Fábrica de Nerdes
CLUBE DE INOVAÇÕES

AUTODESK

VEX ROBOTICS

VEX ROBOTICS
DUAL AXIS ROBOT JOINT

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Fábrica de Nerdes
CLUBE DE INOVAÇÕES

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VEX ROBOTICS

MAKE IT REAL CAD ENGINEERING CHALLENGE SPONSORED BY AUTODESK ®

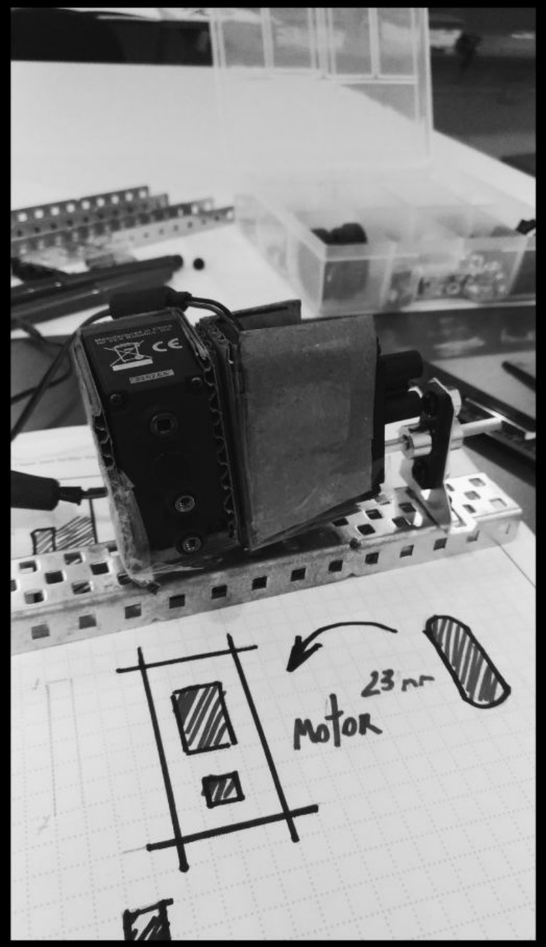
CONTENT

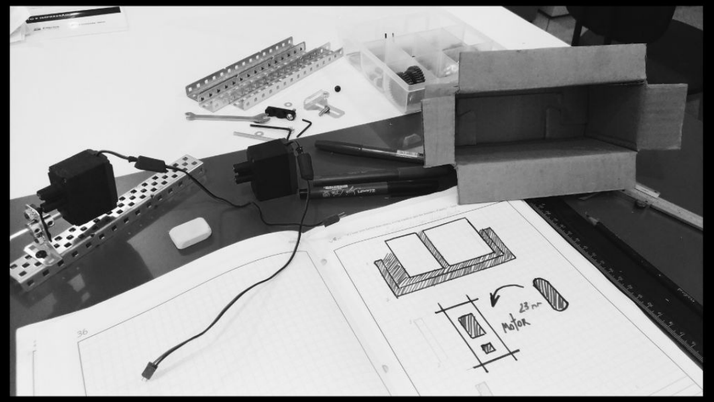
Introduction:

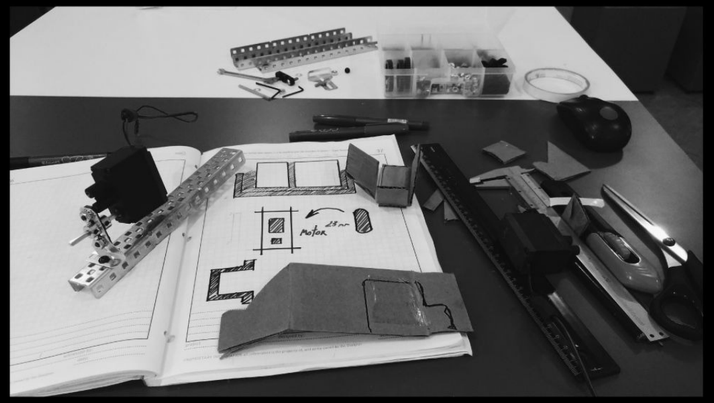
This work presents the development of a double shaft robotic joint, a robotic joint suitable for a variety of robot applications.

IDEATE

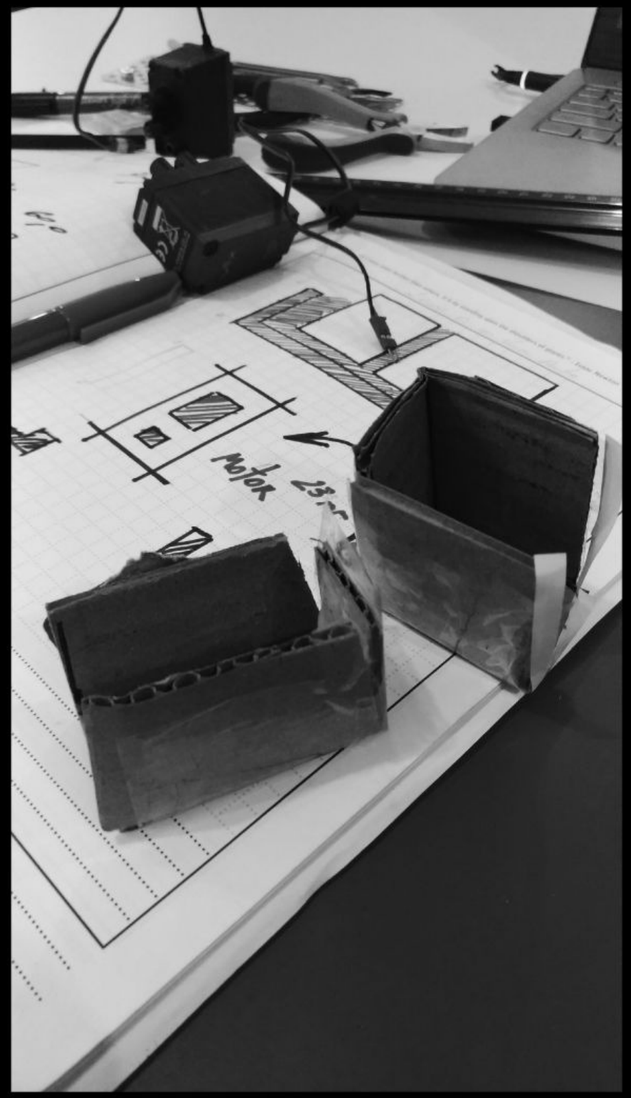
Through a combination of sketching and iterative development I started to refine my ideas into a family of products with a shared design language.

