TEAM TOKYO DRIFT: Amos Hunter, Zach Carlson, Matt Crisp, Beau Garland, Nedzad Ljaljic

DESPITE IT ALL, THIS IS OUR ROBOTICS PROJECT

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BRAINSTORM

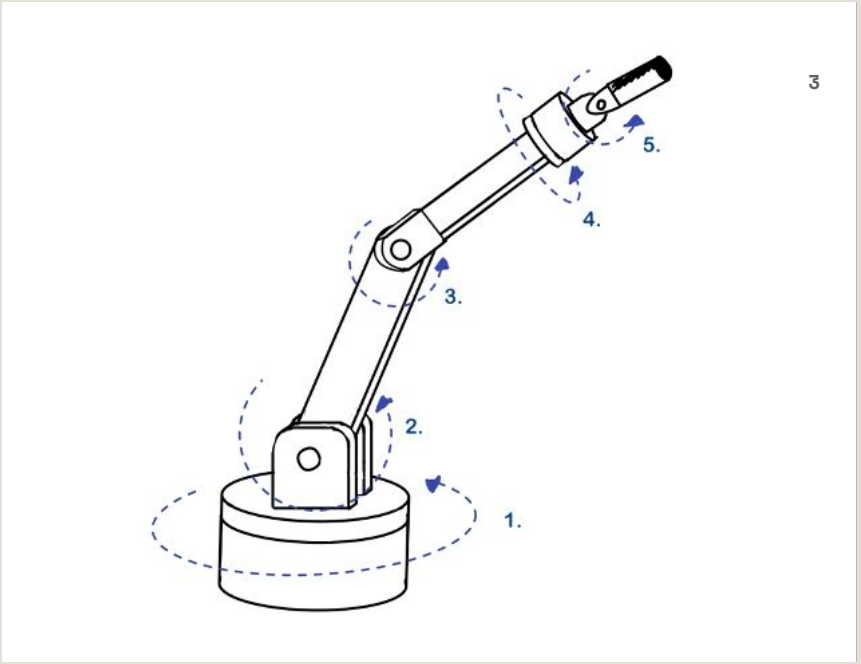
5 DOF design

Rigid Base Turntable

Modular Length

Reaches all points on board

Spring-loaded pen



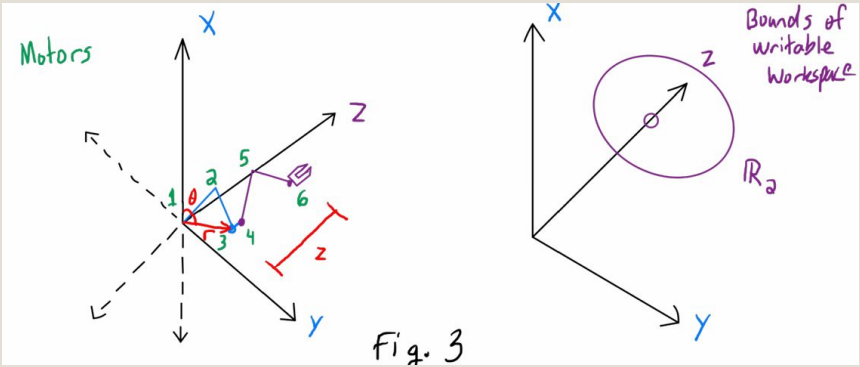


Fig. 3

HARDWARE

BASE TURNTABLE

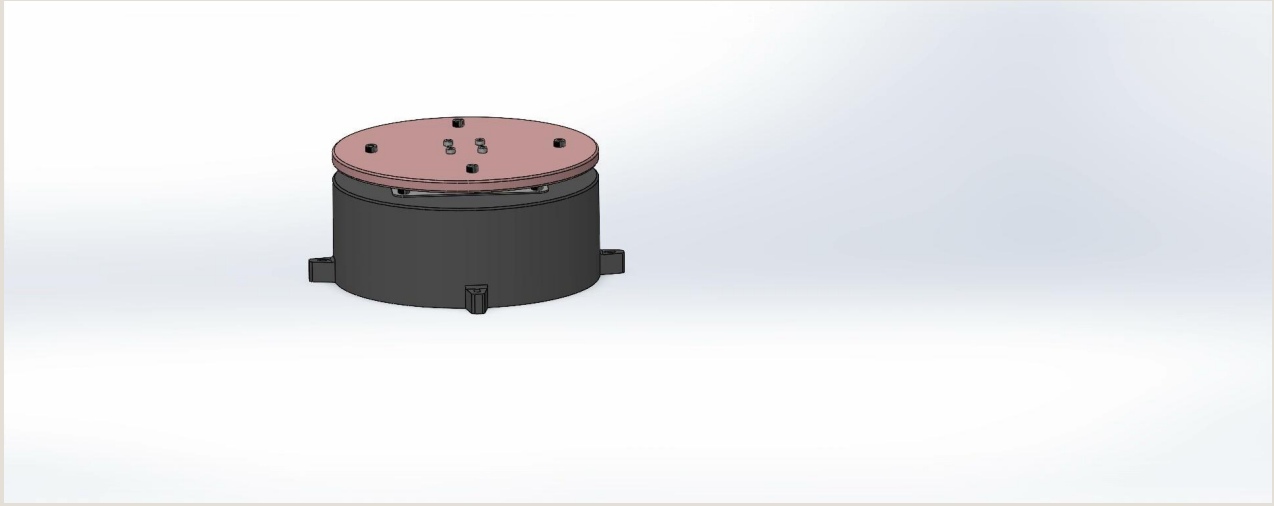
