UC San Diego
JACOBS SCHOOL OF ENGINEERING

VALOR - TEAM 8 MEW

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SE 3 Graphical Communication for Engineering Design
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Project Overview:

- Tasked with creating structure that can launch Pokéballs.
- Learn how to use Solidworks and AutoCAD to visually communicate ideas.
  - Incorporate engineering techniques such as design process, tolerancing, etc.
- Want to consistently launch Pokéballs into designated zone.
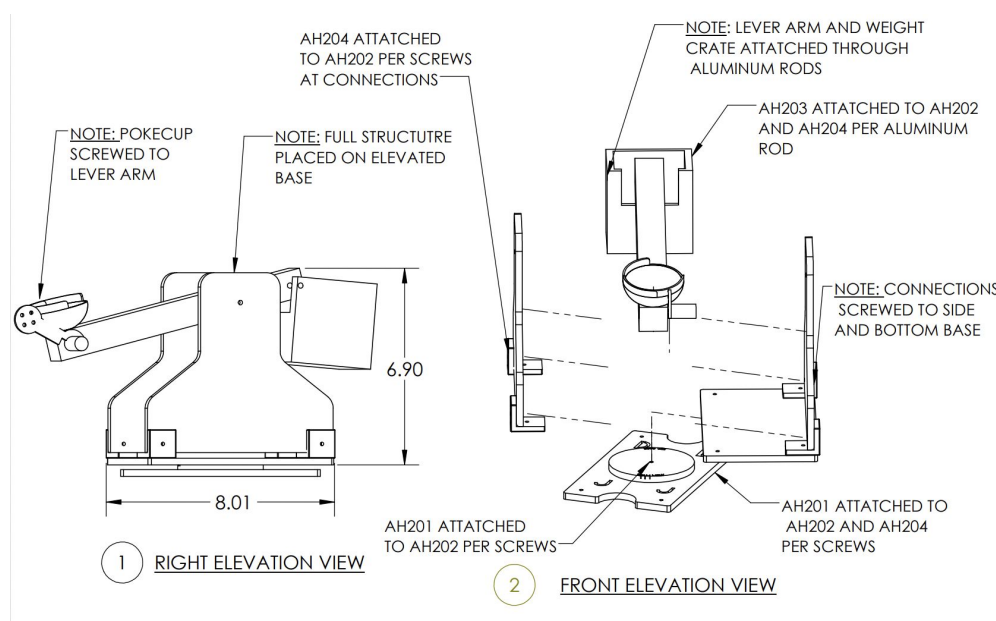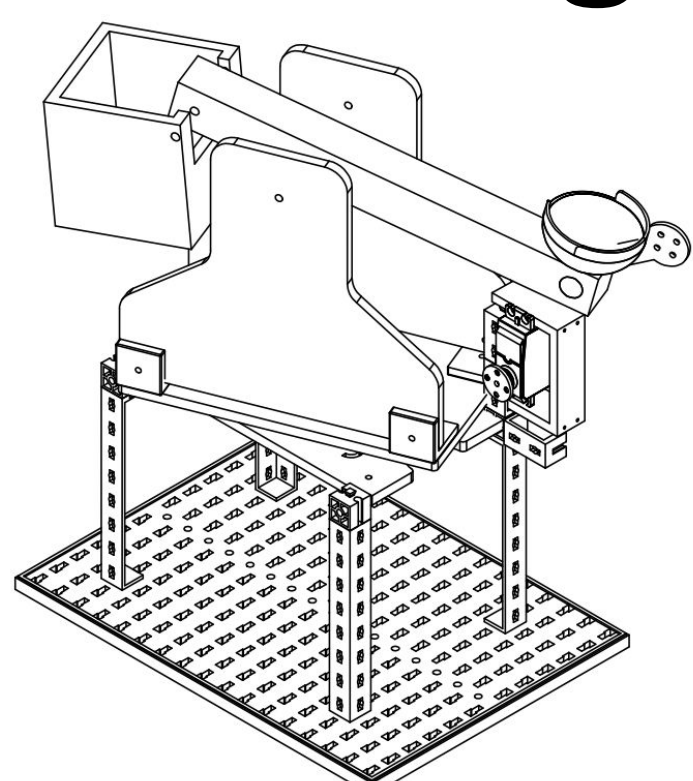
Construction Drawings:

Fig. 1 Exploded View

Fig. 2 Isometric View of Total Assembly

- In Fig. 1 there are 4 total subassemblies that are connected to each other to create our total assembly which is then placed onto fischertechnik parts to elevate the structure as shown in Fig. 2.
- The lever arm subassembly connects to the side base and bottom base assembly through aluminum rods. It is also connected to the crate through aluminum rods.
- To stabilize the bases together, we attached each component using screws.
- The rotating base allows our structure to be able to rotate along the x-y axis which can further improve the angle of projection
- The most important component of the assembly is the lever arm because it is the direct cause of launching the pokeball.

Key Design Features:

- Side Base Subassembly:
  - Fig. 8 shows acrylic side base connected to two 3D printed connections through screws.
- Rotating Base Subassembly:
  - Fig. 9 demonstrates acrylic rotating base connected to circular plate through screws.
- Bottom Base Subassembly:
  - Fig. 6 shows bottom acrylic extruded base connected to two 3D printed connections and an acrylic side base through screws.
- Lever Arm Subassembly:
  - Fig. 7 shows 3D printed crate attached to 3D printed lever arm through aluminum rods. It also illustrates the 3D printed pokecup attached to lever arm through a screw.

Design Approach:

- The goal was to create a simple and efficient design that would launch our pokeball to a target.
- Most parts were customly designed in order to reduce the total cost.
- Fischertechnik parts were used to enhance the structure once total assembly was completed. The library parts were used to elevate the structure and secure the motor.
- After testing the acrylic and 3D printer filament, it helped to decide which parts would be 3D printed and which would be laser cut.
- Testing also allowed for us to make changes to each component such as adding filaments to the sides.
- Table 1 shows the delegation of tasks, designs, and assemblies amongst group.

TOTAL ASSEMBLY BILL OF MATERIALS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	32985	Base Plate 258x186	1
2	36293	Girder 120	4
3	32064	Building Block with Bore	4
4	345800	Rotating Base Plate	1
5	345803	Circular-cut Base Plate	1
6	337269	Base Side	2
7	345801	Extuded Base Plate	1
8	345789	Base Connections	4
9	11278	Servo Hook	1
10	890121	Lever Arm	1
11	432117	Weighted Crate	1
12	36920	Girder 30	3
13	554203	Pokecup	2
14	5413	Servo Part	2
15	5214	Servo Wheel	1
16	112367	Servo Holder	1

Fig. 3 : BOM including all parts and materials used

Table 1:
Work distribution of the project for each team member

Task	Jenny	Lizzy	Davis	Jeremy
Custom Parts	25%	25%	25%	25%
Subassembly	25%	25%	25%	25%
Construction	20%	40%	20%	20%
Drawings	40%	20%	20%	20%
Poster	37.5%	37.5%	10%	15%
Side base Subassembly			100%	
Bottom Base Subassembly	100%			
Lever Arm Subassembly		100%		
Rotating Base Subassembly				100%

Experimental Setup:

- Wanted to have test setup on a beach
- Imported, traced, and handmade several blocks in AutoCAD to reproduce a beach environment

Fig. 4 : Setup Plan View

Fig. 5 : Setup Elevation View

Conclusion:

- Challenges faced:
  - Issue with creating drawings in Solidworks.
  - Some small inconsistencies when manufacturing 3D printed and laser cut acrylic pieces.
  - Launching mechanism too slow, Pokéball didn't launch far enough.
- Teamwork, communication, and time management are very important.
- Following guidelines and standards makes graphical communication effective.
- Would figure out how to properly export files ahead of time if we could start over.