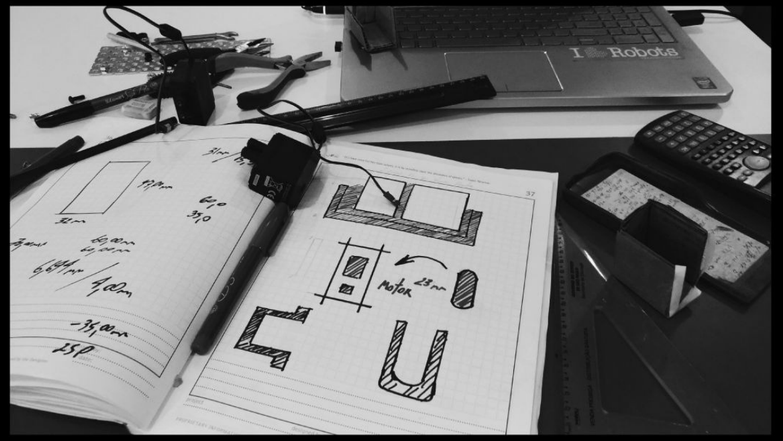


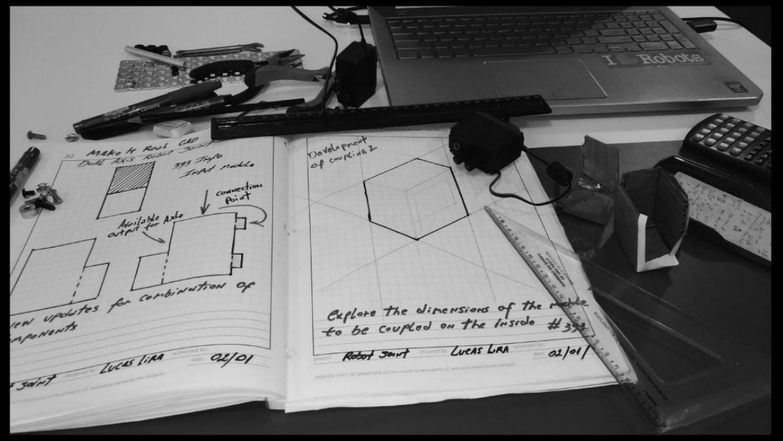




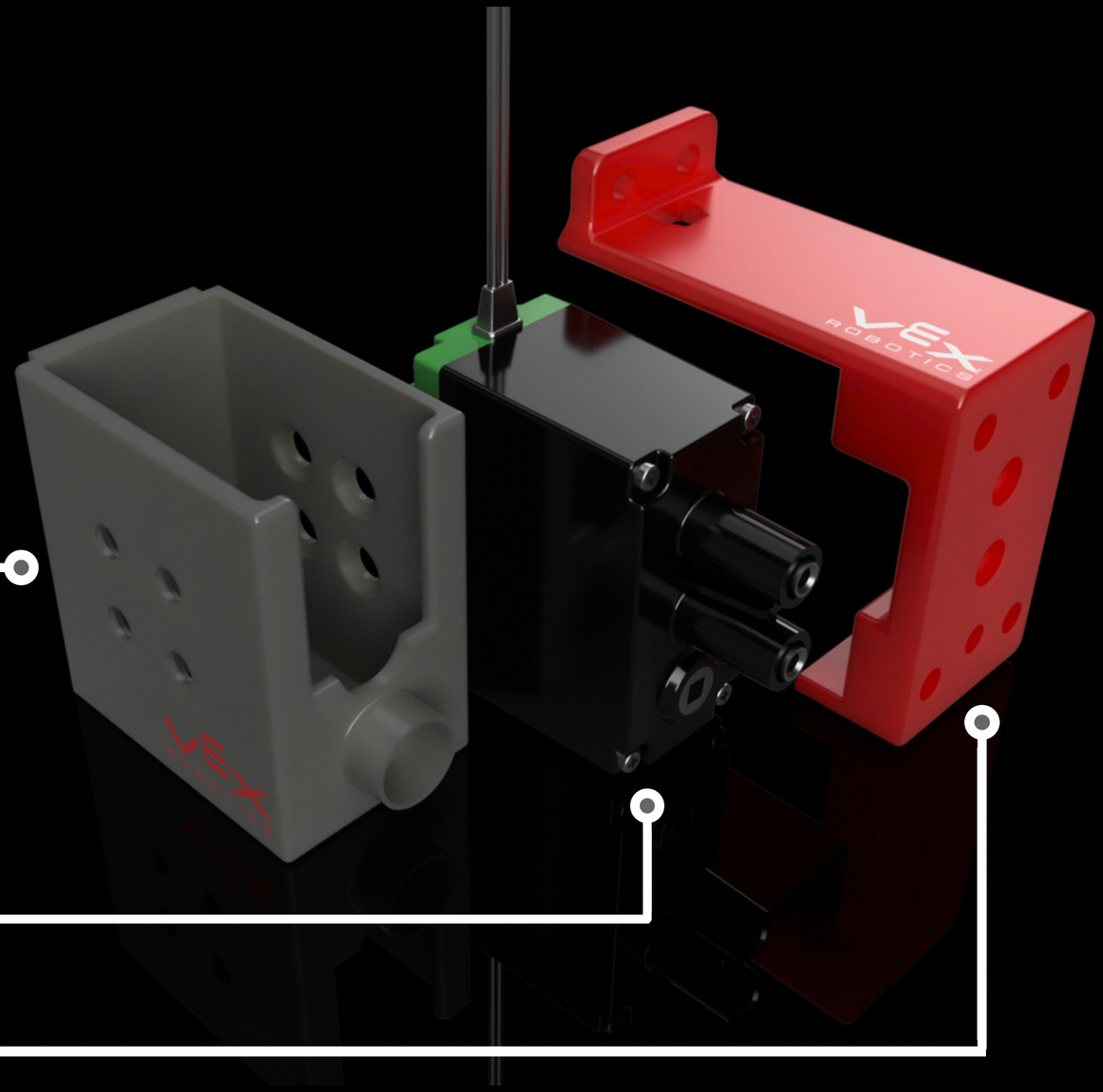
The use of accessible resources to put into practice the first ideas for the development of the new component to provide new possibilities of creation for the mechanical systems of movement.







The development of the component demonstrated here allows the users of the platform a personalization in their mechanical projects.

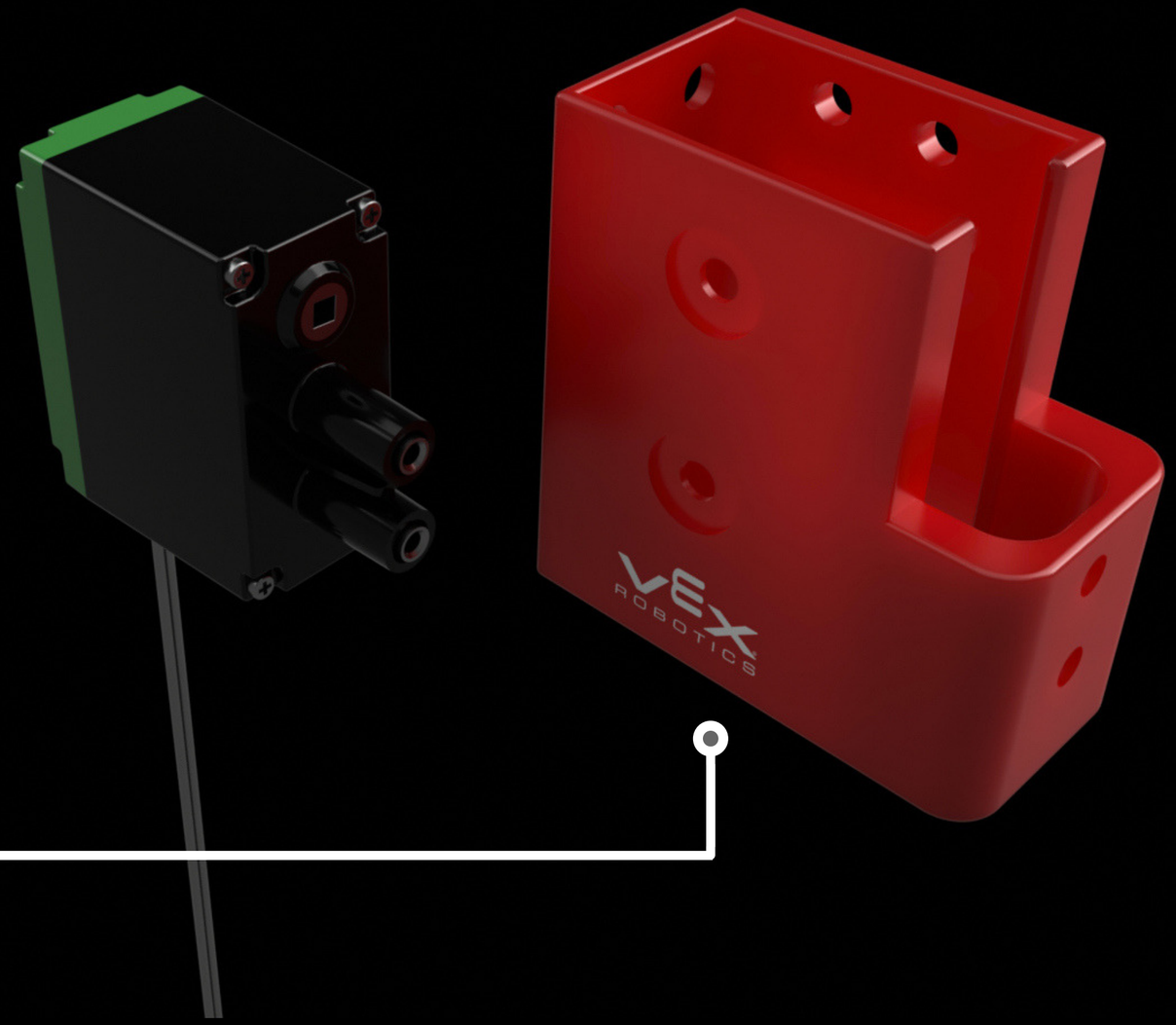


Case for motor coupling 393, bracket for structural mounting, bracket for axle lock.

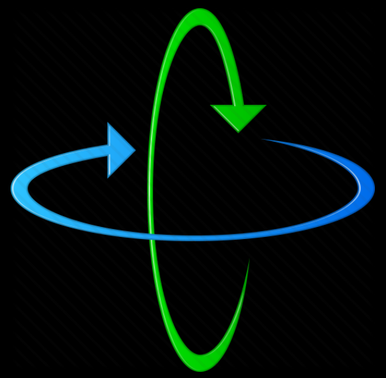
VEX Robotics Motor 393

Locking module for fixing the motor to mechanical structures

VEX Robotics Motor 393



Secondary motor
securing case



Through a combination of sketching and iterative development the tri-dimensional model of the project was finalized, the proposal is the integration between 2 Engines to enable the double movement of axes in a single point of the mechanical system.

