

Assembly and modification guide to the Chess-Bras's robotic arm.

The robotic arm for the Chess-Bras project is a derivation of the Handling-Gro's robot project. Some modifications have been made to suite our needs. This guide explain how we assemble our arm, the modifications we had to the original project and what modification to our robot we would've done to perfect the arm with more time.

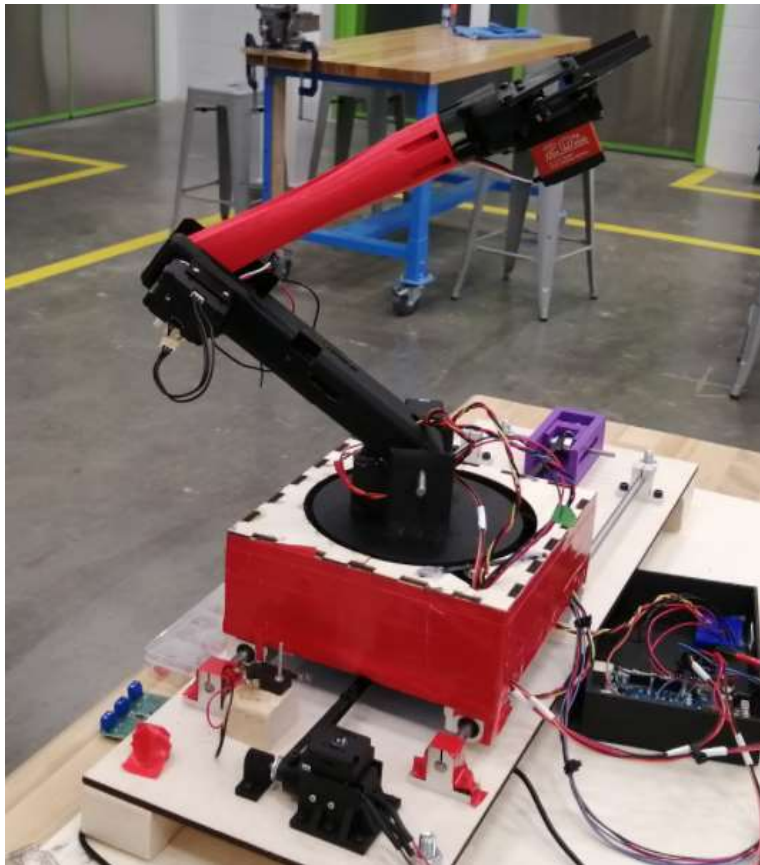


Figure 1 : Handling-Gro Project

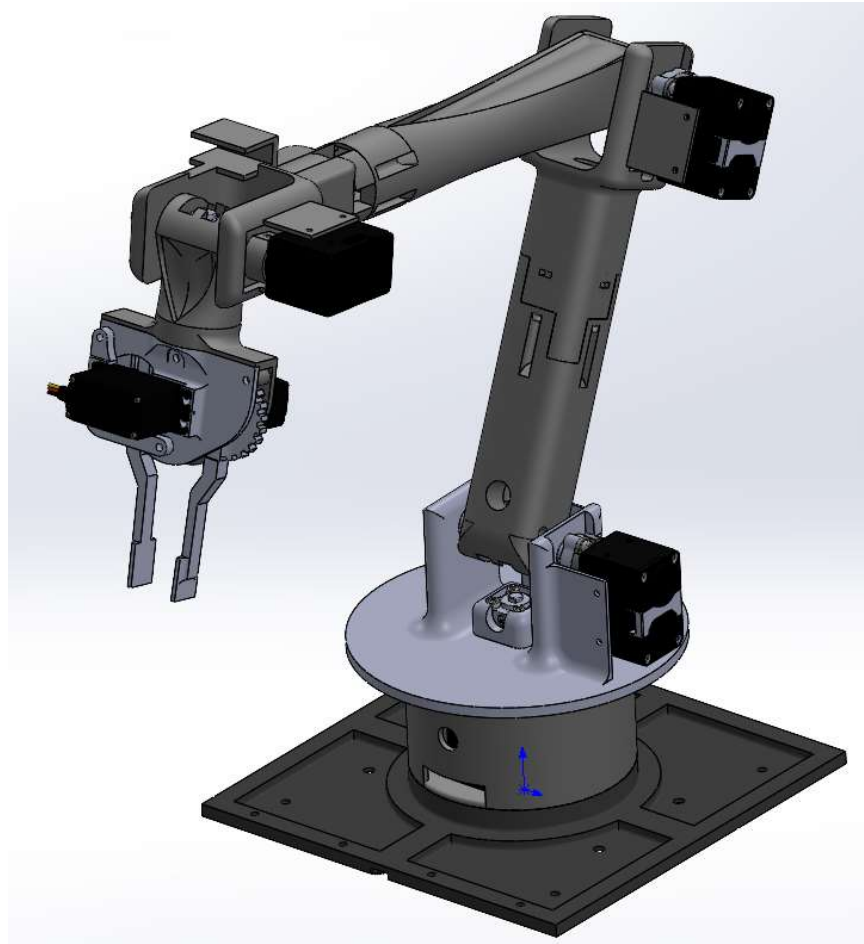
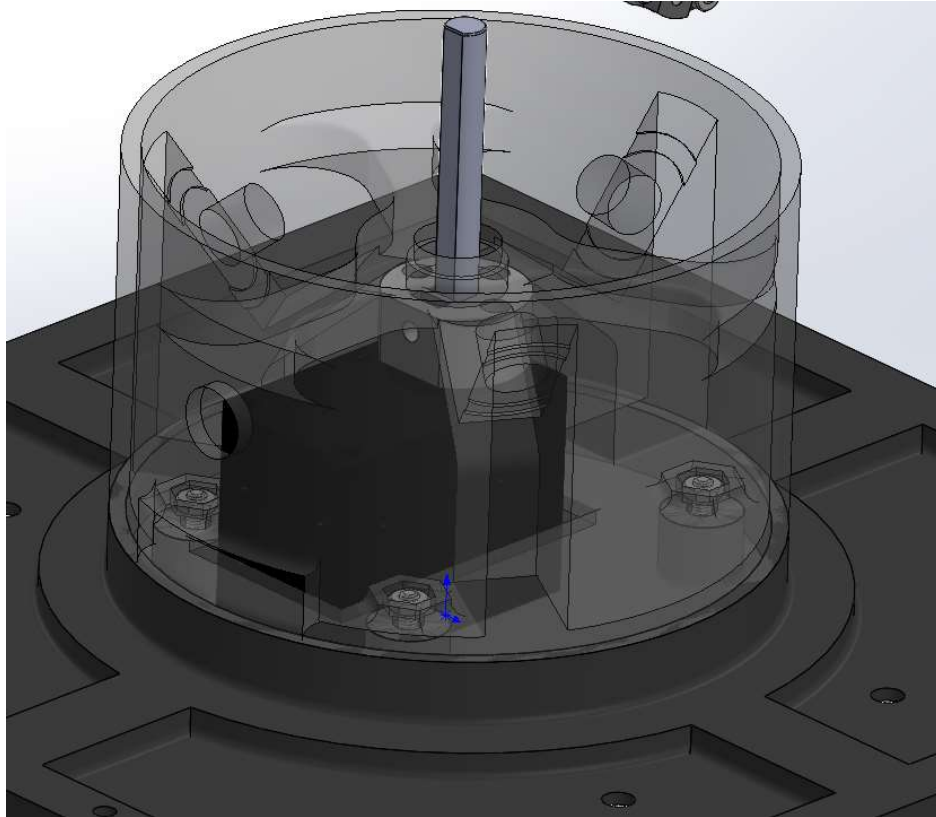
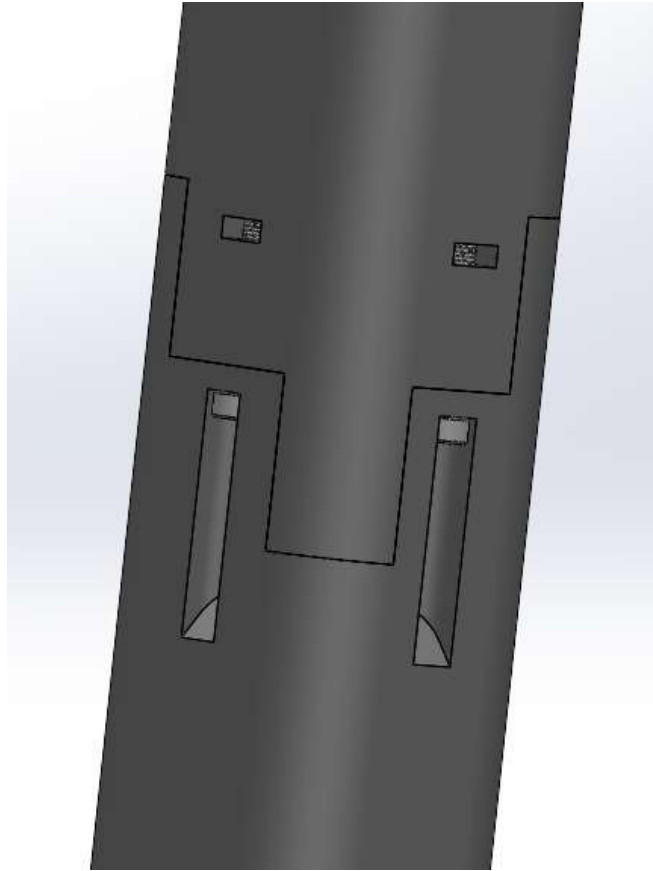