Acknowledgements:

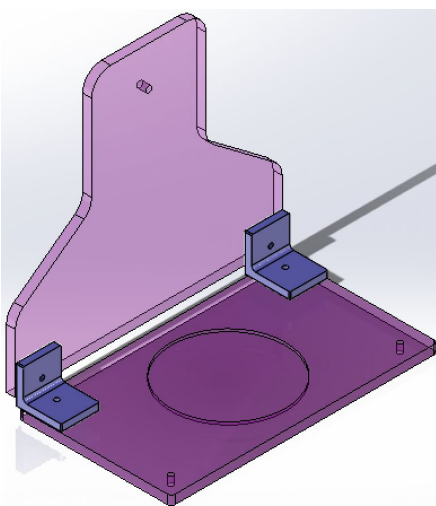We would like to thank the SE 3 teaching team for their feedback and guidance on this project.

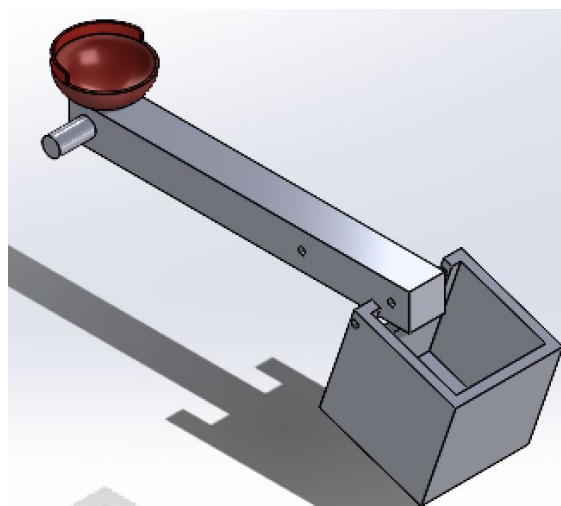Fig. 6 : Bottom Base Subassembly