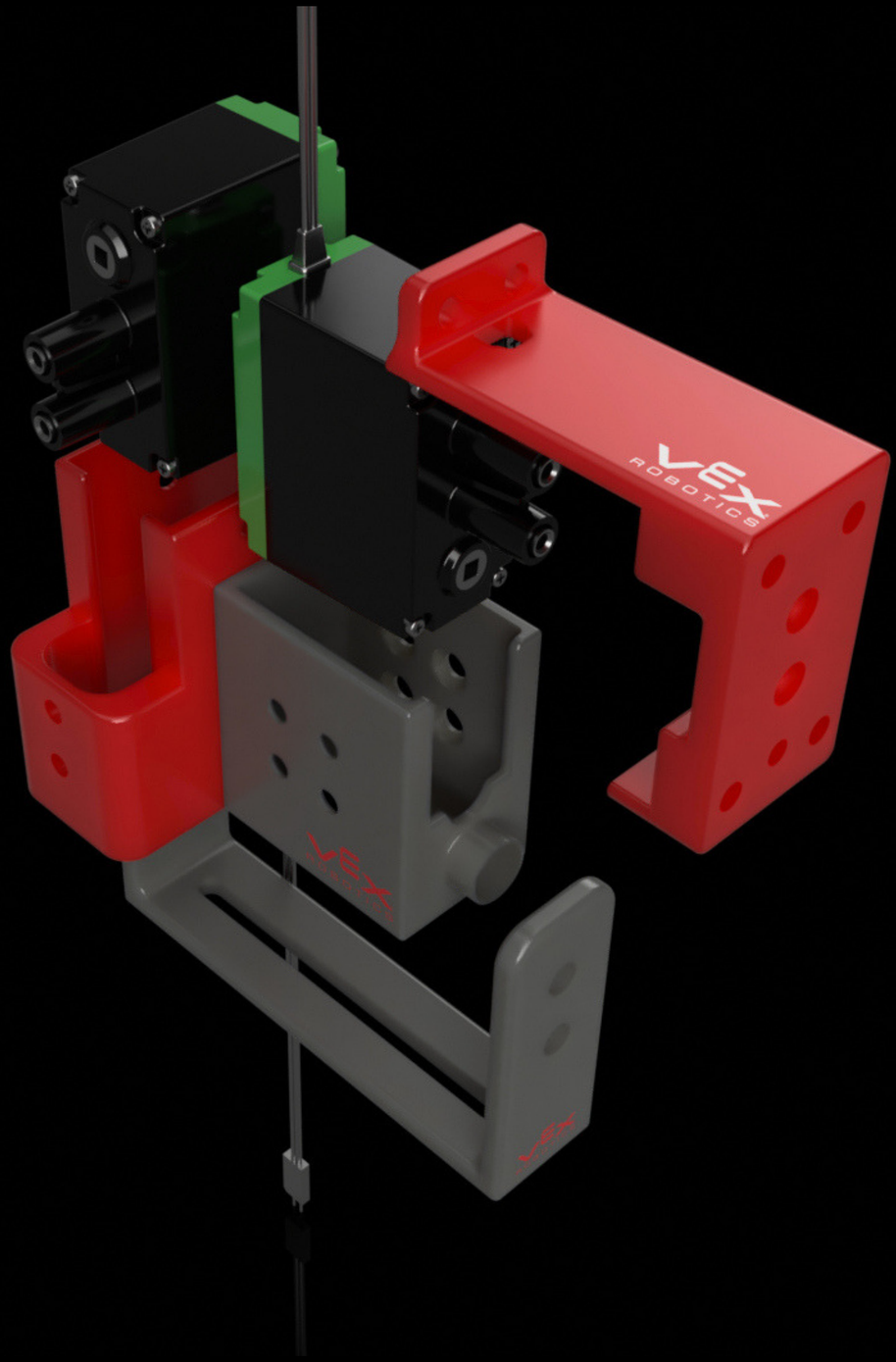
The detailing of the integration between mechanical components, 3 main elements such as:

- Case for motor coupling 393, bracket for structural mounting, bracket for axle lock;

- Locking module for fixing the motor to mechanical structures;

- Secondary motor securing case;

The integration allows the execution of the double mobility for the implementation and mechatronic system.



Separate components for the elaboration of assembly with the motors 393 of the robotic platform VEX.

Integrated primary module for connection to the secondary module.

Coupled components for receiving the secondary motor.

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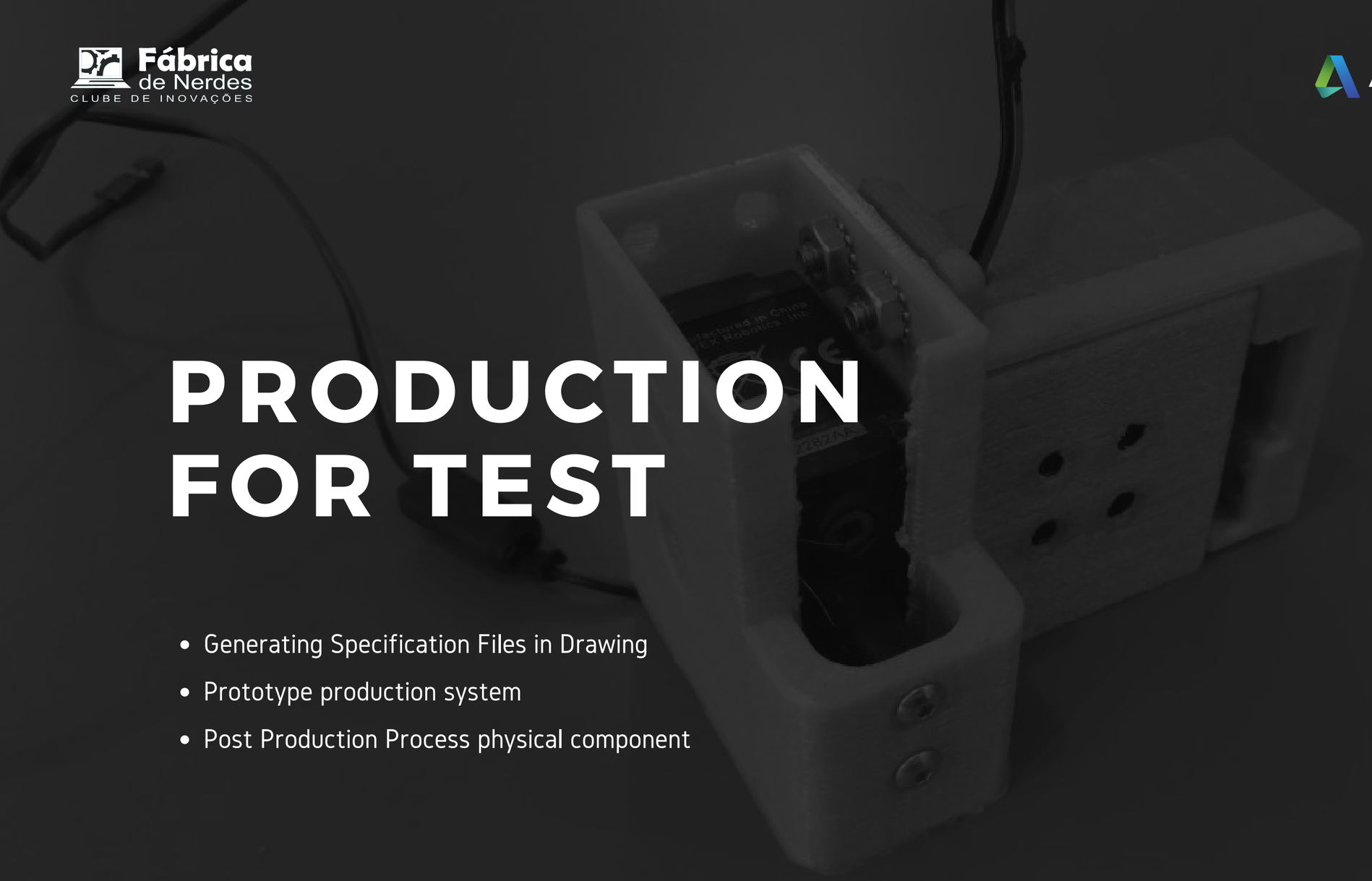
VEX ROBOTICS

