Farbrication Plan

Fruit Picking Robot

Group 7

Step 1

Cut purchased 2020 extruded aluminum beams to following different lengths with corresponding quantity:

450mm x2

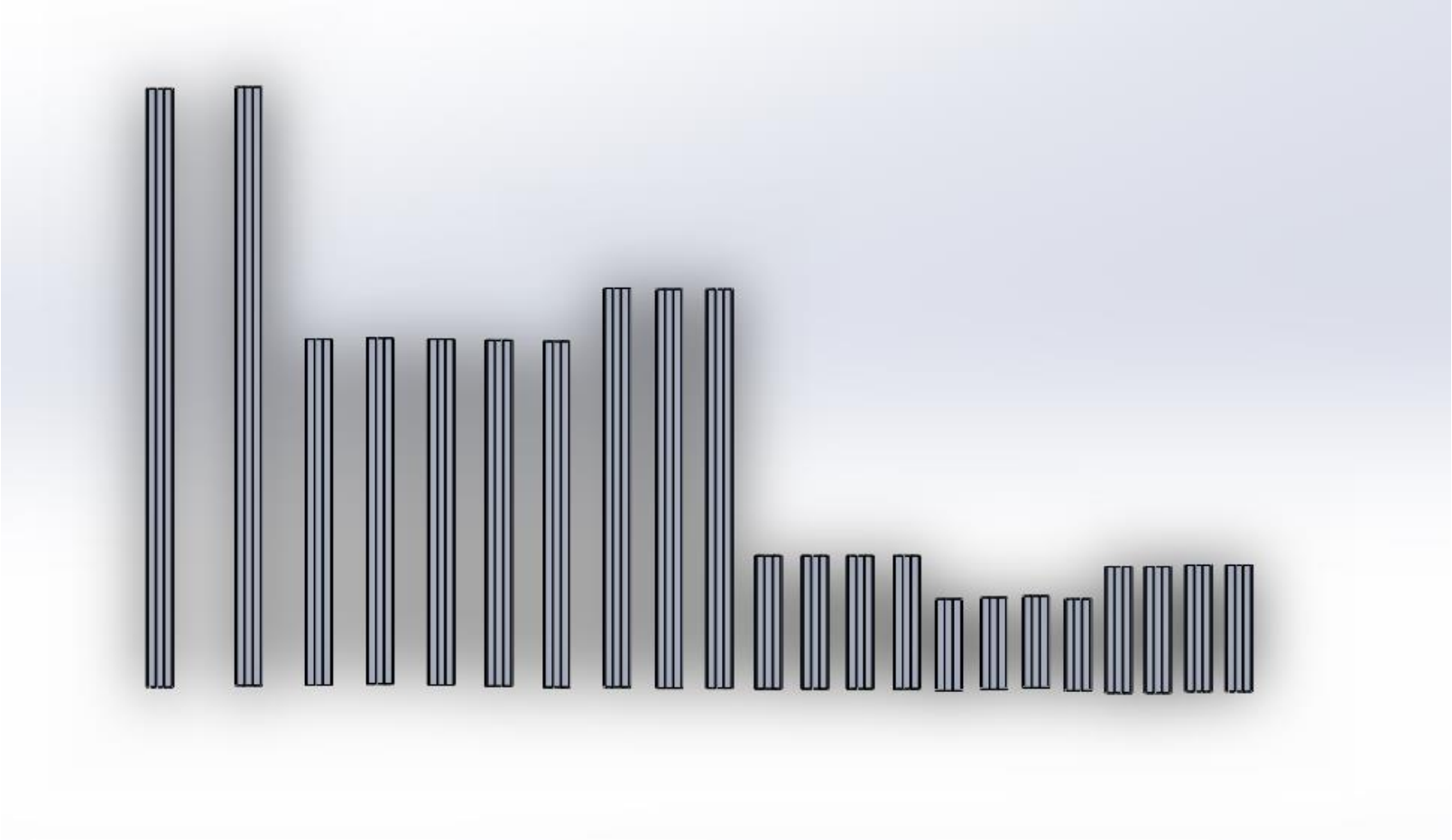
300mm x3

260mm x5

100mm x4

95mm x4

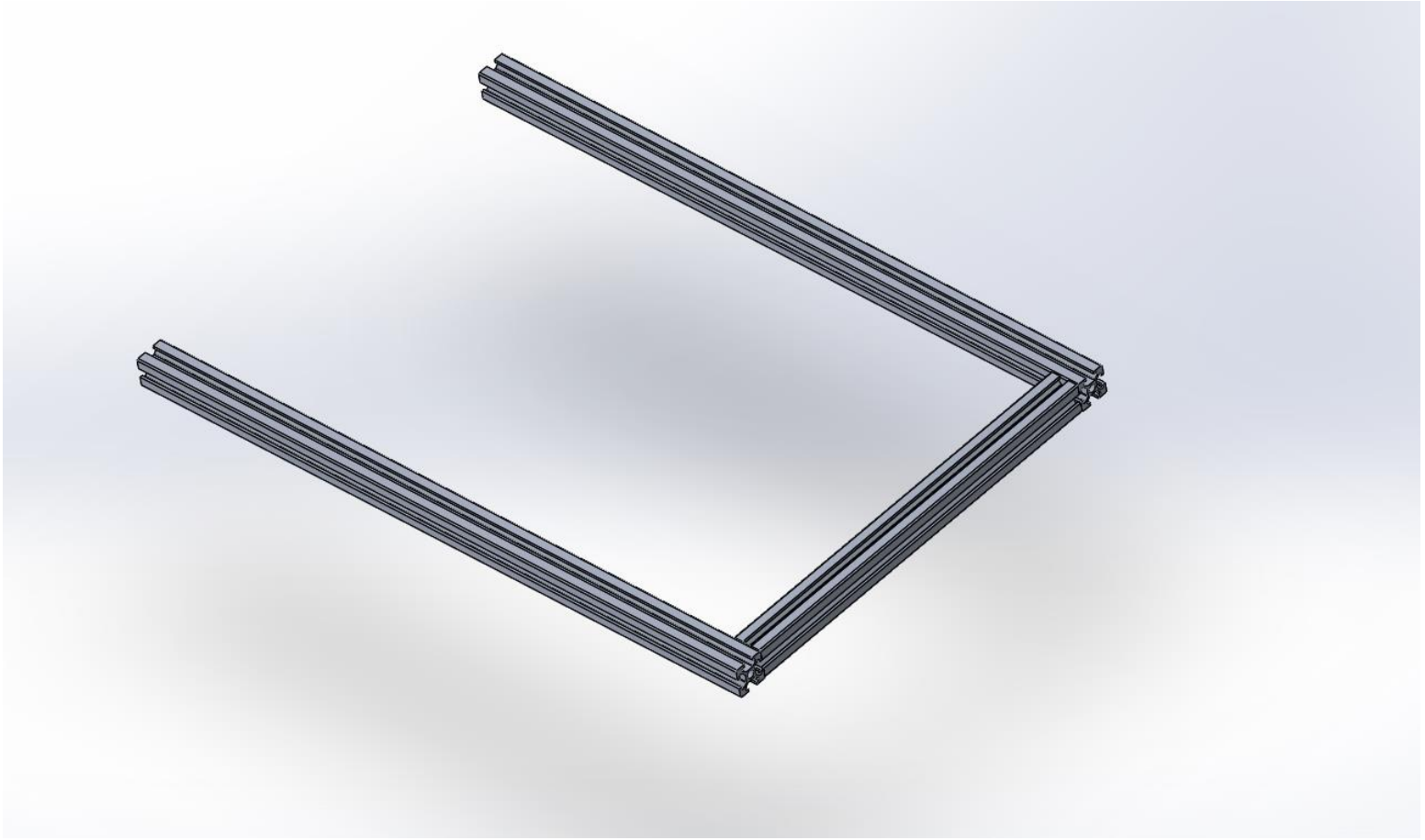
70mm x4



Step 2

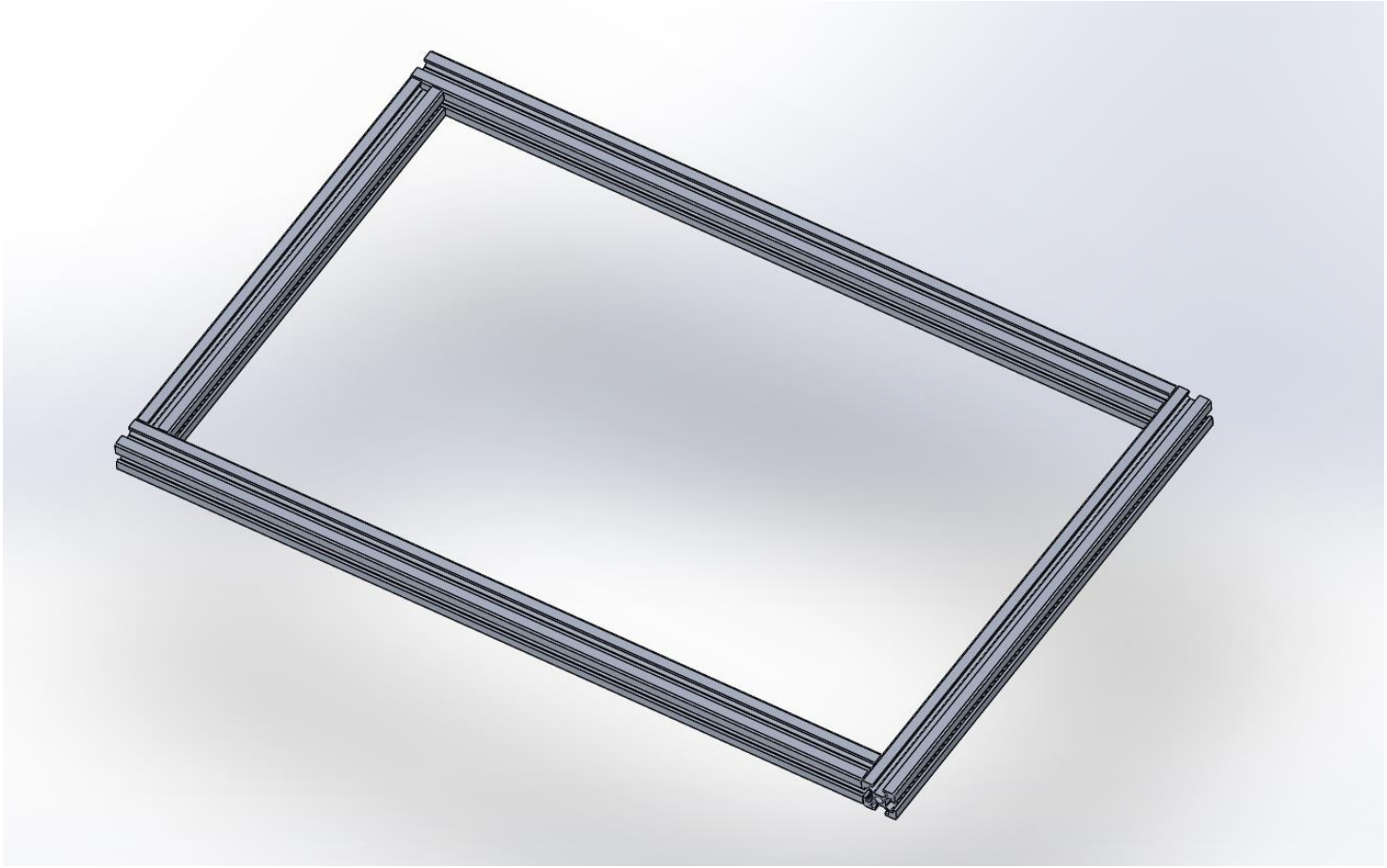
Starting with the base frame:

Connect two 450mm beam with a 260mm beam



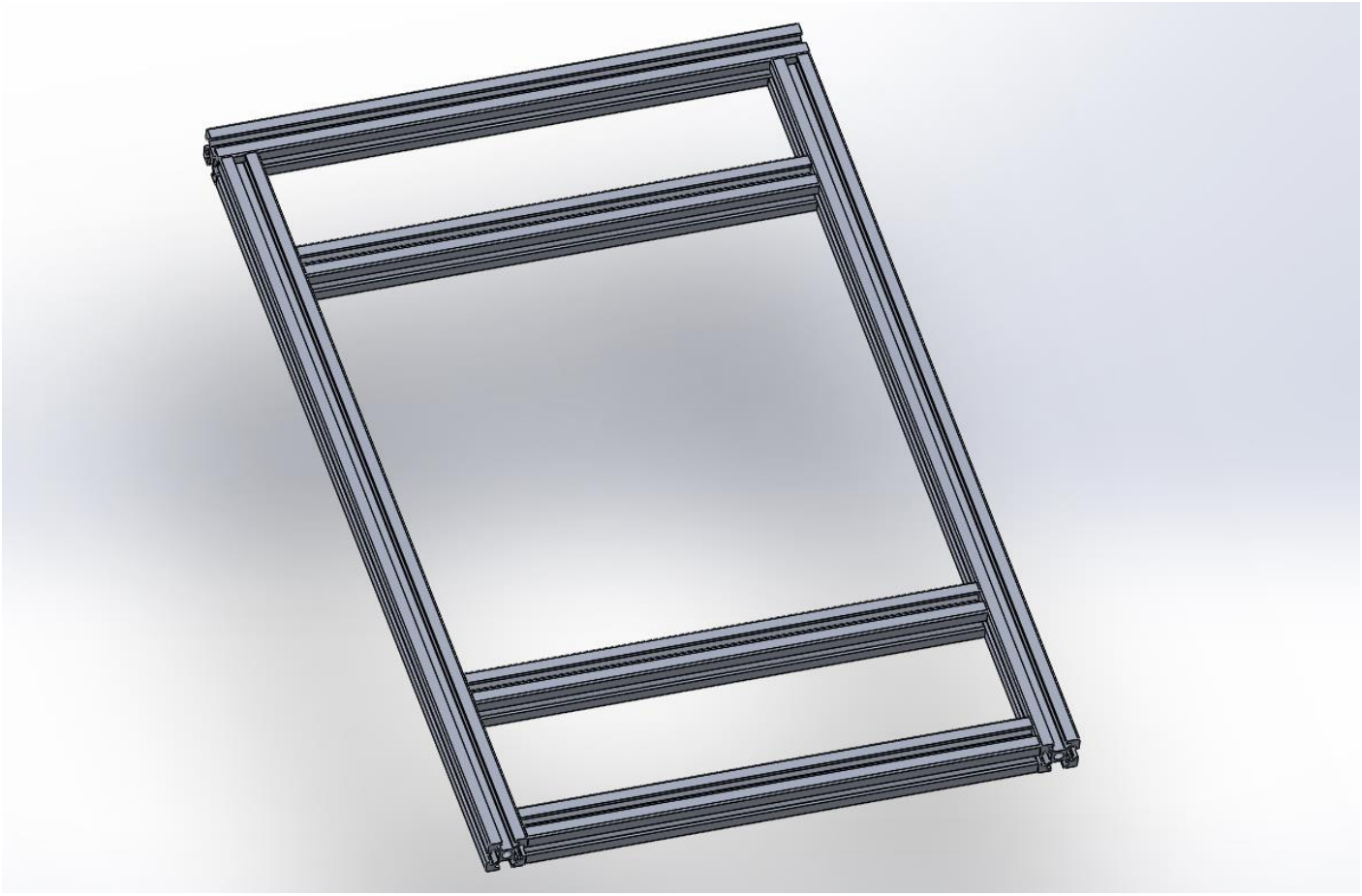
Step 3

Connect the other end with a 300mm beam



Step 4

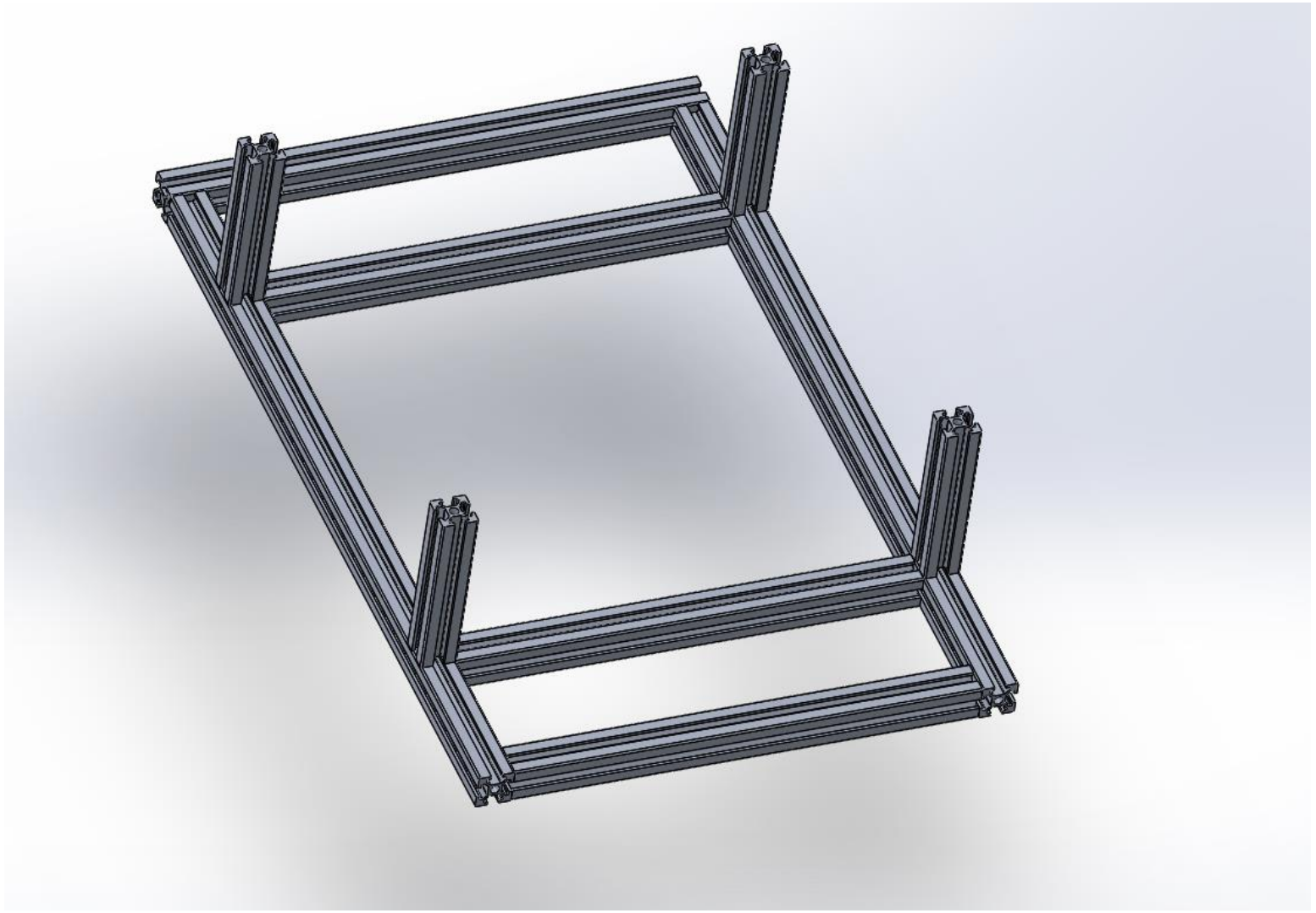
Add two 260mm beams in the middle of the frame, with a gap space of 260mm



Step 5

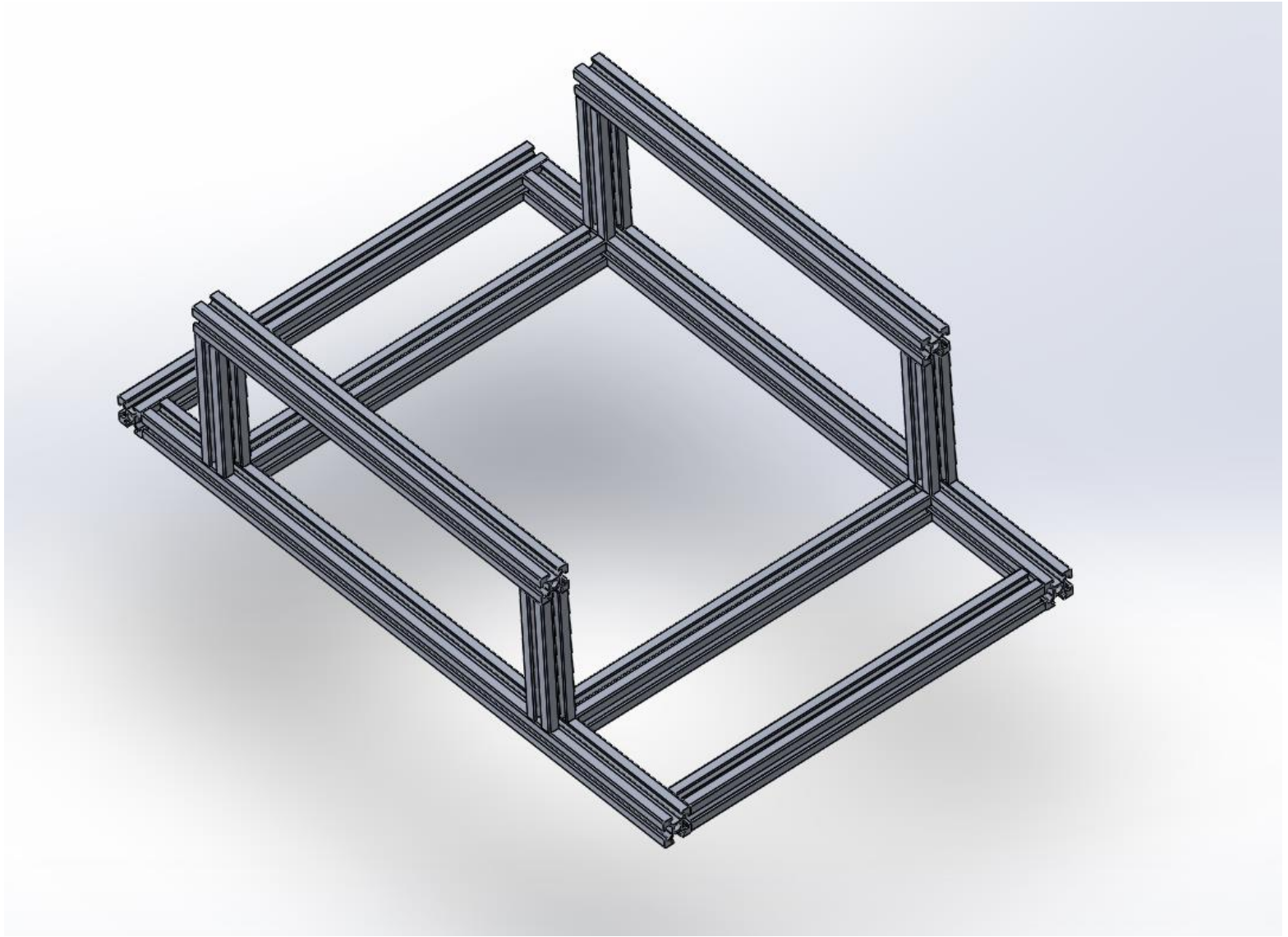
Now the assembly of the base frame is completed, starting the assembly of manipulator frame.