Figure 2 : Chess-Bras' arm

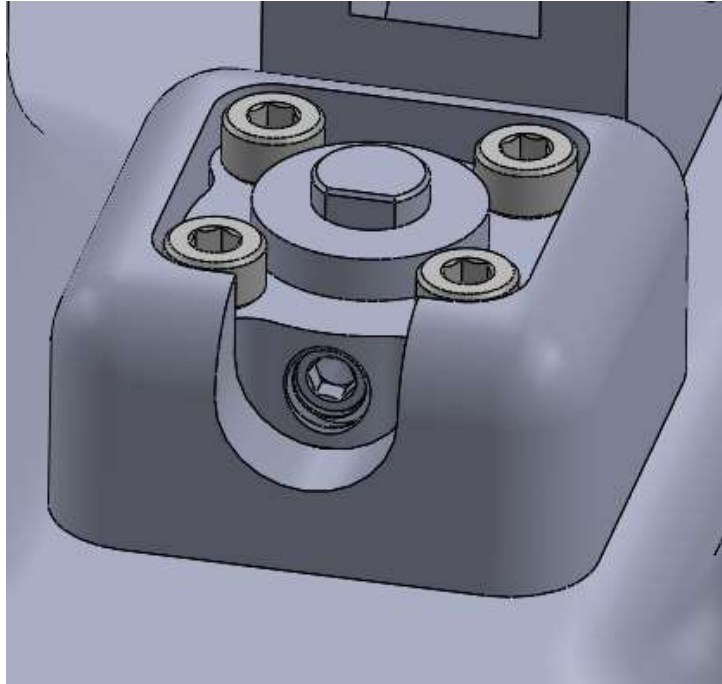
The main difference between the original and our version is the removal of the linear joint at the bottom, the addition of a 4th joint at the end of the arm and the simplification of the gripper.



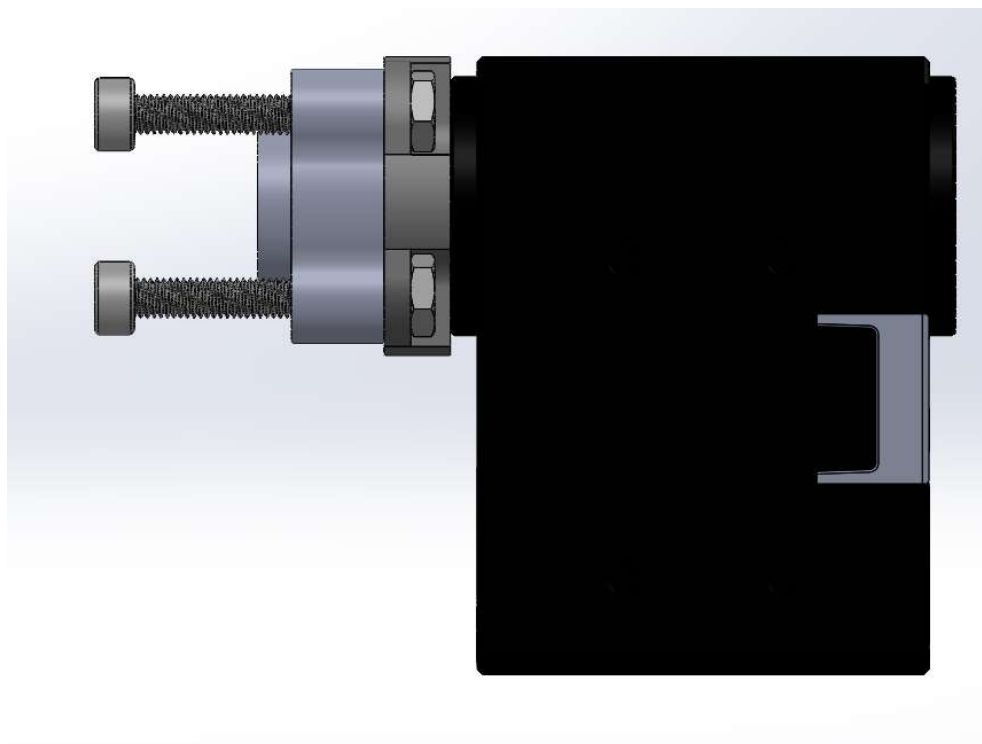
- To assemble the base, you must connect the first motor and screw it in with the coupler and the shaft. After you screw the support bearing.