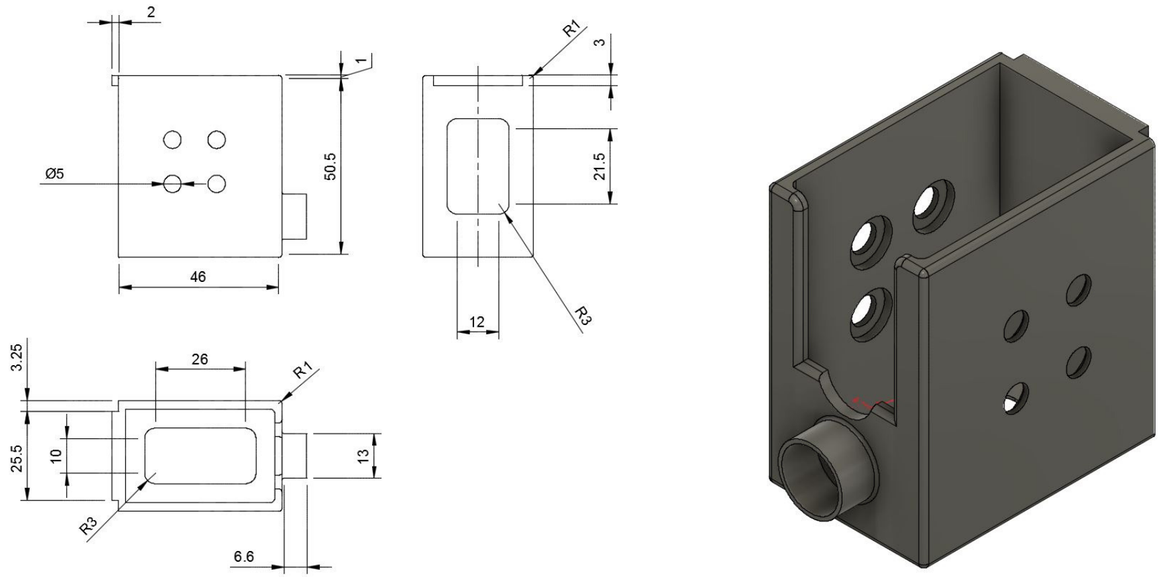
PRODUCTION FOR TEST



- Generating Specification Files in Drawing
- Prototype production system
- Post Production Process physical component

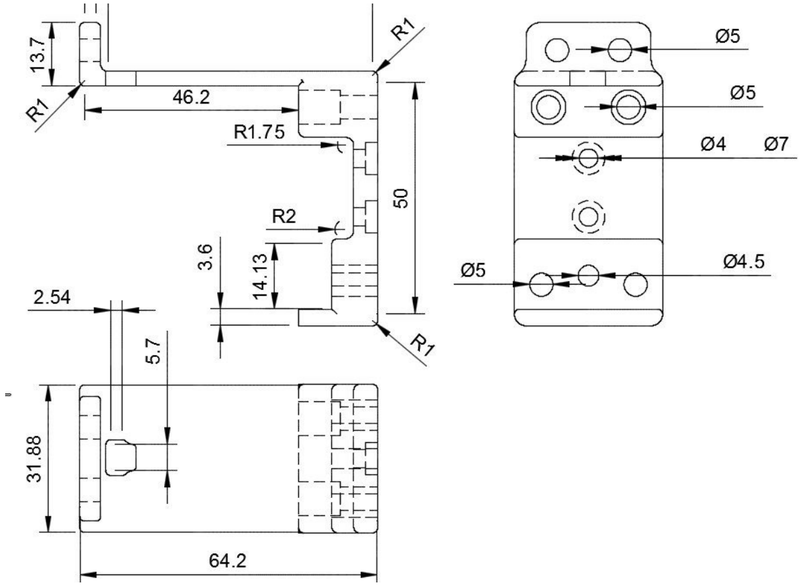
PRIMARY MODULE

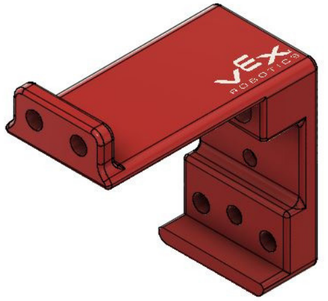
Representation of measures used to develop components for integration into the VEX robotics system.
Module responsible for the insertion of the first motor.



COUPLING LATCH

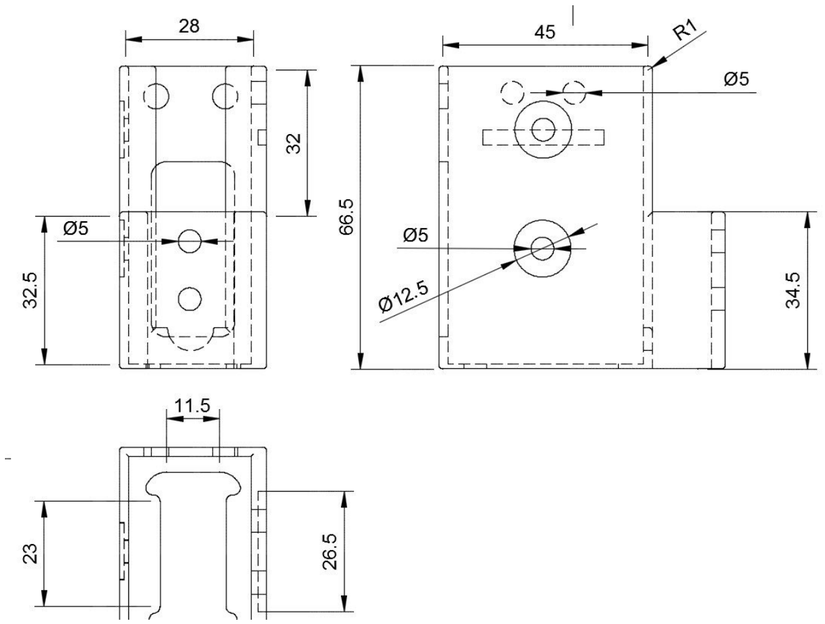
Component responsible for making the union between the first engine next to the second engine.

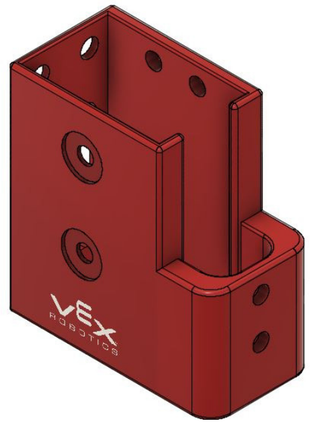




SECONDARY MODULE

Module responsible for
compacting the second motor for
the execution of movements.





STAGE OF MATERIALIZATION

Original Bounds

In: 1.26 x / 2.067 y / 2.209 z
Cm: 3.2 x / 5.25 y / 5.61 z

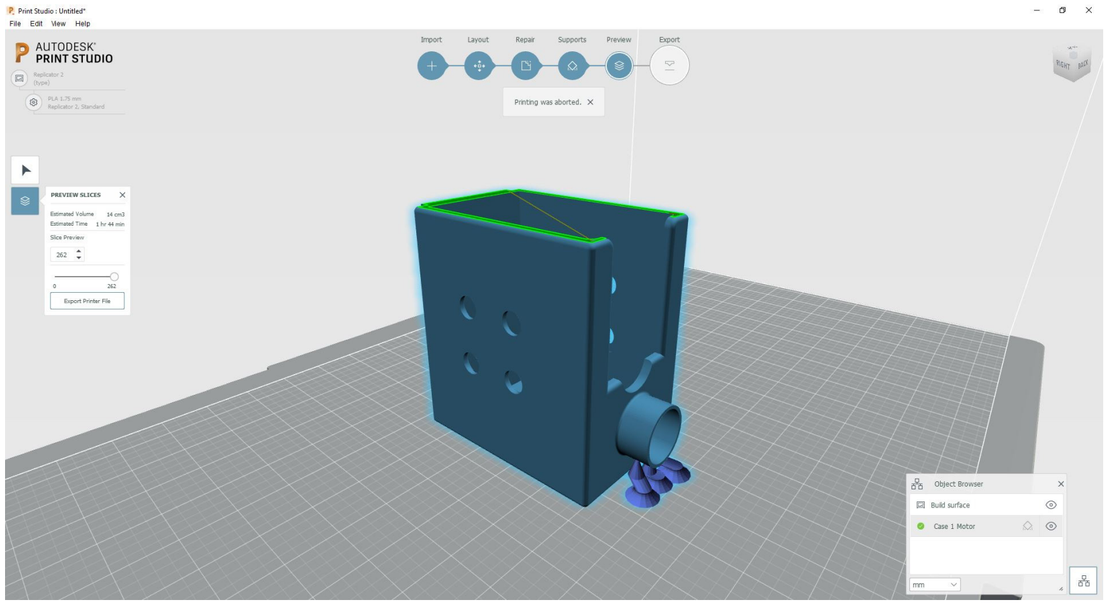
Oriented Bounds

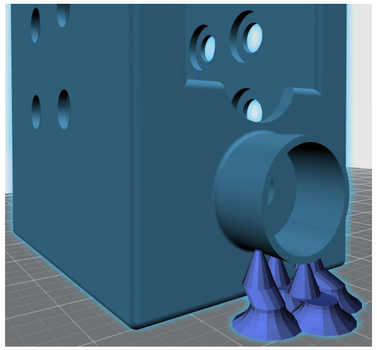
In: 1.26 x / 2.067 y / 2.209 z
Cm: 3.2 x / 5.25 y / 5.61 z
Material Volume: 16.1454cm^3
Machine Space: 87.6693cm^3
Surface Area: 172.0587cm^2
Density: 17.13%