Connect four 100mm beam on each four corners of the inner rectangular frame.



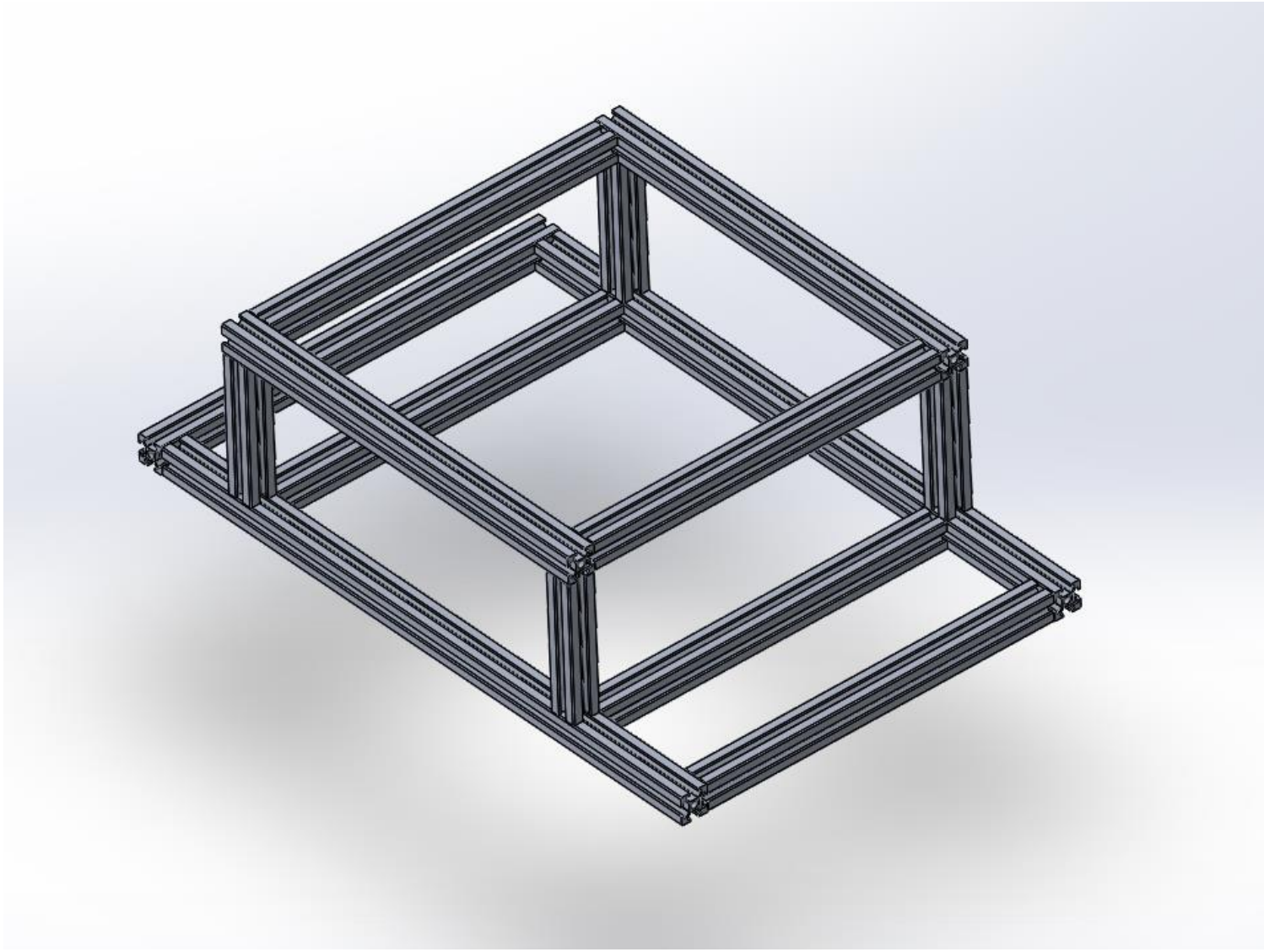
Step 6

Connect two 300mm beams on the 100mm beams



Step 7

Connect two 260mm beams to the other side



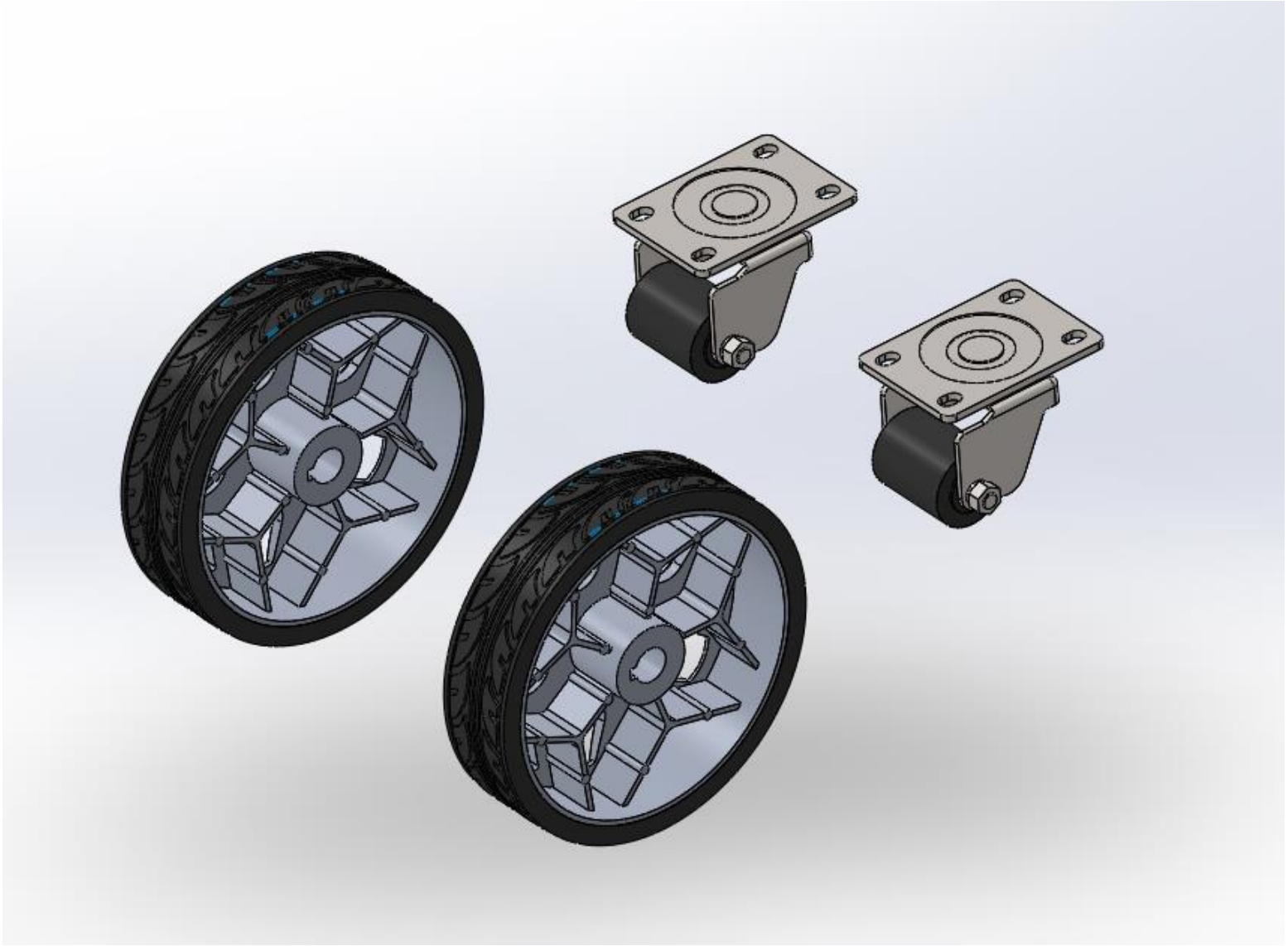
Step 8

Now the assembly for general frame is finished, starting to attach wheels to the frame.

The wheels to be attached are listed as follow:

Two 1.6 inches driven wheels (caster)

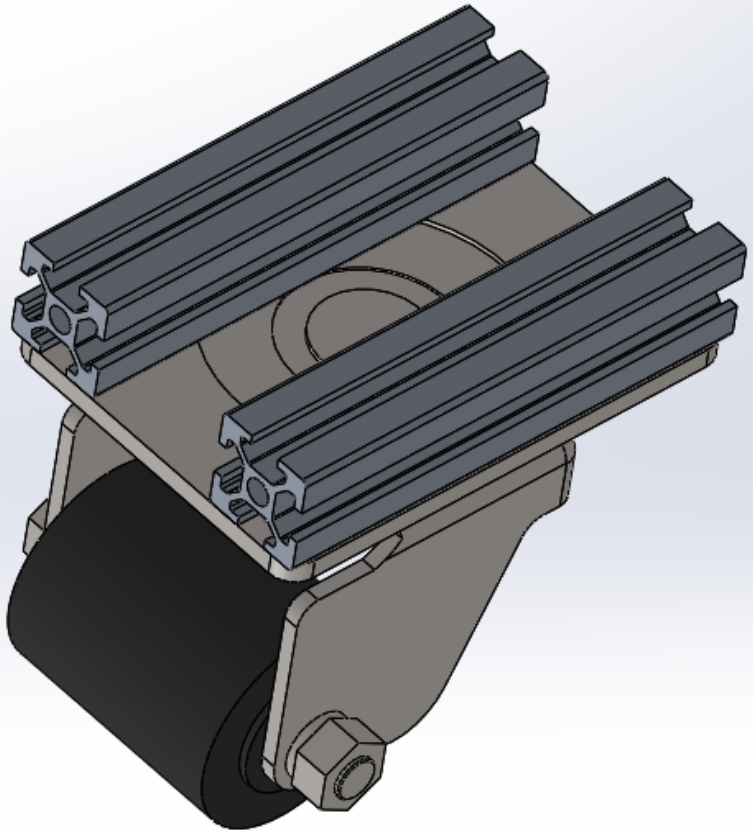
Two 180mm drive wheels with DC motor attached



Step 9

Attach the caster to two 95mm beam

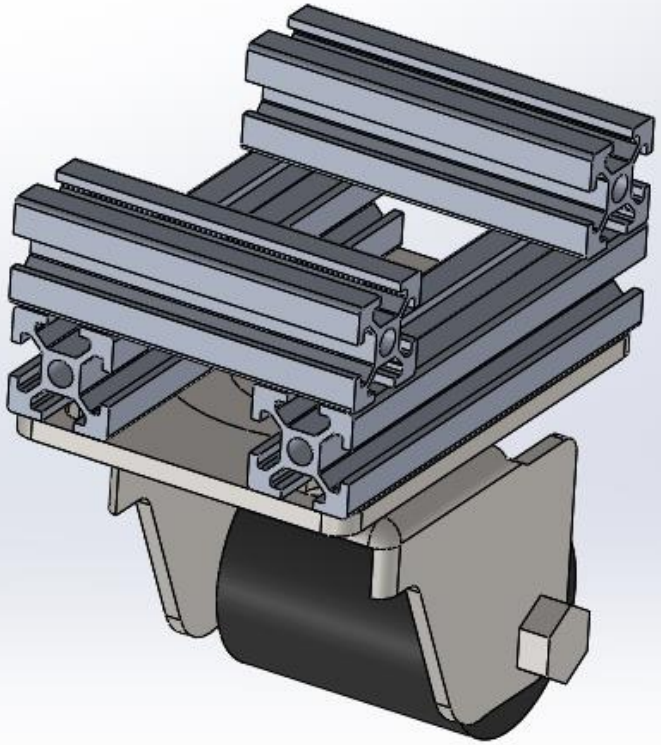
Repeat this step for the other caster.



