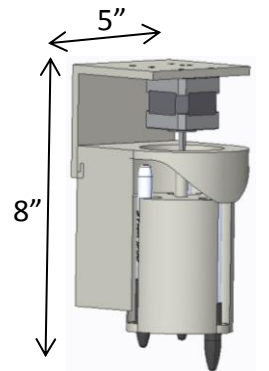


Robotic Platform:

- Pioneer 2DX – Differentially steered robot provided by CISCOR Lab
- SICK Lidar – Used for obstacle detection



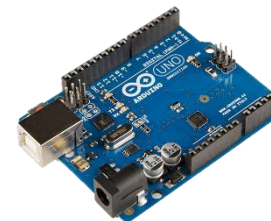
Gantry System



Marker Holder



Raspberry Pi



Arduino Uno

System Features:

- Gantry Marking Mechanism
 - Lead screws driven by stepper motors
- Robotic Total Station
 - Tracks and measures position of external prism mounted on robot for localization
- Raspberry Pi
 - Central hub for communication and control of all subsystems
- Arduino Uno
 - Controls gantry stepper motors
- Marker Holder
 - Revolver design which holds three different colors

Future Work:

- Increase system efficiency
- Increase number of useable marker colors
- Completely integrate the robotic platform with the marking mechanism