Parts

Number of Separate Parts: 1

shapeways





3D Printing Process Information Obtained in Autodesk Print Studio Software

STAGE OF MATERIALIZATION

Original Bounds

In: 2.528 x / 2.579 y / 1.26 z
Cm: 6.42 x / 6.55 y / 3.2 z

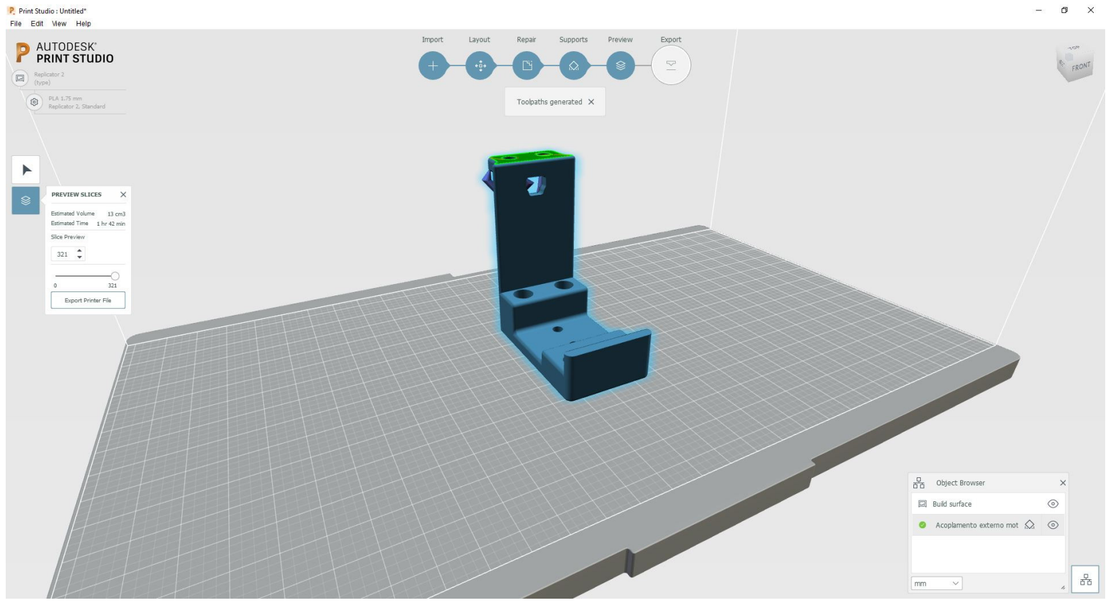
Oriented Bounds

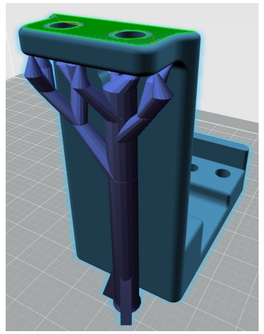
In: 2.528 x / 2.579 y / 1.26 z
Cm: 6.42 x / 6.55 y / 3.2 z
Material Volume: 21.6349cm^3
Machine Space: 40.6217cm^3
Surface Area: 110.3796cm^2
Density: 16.08

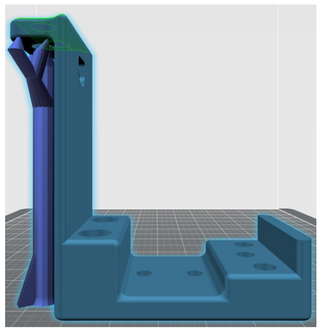
Parts

Number of Separate Parts: 1

shapeways







3D Printing Process Information Obtained in Autodesk Print Studio Software

STAGE OF MATERIALIZATION

Original Bounds

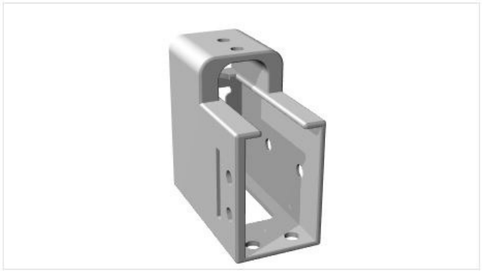
In: 1.277 x / 2.618 y / 2.48 z
Cm: 3.244 x / 6.65 y / 6.3 z

Oriented Bounds

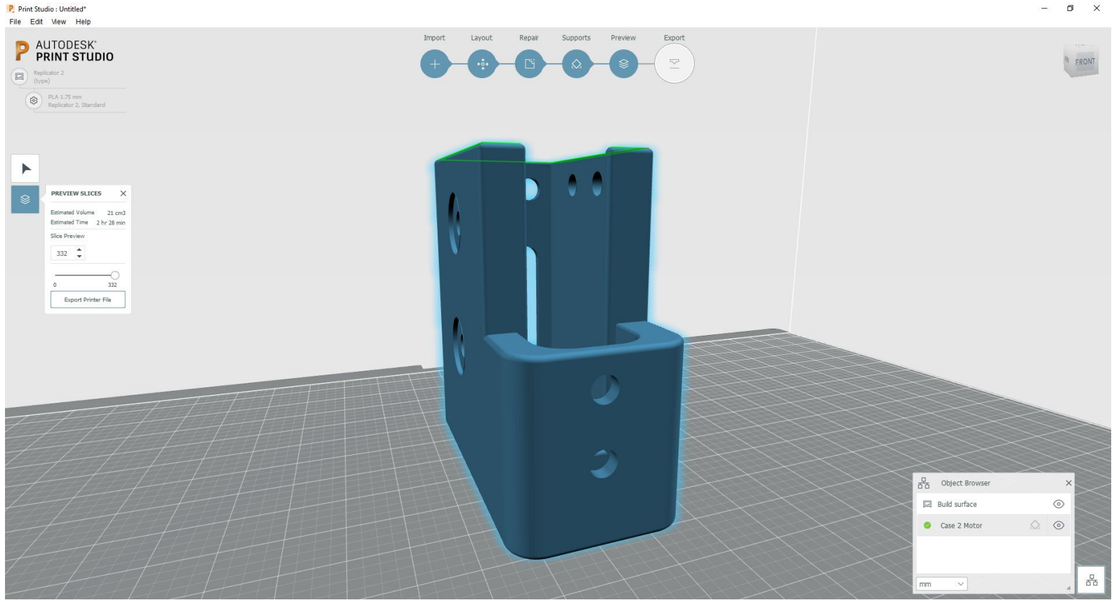
In: 1.277 x / 2.618 y / 2.48 z
Cm: 3.244 x / 6.65 y / 6.3 z
Material Volume: 29.9883cm^3
Machine Space: 130.1609cm^3
Surface Area: 223.7521cm^2
Density: 22.07