Step 10

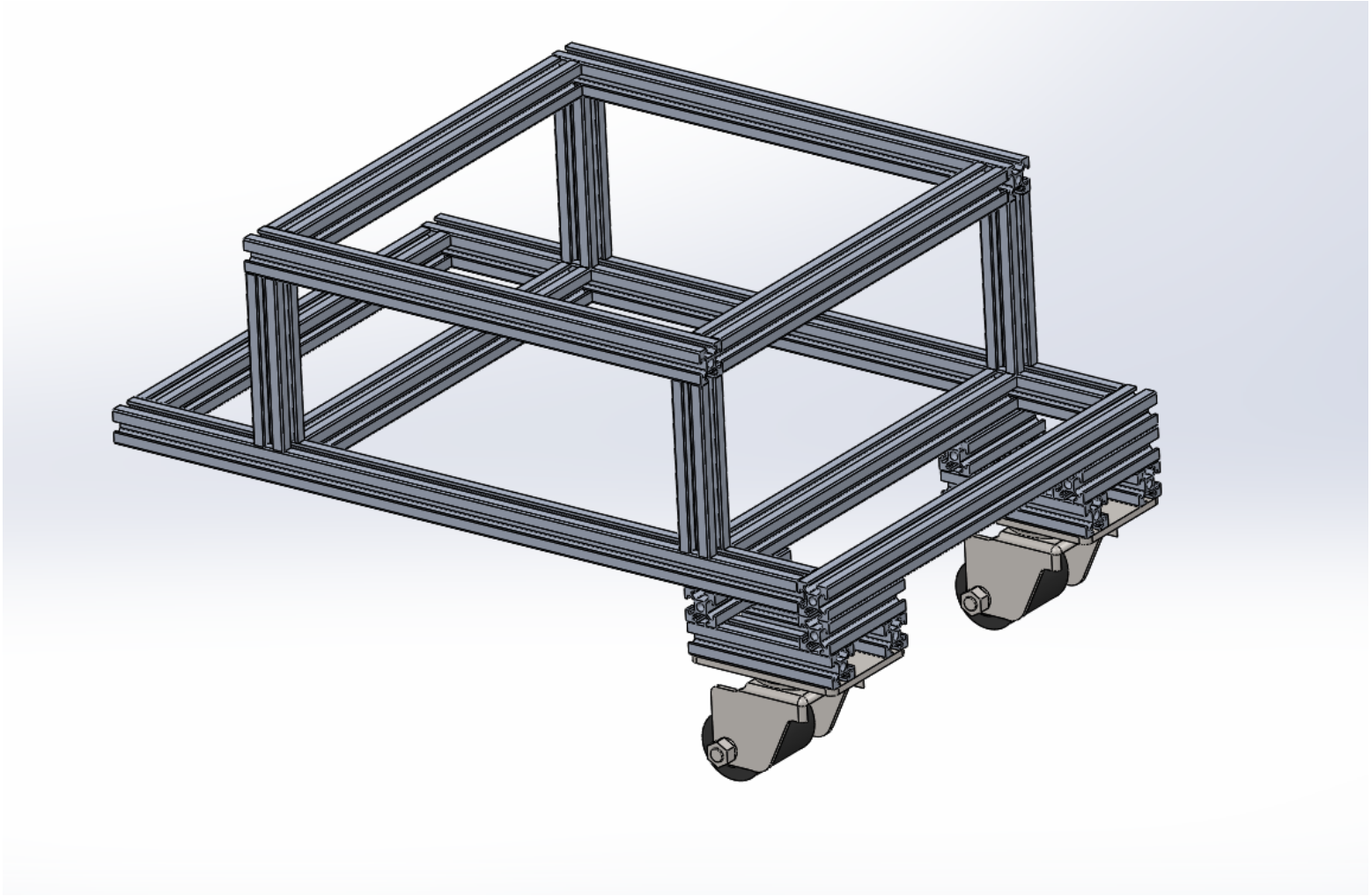
Attach the two 69mm beams on the 95mm beams

Repeat this step for the other caster.