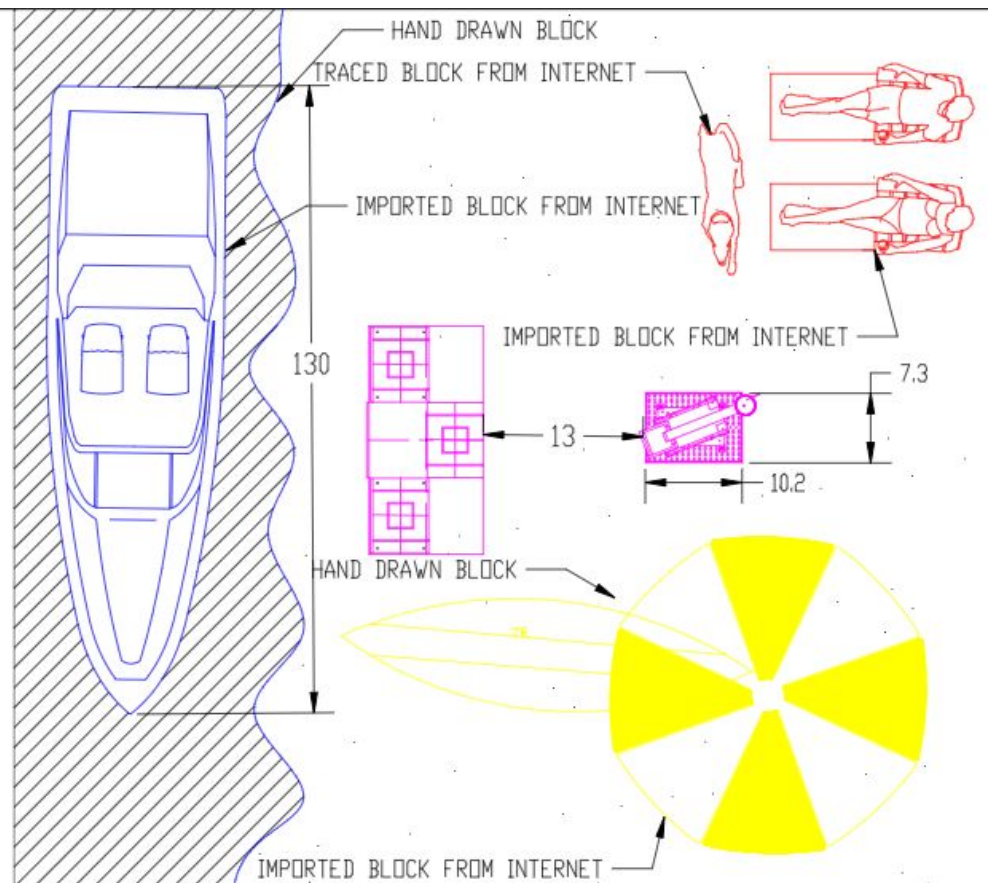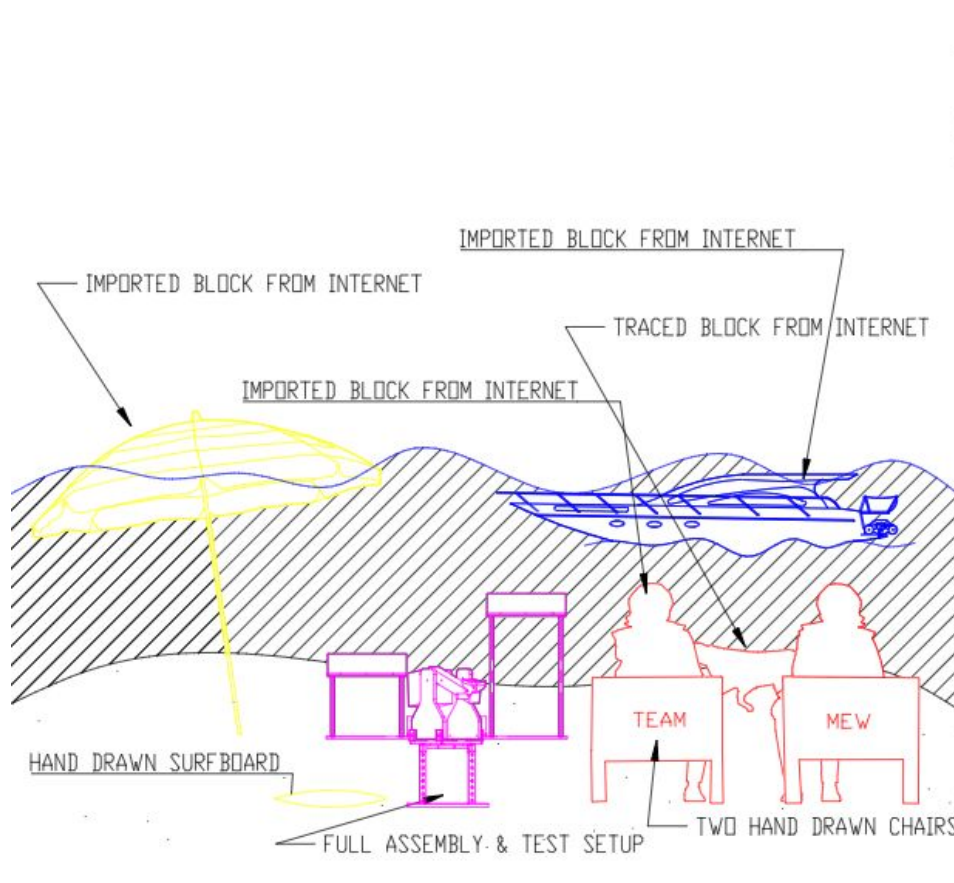Fig. 7 : Lever Arm Subassembly
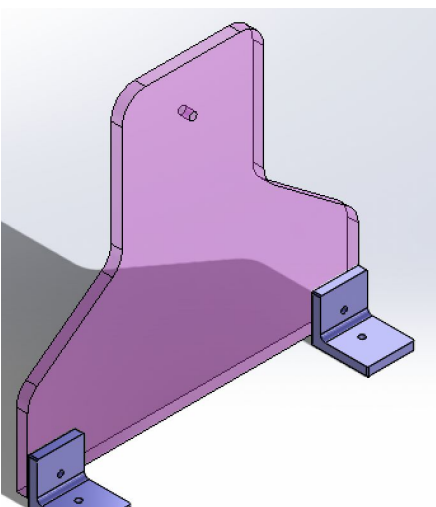
Fig. 8: Side Base Subassembly

Fig. 9: Rotating Base Subassembly