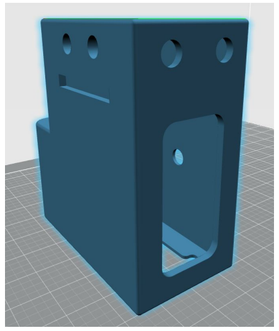
Parts

Number of Separate Parts: 1



shapeways

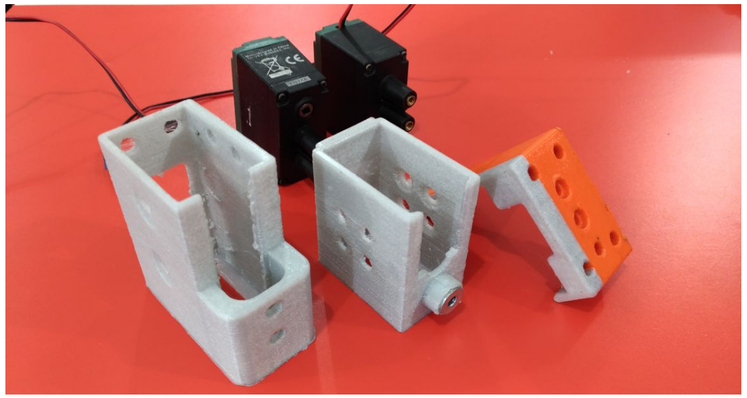


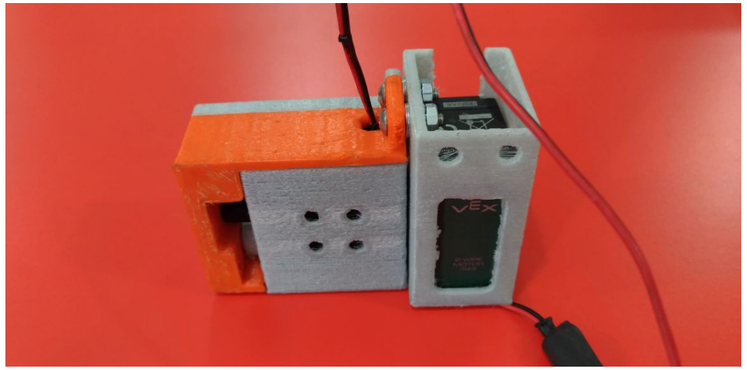


3D Printing Process Information Obtained in Autodesk Print Studio Software

PHYSICAL COMPONENT

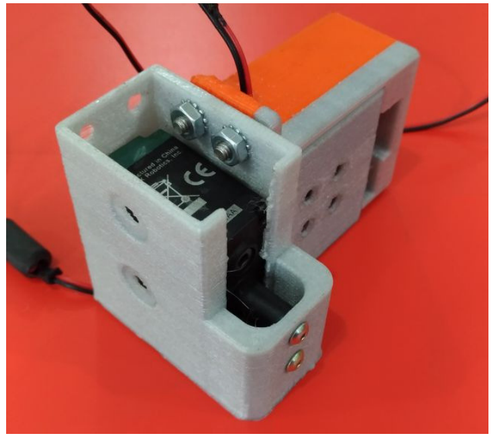
After the productive process of the components the elaboration of a robotic platform is developed for the execution of the tests of functionality of the new product.

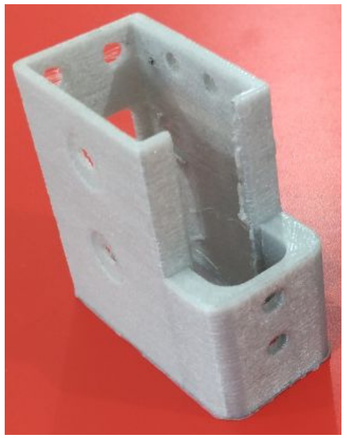


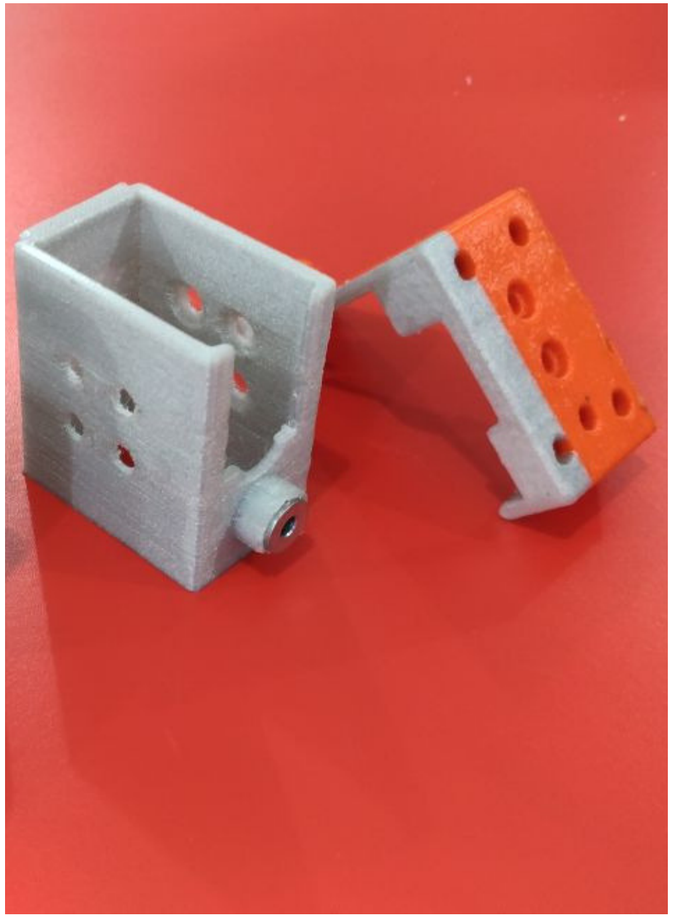


PHYSICAL COMPONENT

Assembly of the components and integration of the main motor element 393 for the execution of movements in 2 axes.