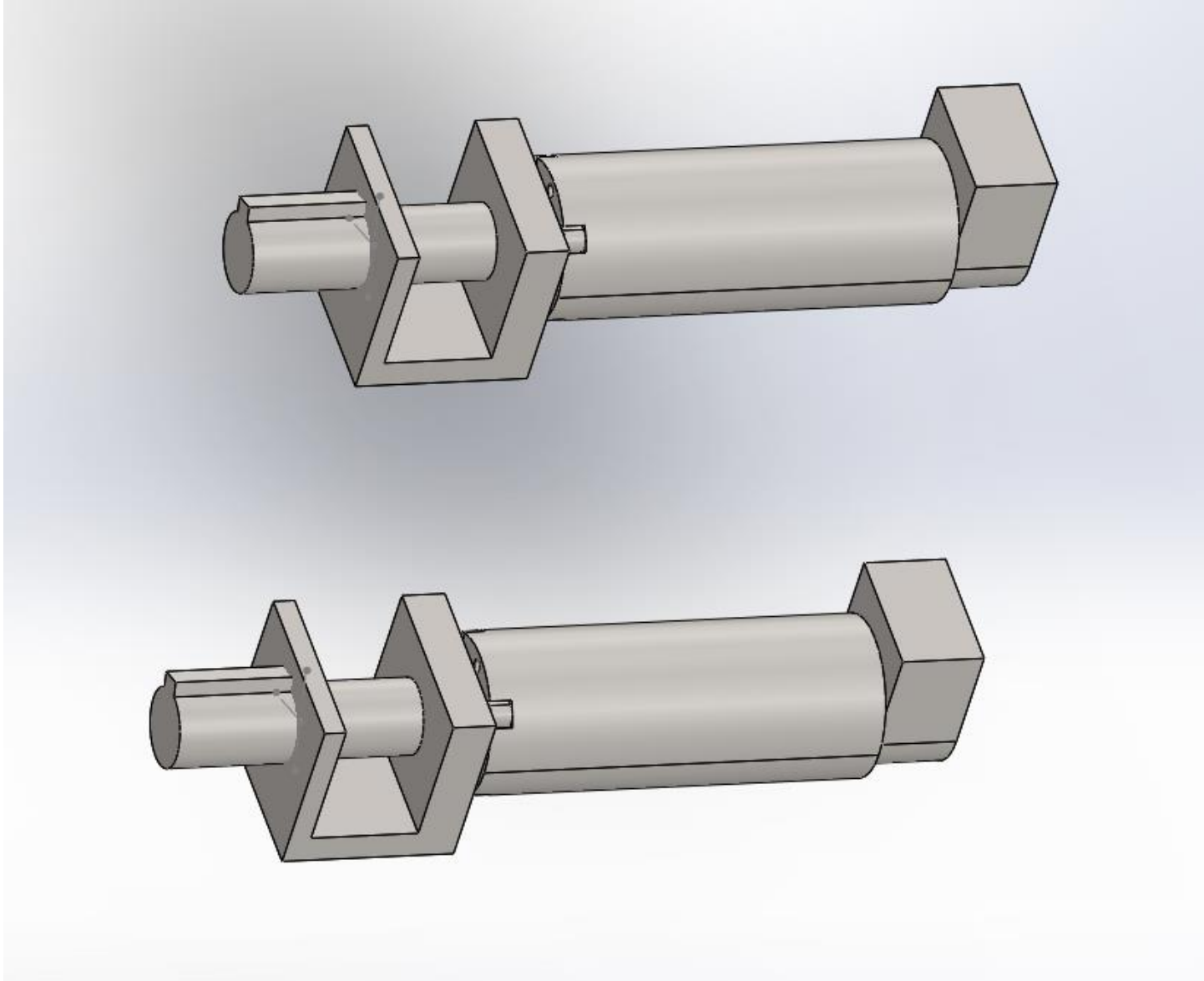
Step 11

Attach these two caster to the frame as shown



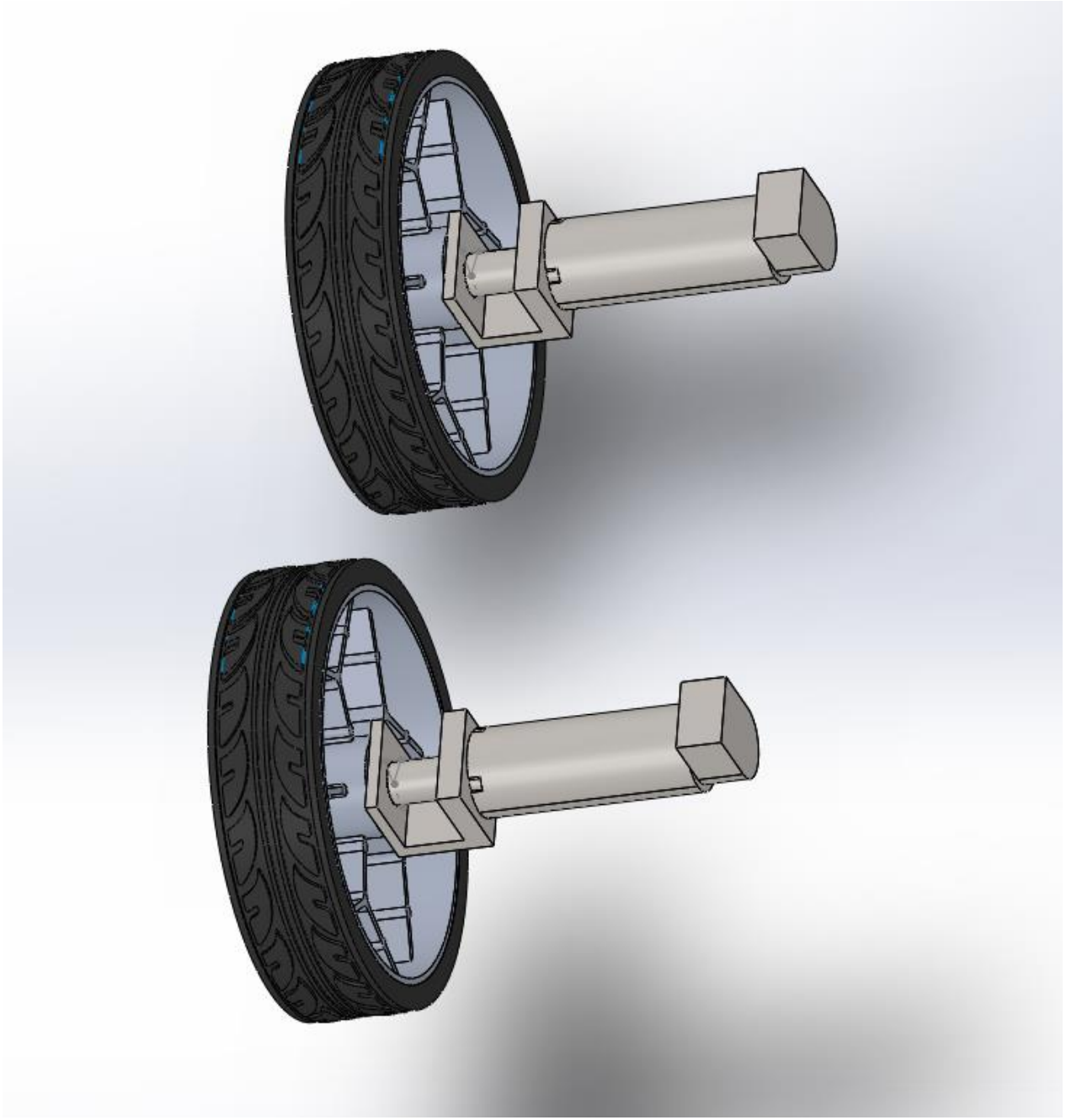
Step 12

Obtain two DC motor with the motor mount



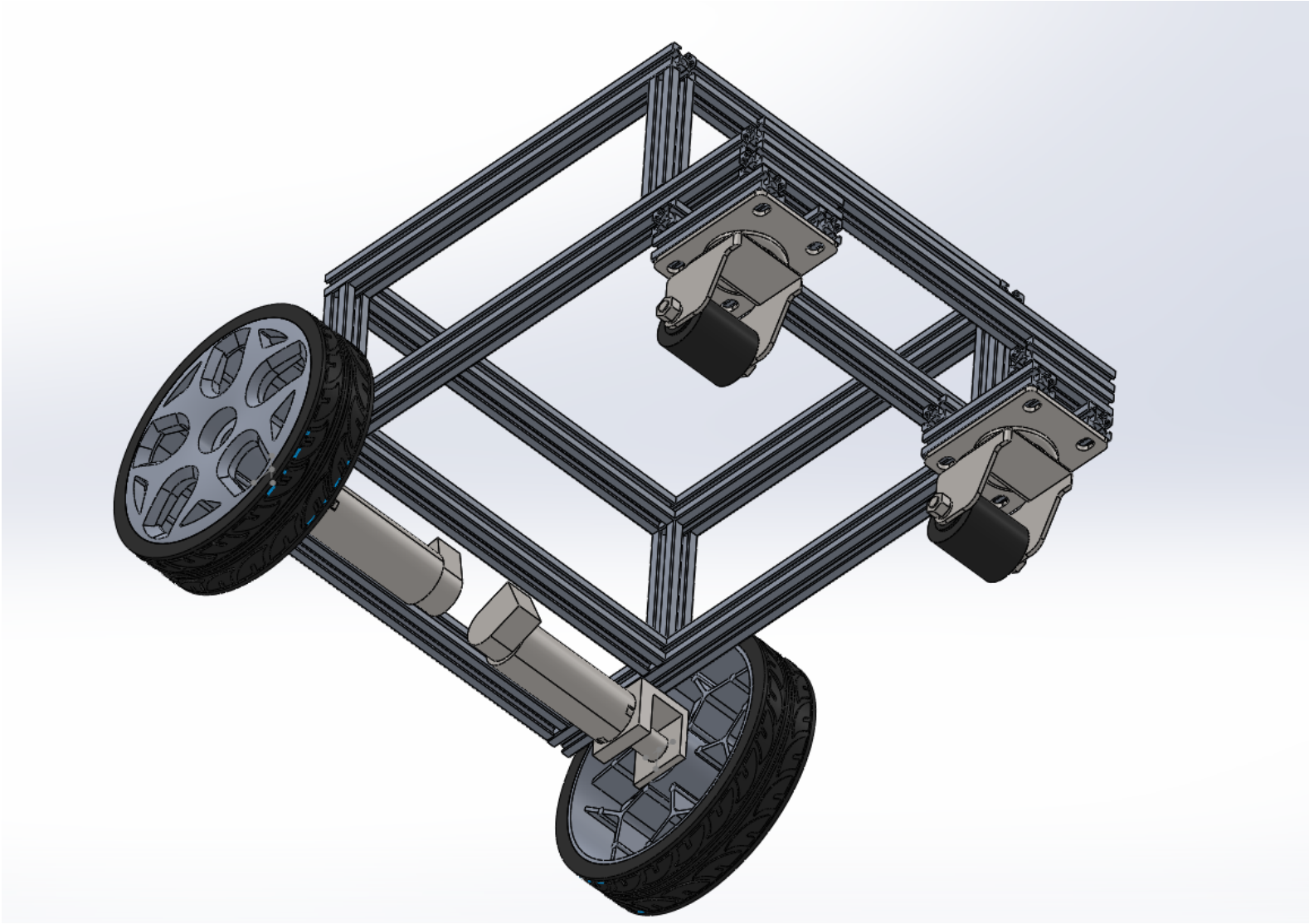
Step 13

Attach wheels to the motor



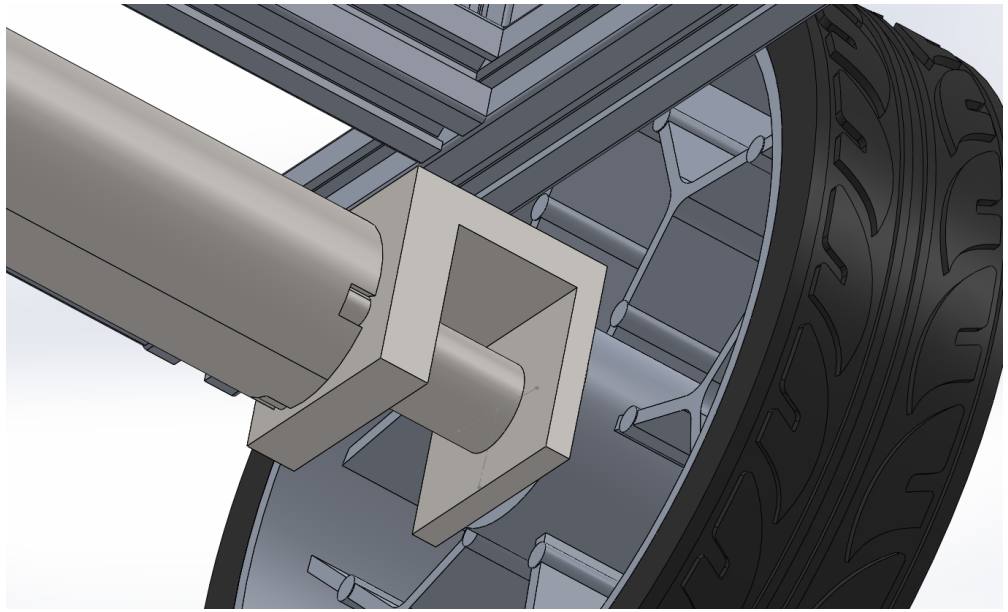
Step 14

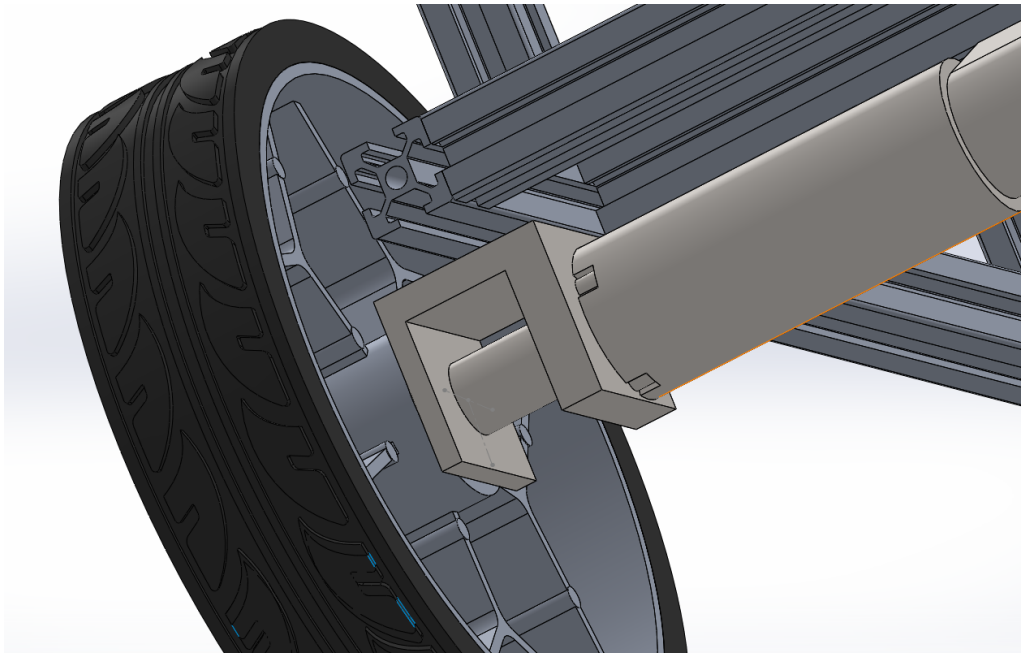
Attach the motor mount on the frame



Step 14.A

Enlarged view of how motor mounts with the frame





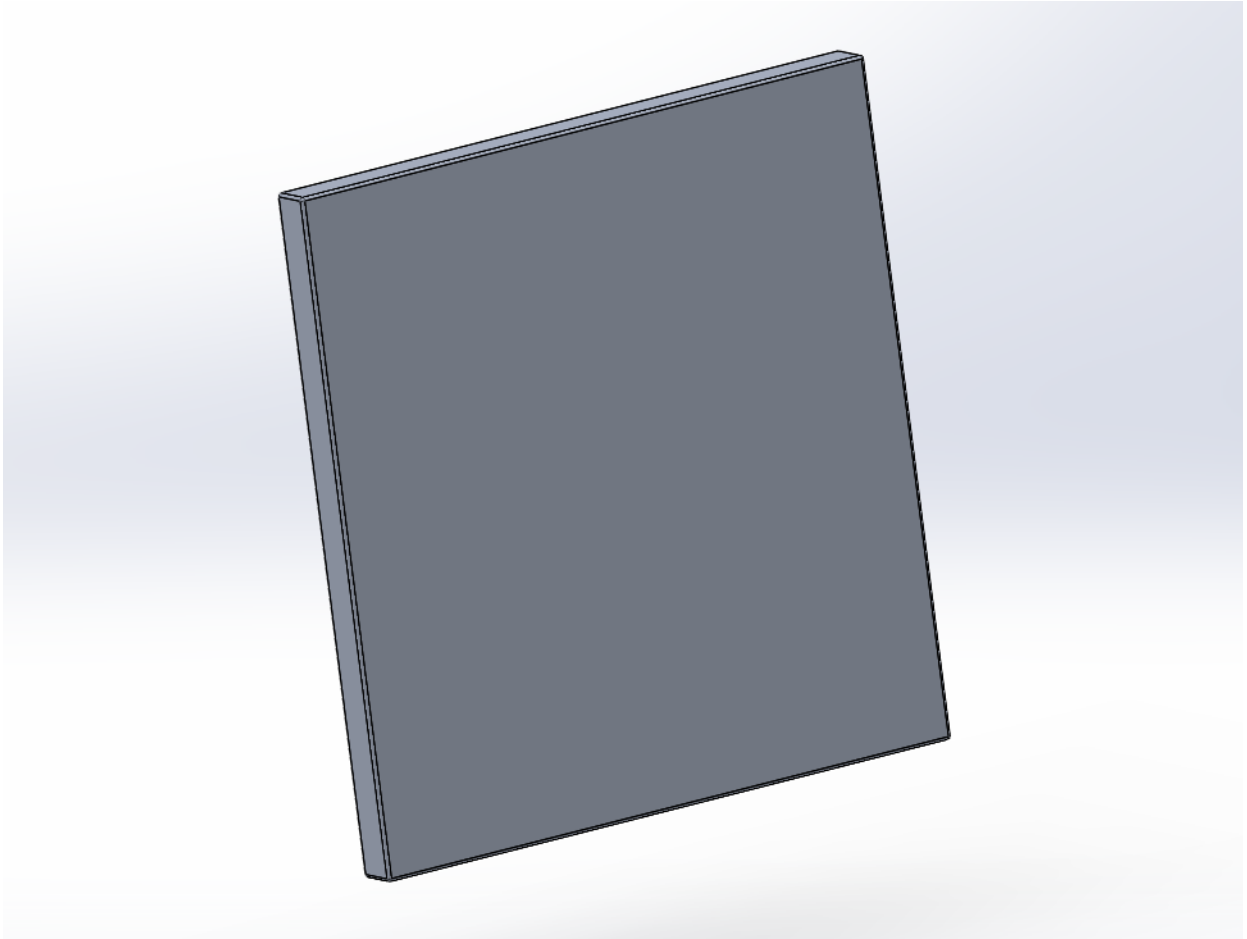
Step 15