- The fit between the superior and inferior segment is pretty tight. We only put 2 screws in and without the nut in the hole planned for it. It is strong enough because there is not a lot of tension in this section.

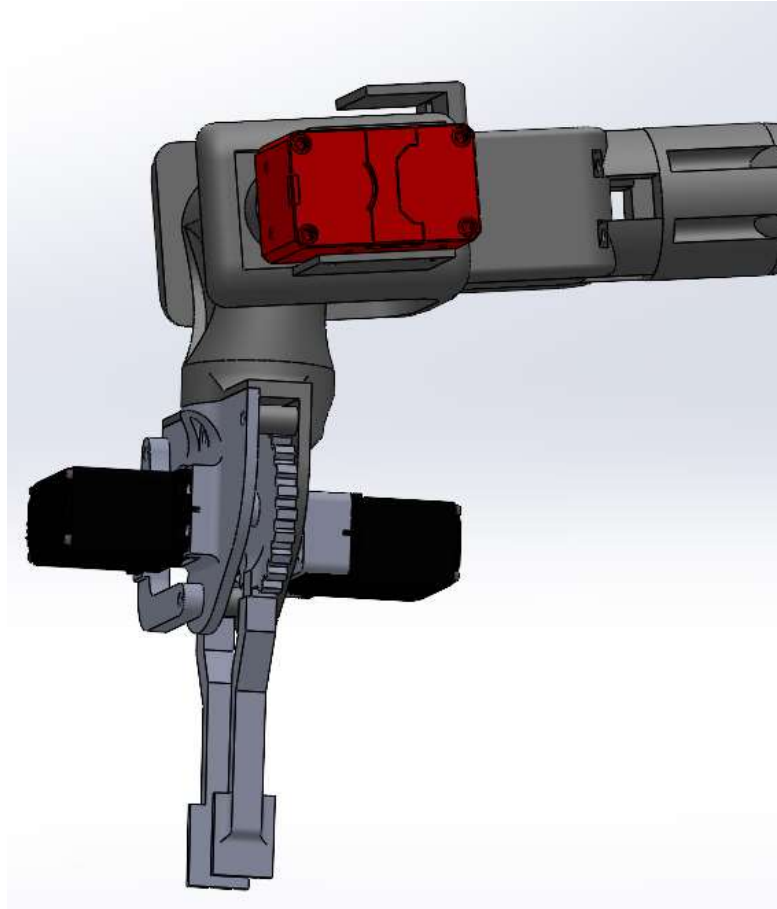


- The hub into the base plate is extremely tight we had to force it in you might consider enlarging the space for it.



- We improve the original coupler because the plastic one wasn't strong enough. We decide to use the hub available in our university's stock. We first screw in the plastic coupler 350W to the

Dynamixel. After, we insert smaller screws (M2) than the hub hole and we fix it with the nut. This assembly is strong enough the pieces that are most likely to fail is the small screws between the motor and the plastic coupler.



- In our research we realize that the OpenCr card cannot support 4 Dynamixels due to the lack of current output. We decide to remove the last motor and make the gripper free of movement. To balance the gripper to a vertical position, we put 2 servos on the gripper on for the gripper action and one as a counterweight. With more time, we would've found a way to connect the last motor.

Problems we had in the assembly.

- The gear in the gripper and their axles needed to be sanded to have good movement.
- The support bearing was extremely sanded to fit with the base plate. The 3 bearings are useless. It will be a good idea to change the first joint contact. With an axial bearing or something else.
- The base plate is flexible we add a ¼ inch wooden plate for weight and solidity.
- The assembly use a lot of types of screws. It will be useful to either only use a metric or imperial set of screws.