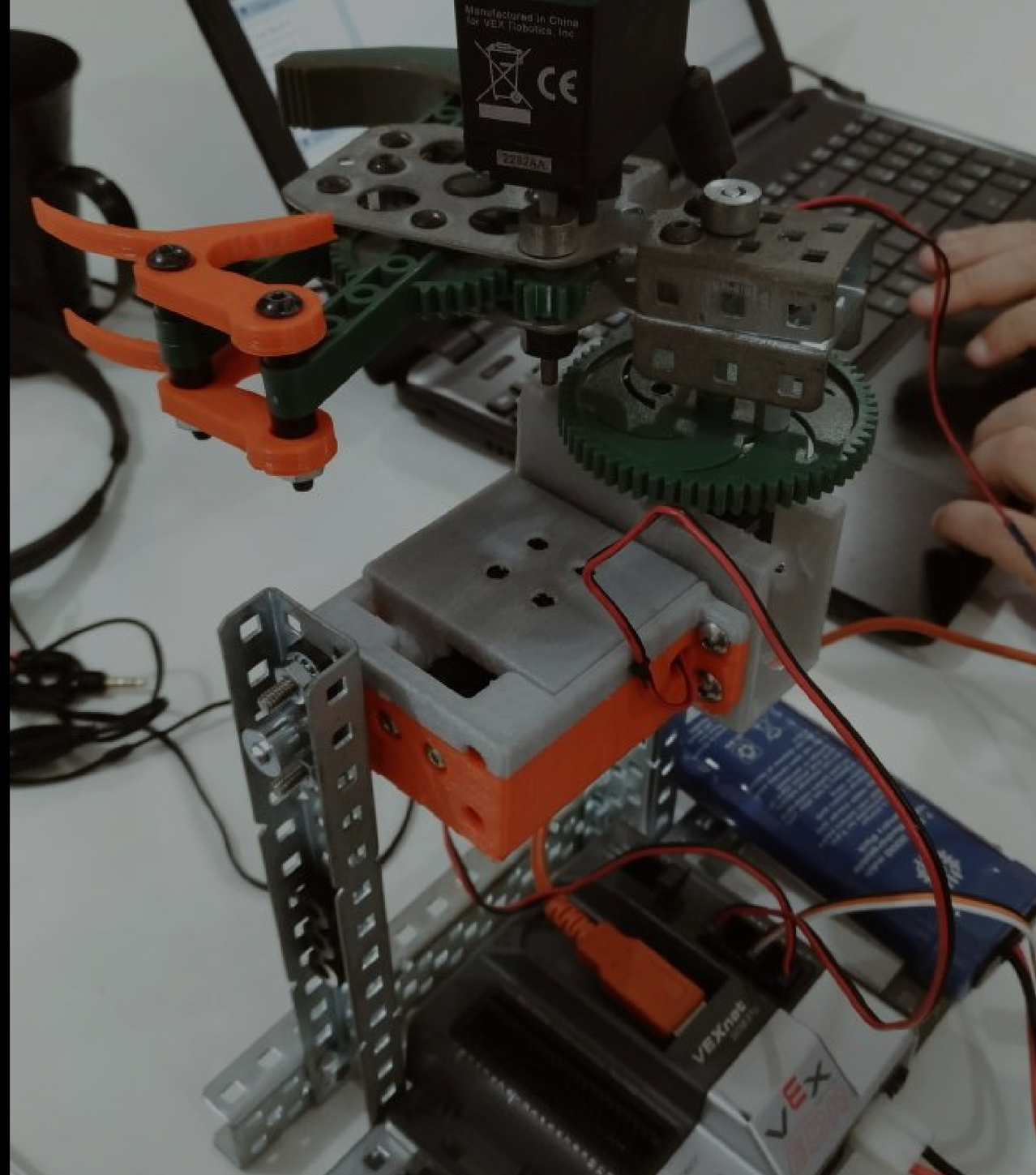


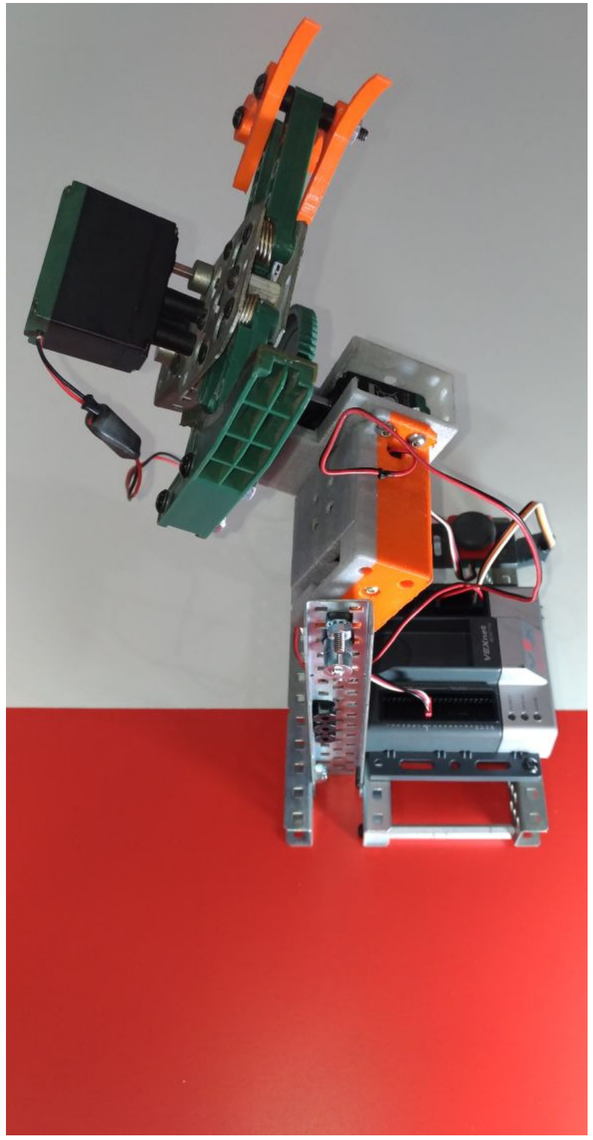


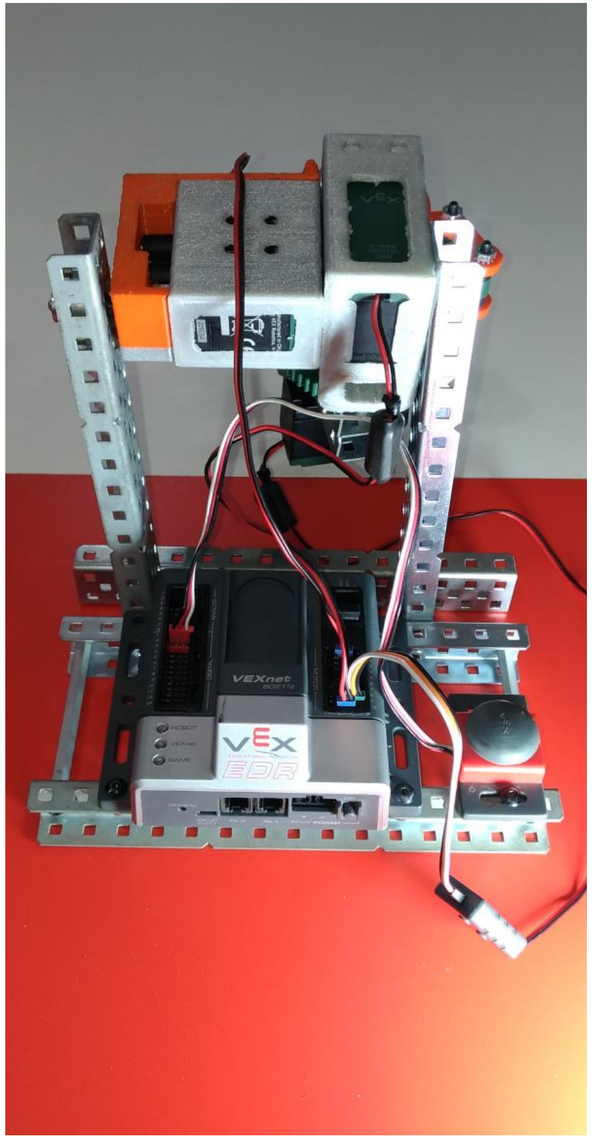


APPLICATION IN ROBOTICS

Robotic platform developed for behavioral analysis of the prototype developed, in this stage it is possible to collect information about the utility of the components for the development of new projects in the area of dynamic mechanics.