Fabricate an aluminum magnetic sensor holder plate that mounts in front of the frame.

Alternatives: Note that the material for holder has to be paramagnetic material (Aluminum, Stainless Steel etc.) to ensure that the magnetic sensor functions properly.

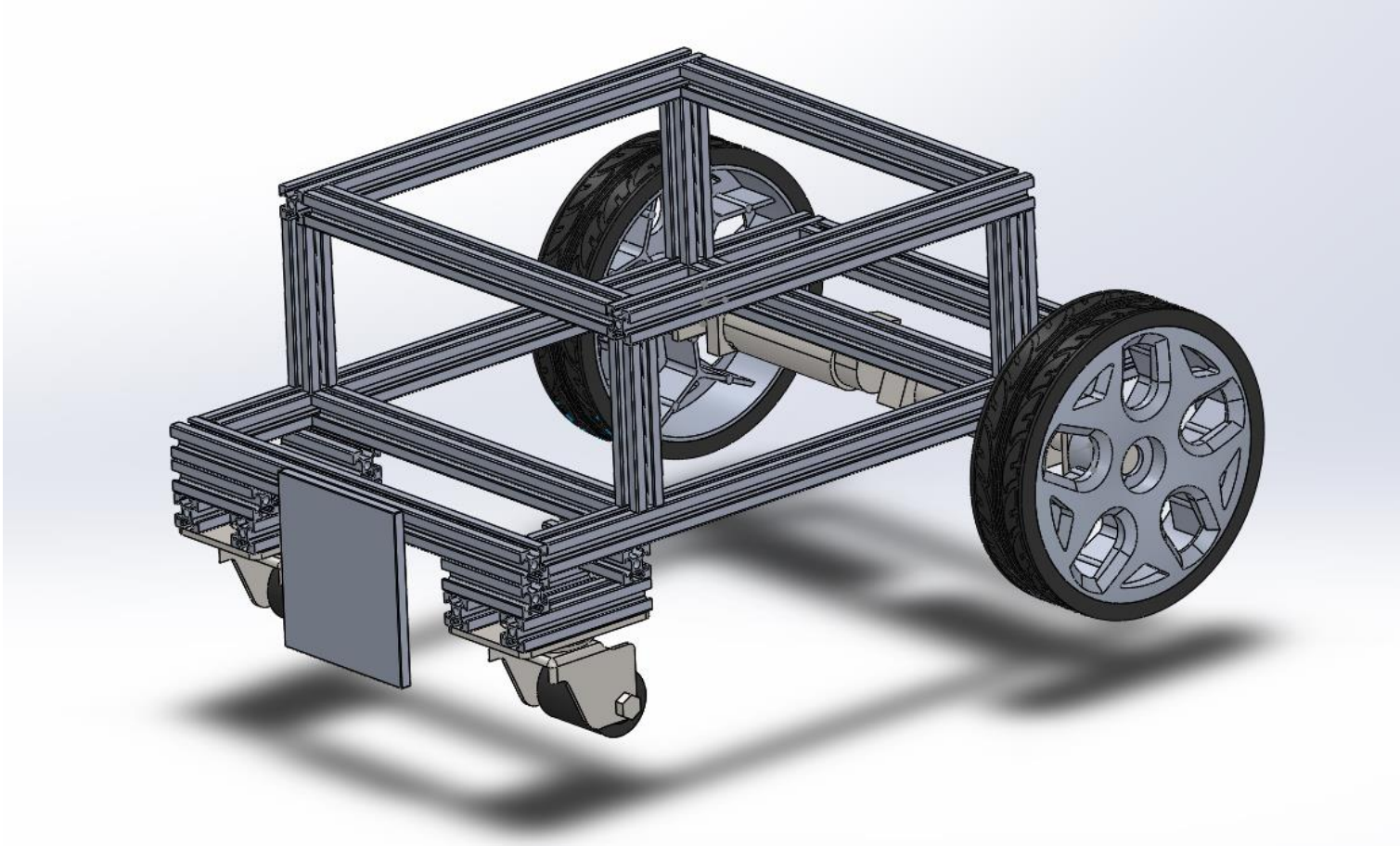
The dimension for the holder fabricated:

100mm x 100mm x 7mm



Step 16

Place the sensor holder in the front of frame and make sure to mount the holder to be as centred as possible.

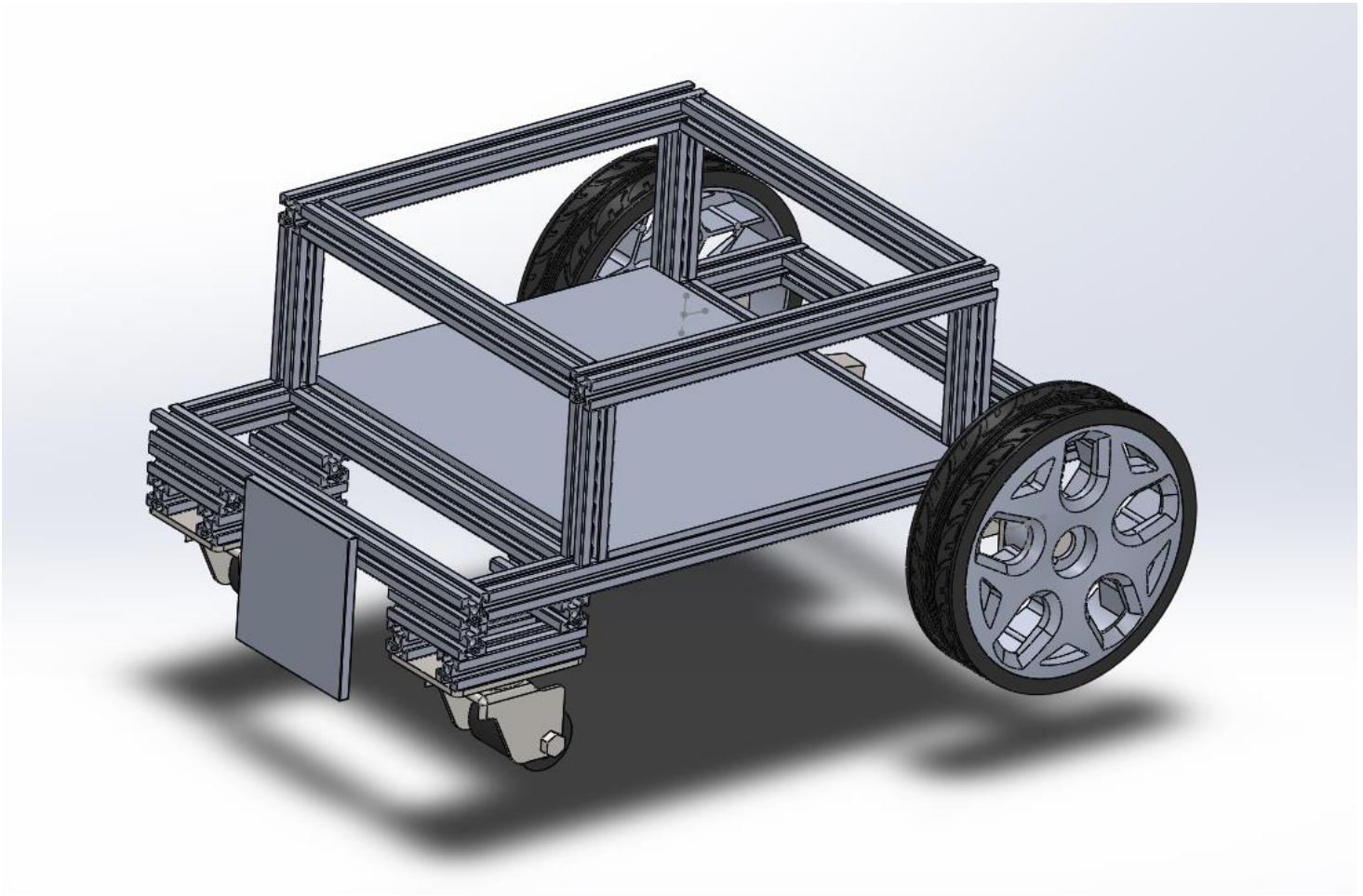


Step 17

Mount a base plate of the dimensions:

300mm x 260mm x 3~6mm

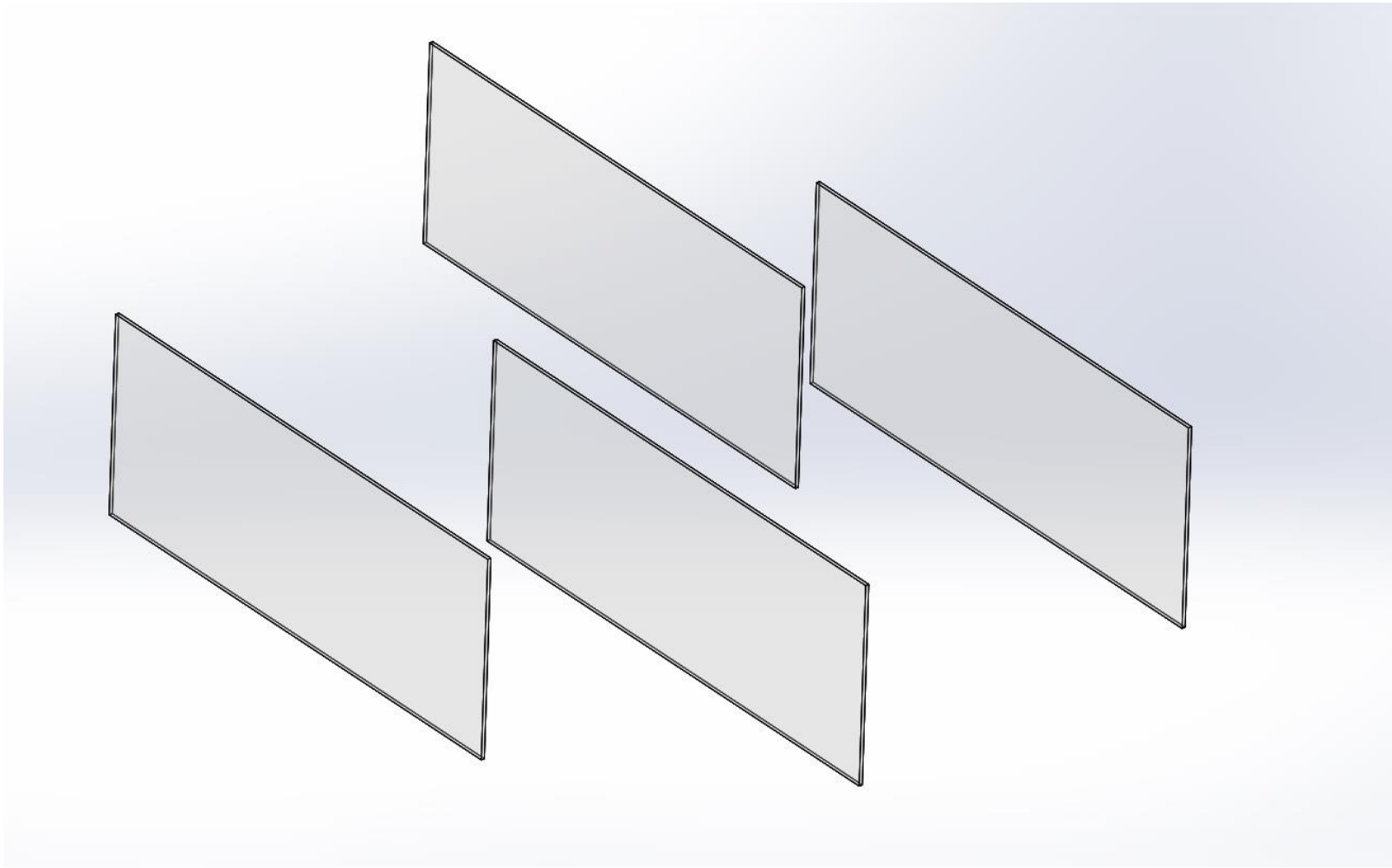
Alternatives: Since the base plate holds the weight of fruit, it is recommended that to use material with higher strength, such as steel and aluminum.



Step 18

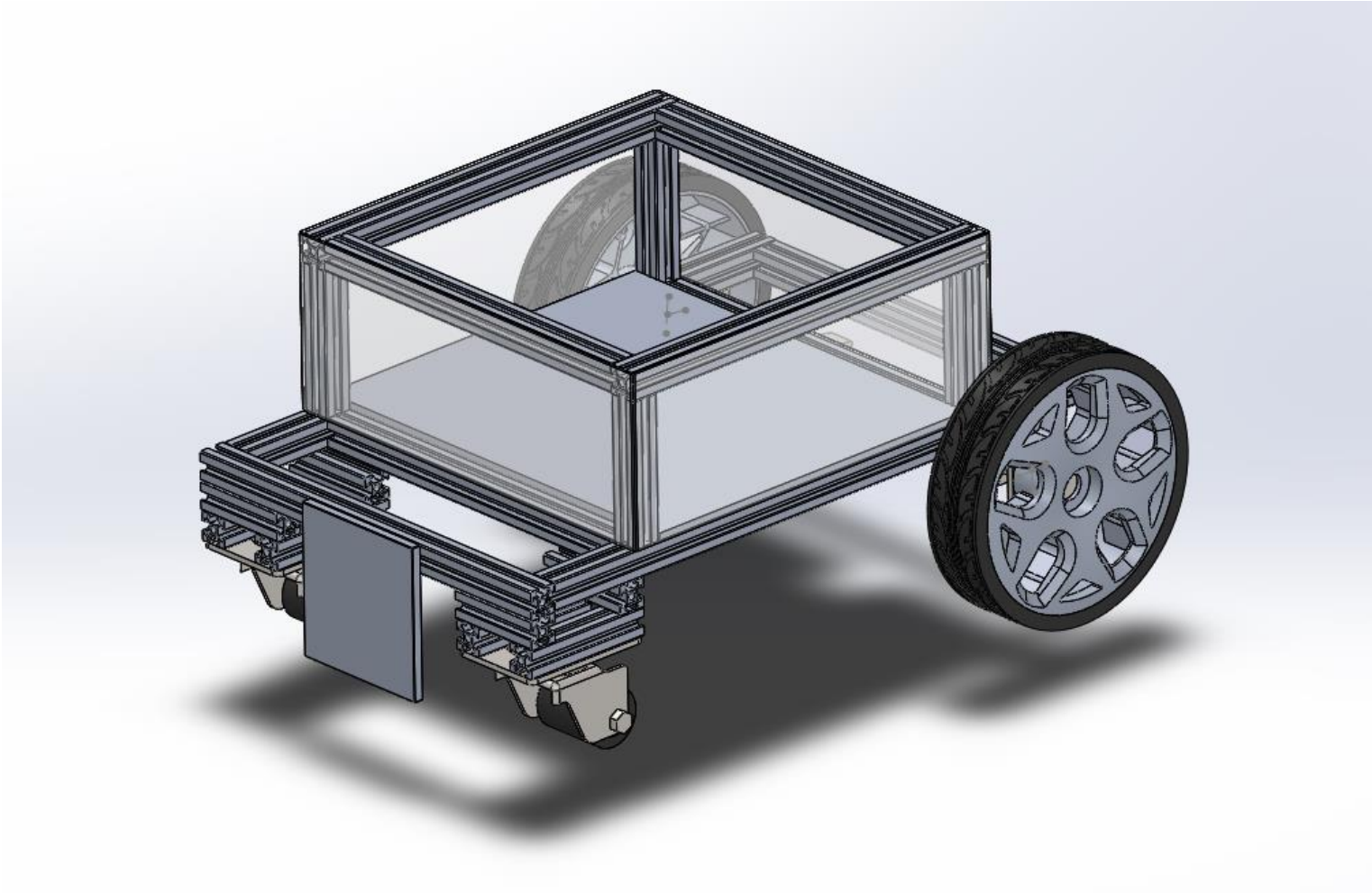
Fabricate four 300mm x 120mm x 2mm acrylic plates as the wall of the container.

Alternatives: The plate should be made out of transparent materials because of the users can tell if the container is full of not by inspection, such as high-strength tempered glass, polycarbonate (PC), polyethylene (PE) or acrylic.



Step 19

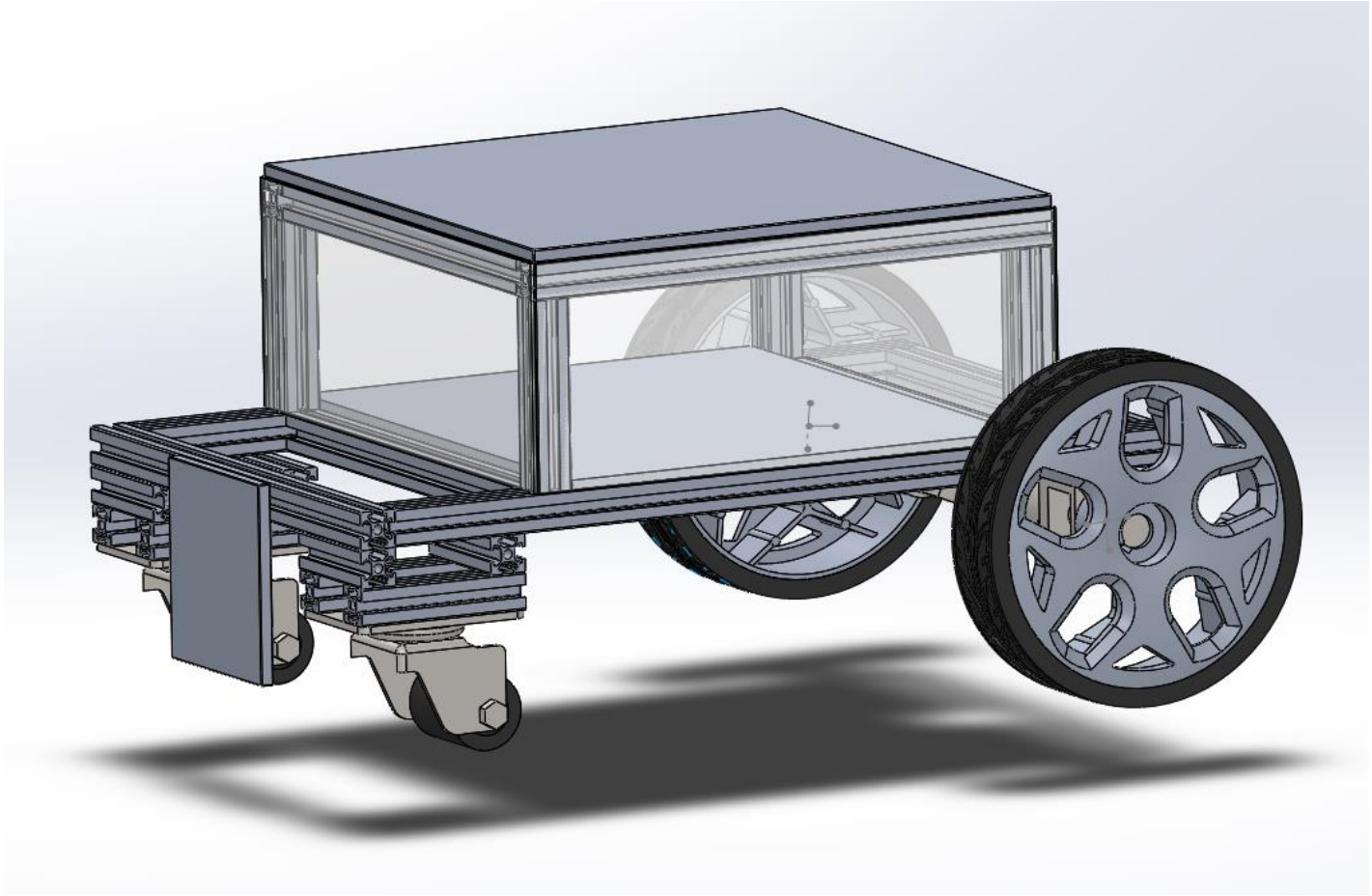
Mount these four acrylic plates on the side of central container