Steel axial ball bearing

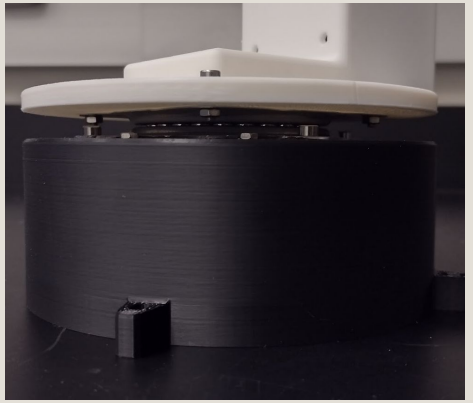
Flange mounted to heavy metal base

AX-64 Motor

M2 & M2.5 Motor Screws

M3 Flange Screws



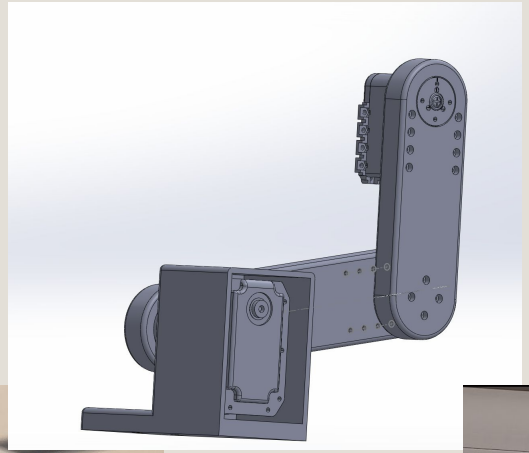


BEARING
SIDE VIEW

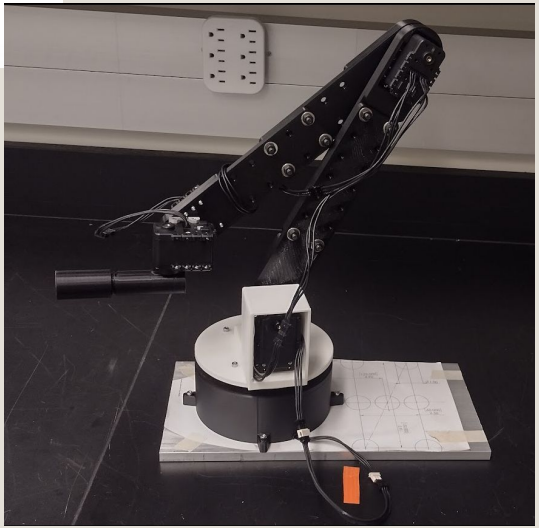
HARDWARE

ADJUSTABLE ARMS & SPRING LOADED PIN TIP

Arms



Spring-Loaded End Effector



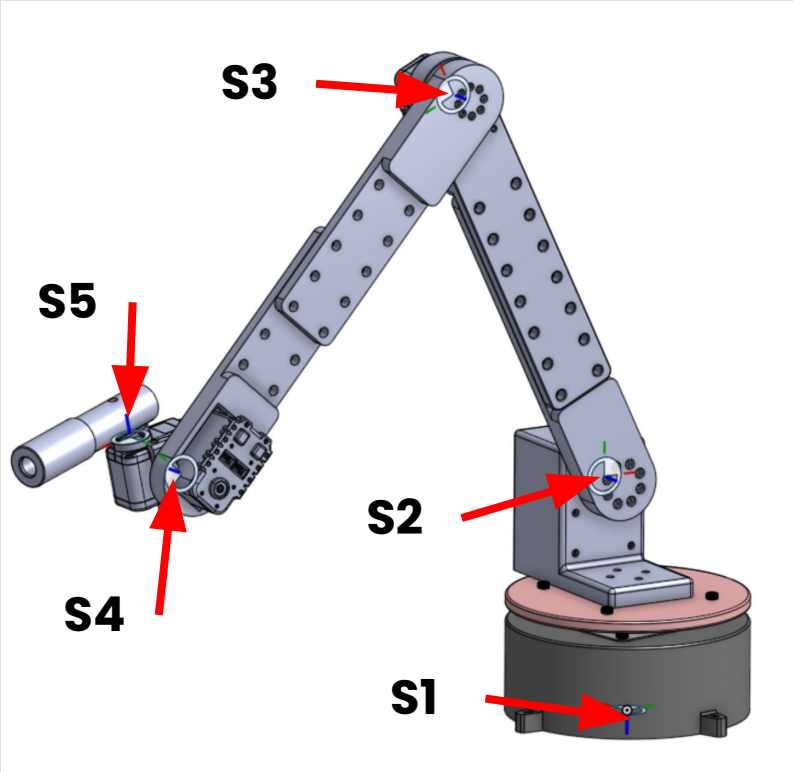
Full Robot

CAD Assembly

Fully Defined CAD Assembly

Complete Onshape assembly makes it easy to determine home matrix and screw axis

Screw Axis	r	w	v = (r x w)
S1	[0, 0, 0]	[0, 1, 0]	[0, 0, 0]
S2	[0, 0.12229, 0]	[1, 0, 0]	[0, 0, -0.12229]
S3	[0, 0.12229, -0.250]	[1, 0, 0]	[0, -0.250, -0.12229]
S4	[0, 0.12229, -0.500]	[1, 0, 0]	[0, -0.500, -0.12229]
S5	[0.03144, 0, -0.5145]	[0, 1, 0]	[0.5145, 0, 0.03144]
S6	[0.03144, 0.15754, 0]	[0, 0, 1]	[0.15754, -0.03144, 0]



SOFTWARE:

OVERVIEW

ROBOTCONFIG:

STORES M, S LIST, V, ETC.

CENTERBOARD:

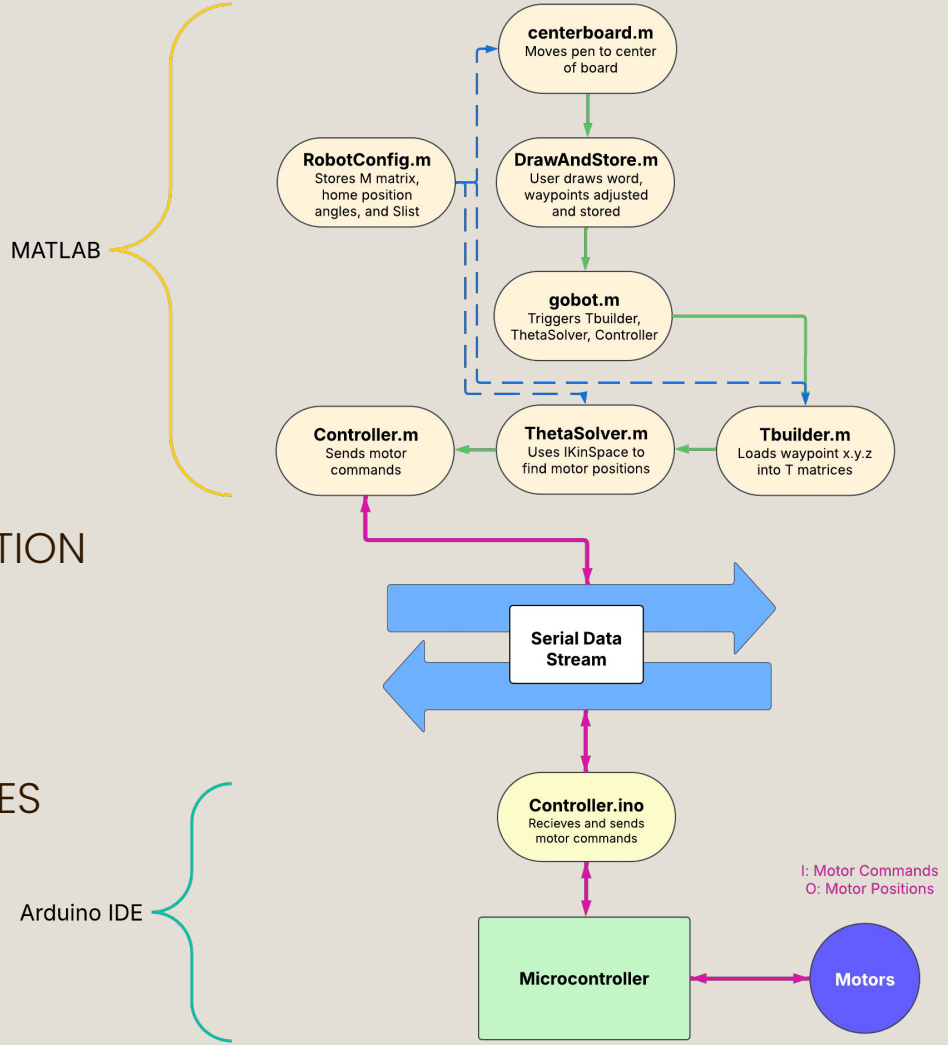
STAGING FUNCTION- DEFAULT POSITION

GOBOT:

COLLECTION OF FUNCTIONS

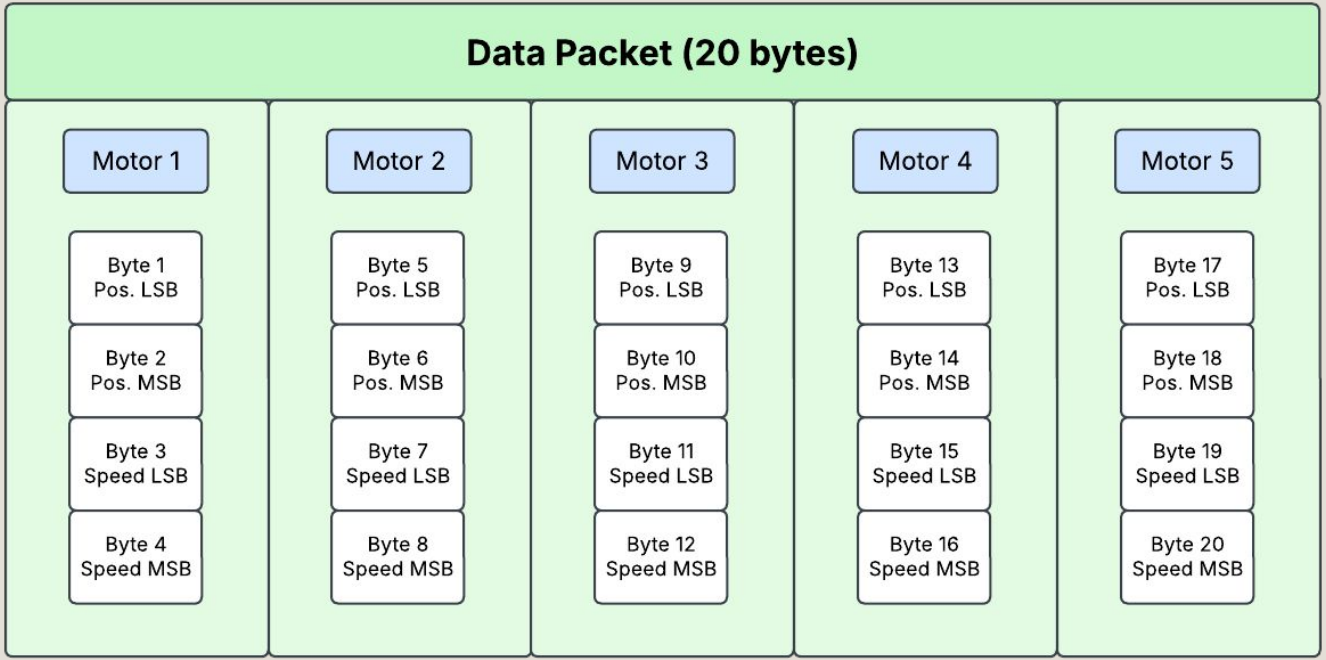
DRAWN COORDINATES → T MATRICES

SENDS RESULTS TO CONTROLLER



SOFTWARE:
MOTOR COMMUNICATIONS

PACKETS BUILT AND SENT FROM MATLAB



SOFTWARE:

CAPTURING CURVES

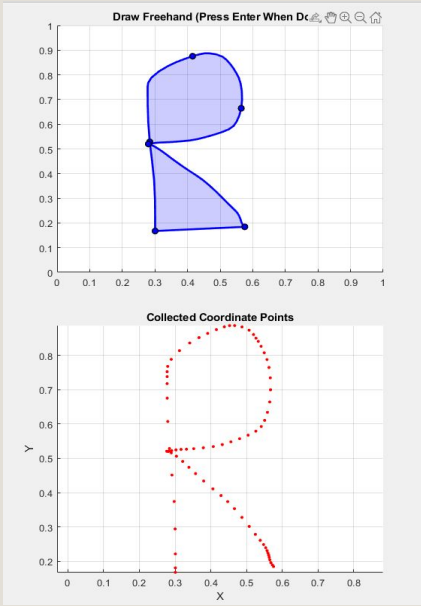
LETTERS CREATED WITH DRAWFREEHAND

STORED AS .CSV FILES, TURNED INTO MATRICES

T MATRICES TURNED INTO THETAS

THETAS TURNED INTO MOTOR POSITIONS

ADD STAGING THETAS TO DESIRED THETAS



TROUBLESHOOTING

NON-PLANAR BOARD & PLAY IN MATERIALS

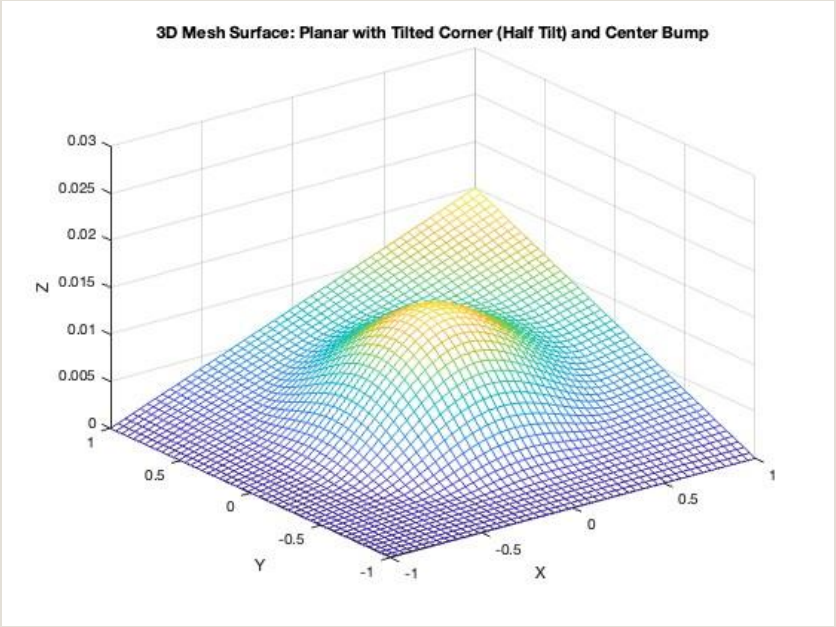
TIGHTENING UP SLOP

MINIMIZING RESIDUAL MOTION

REVISING M MATRIX

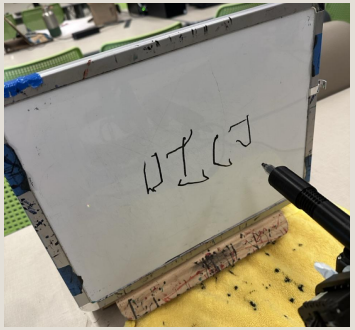
ORIENTING ARMS

CHANGING CONTACT ANGLE OF PEN



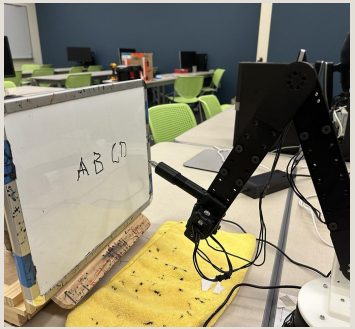
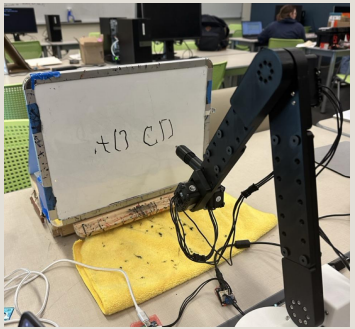
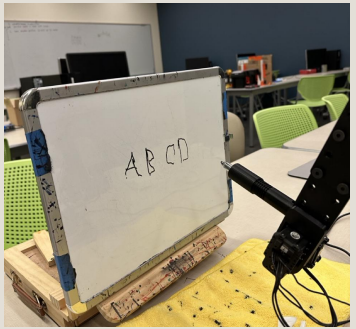
RESULTS

- Able to write words most of the time with careful use off offsets and drawing technique
- Developing a new typeface







Auf Wiedersehen