Step 20

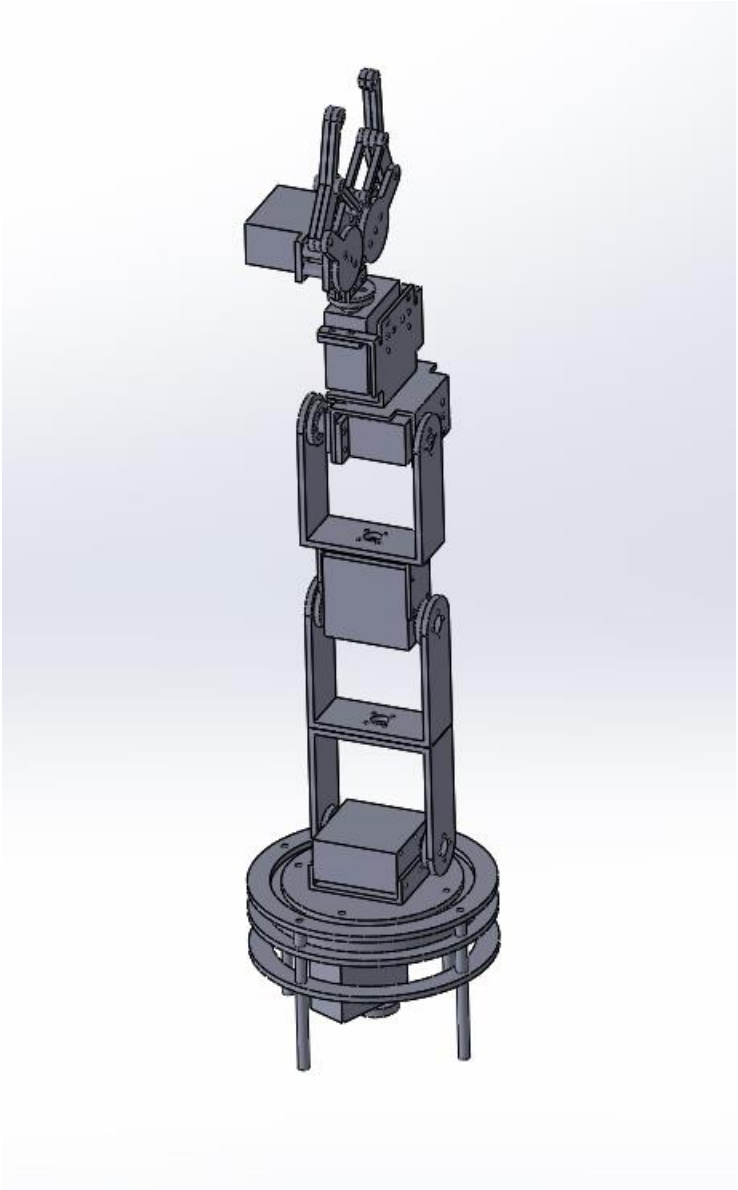
Mount a plate of 300mm x 300mm on top of the container as the base for manipulator

Alternatives: The base plate will have to hold the weight of manipulator of approximately 1kg, so the strength of this plate do not to have be as high as the base plate, it can be made out of various materials.



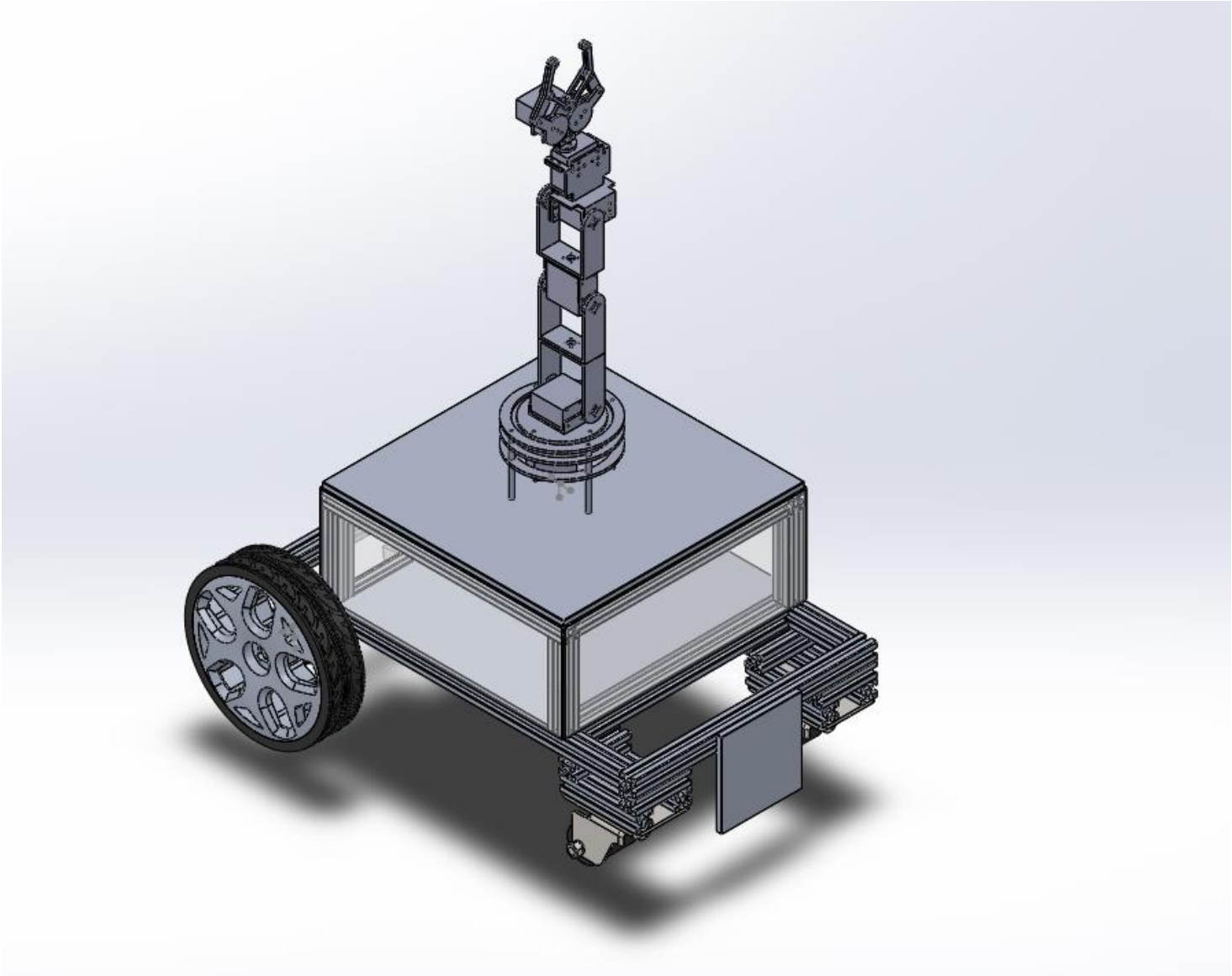
Step 21

Mount the pre-purchased robotic manipulator on top of the container



Step 21.A

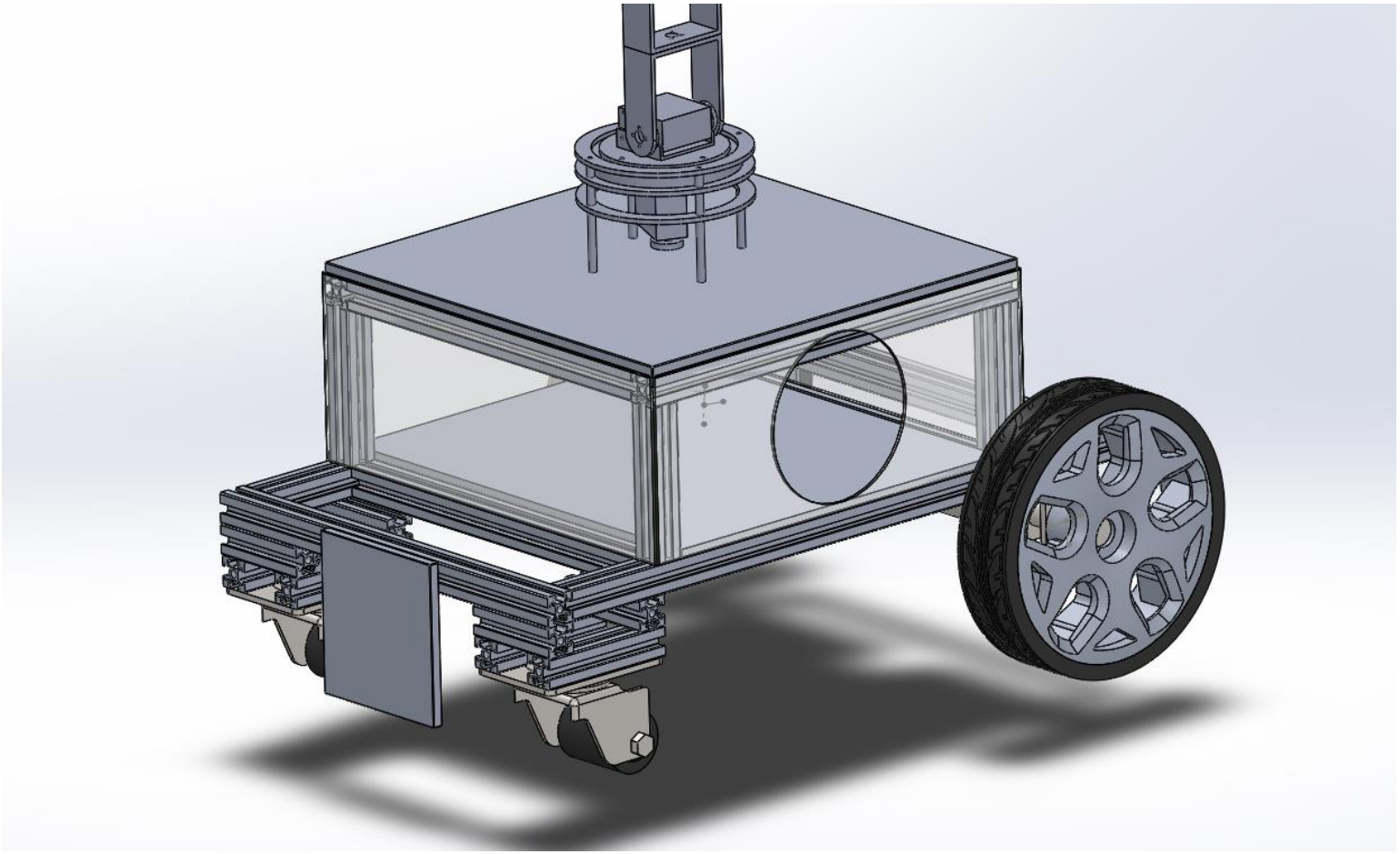
Manipulator should be mounted in the center of the base plate.



Step 22

Make a hole of appropriate size on the left side acrylic plate, the dimension of the hole is depend on the size of transmission tube, since the size of different types of fruit is different, the size of transmission tube is a dependent factor.

The picture shown gave an example of the location of hole.



Step 23

Connect the hole made in Step 22 and the end-effector of the manipulator with the transmission tube.

Picture not available