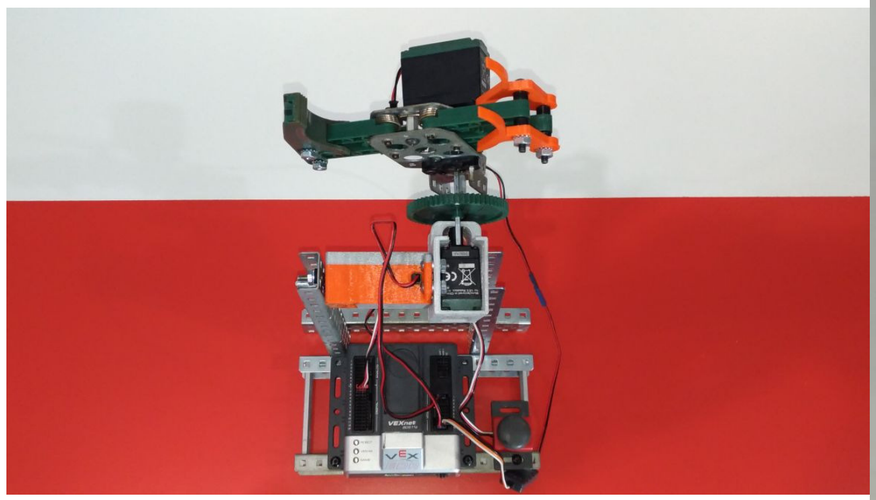


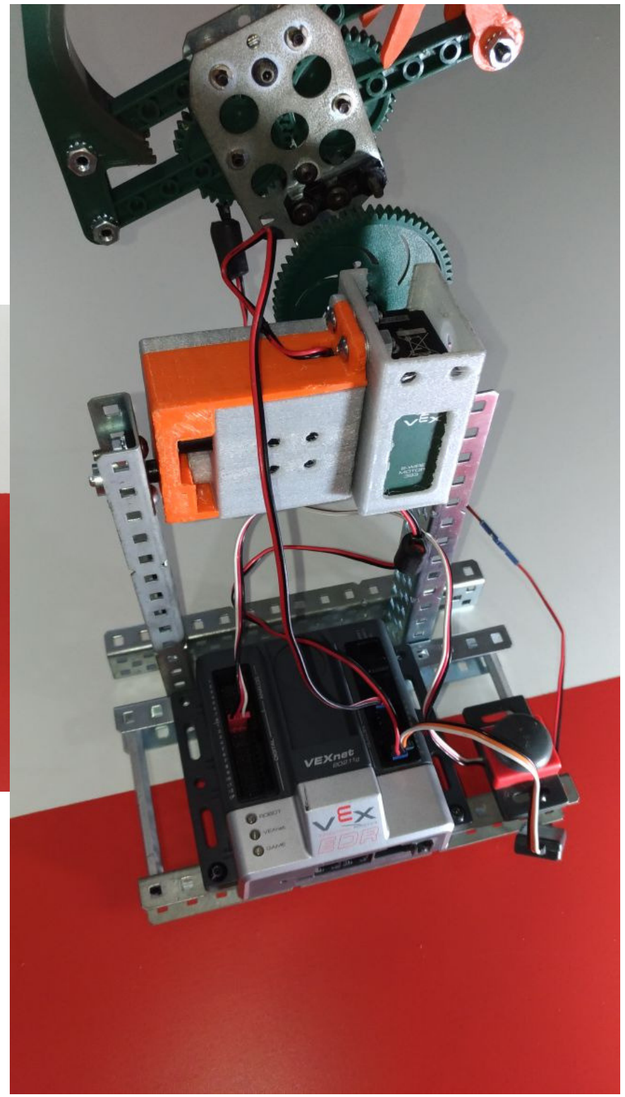
OSCT

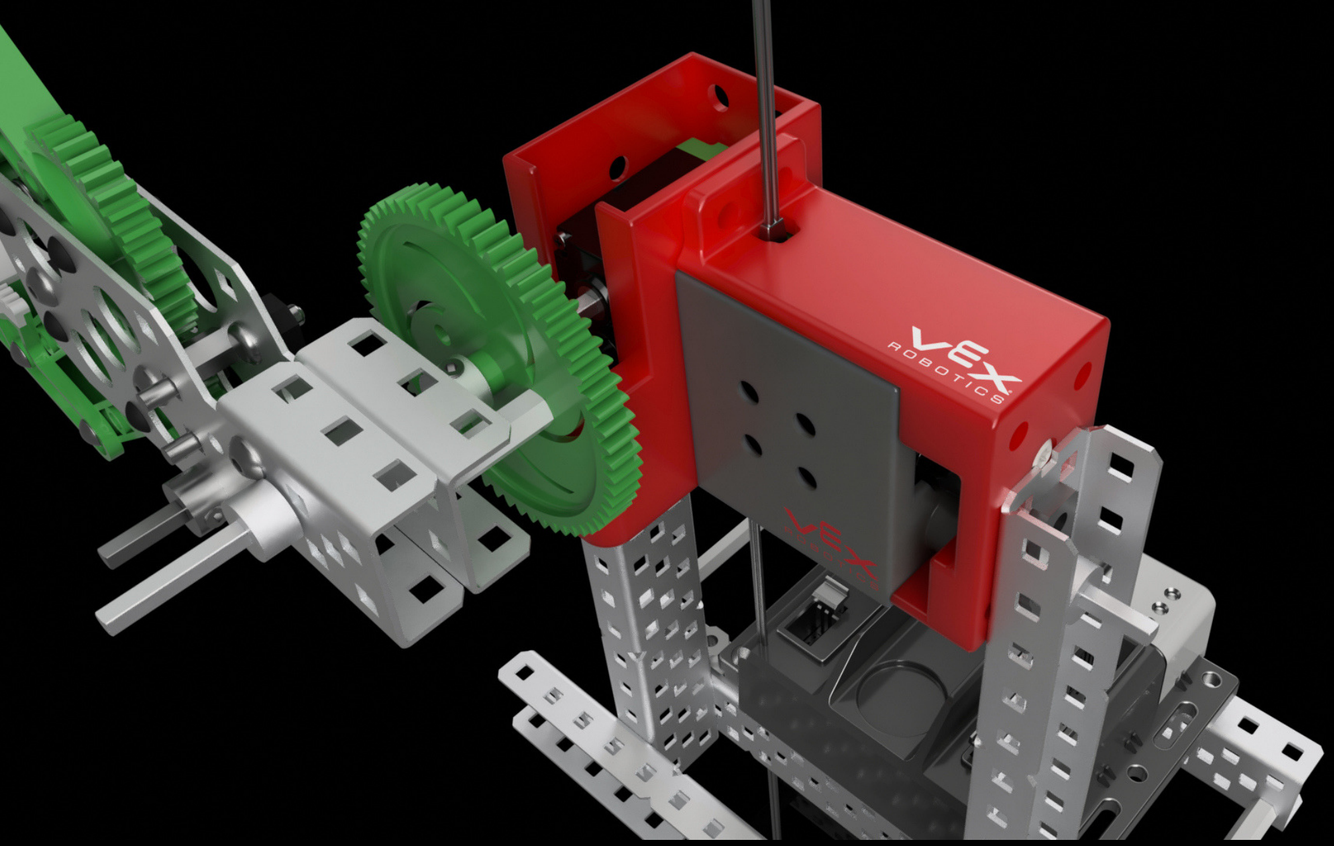
Operating System for Component Testing

PHYSICAL APPLICATION

Robotic platform executing the first test of movement for the validation of the projected components.

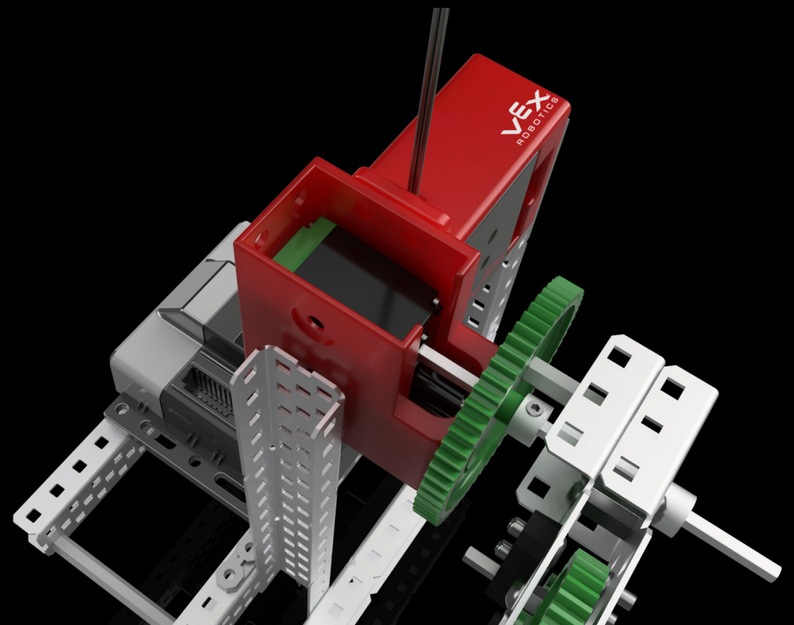




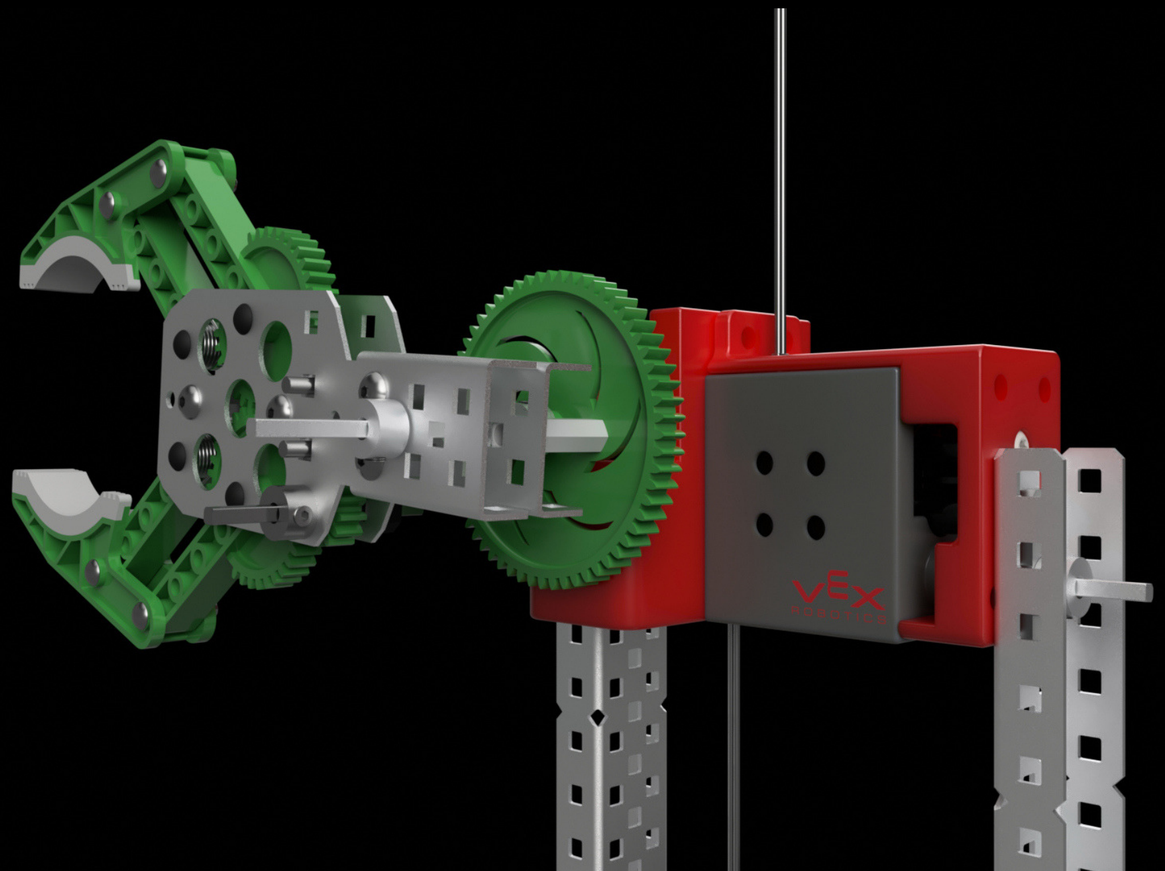


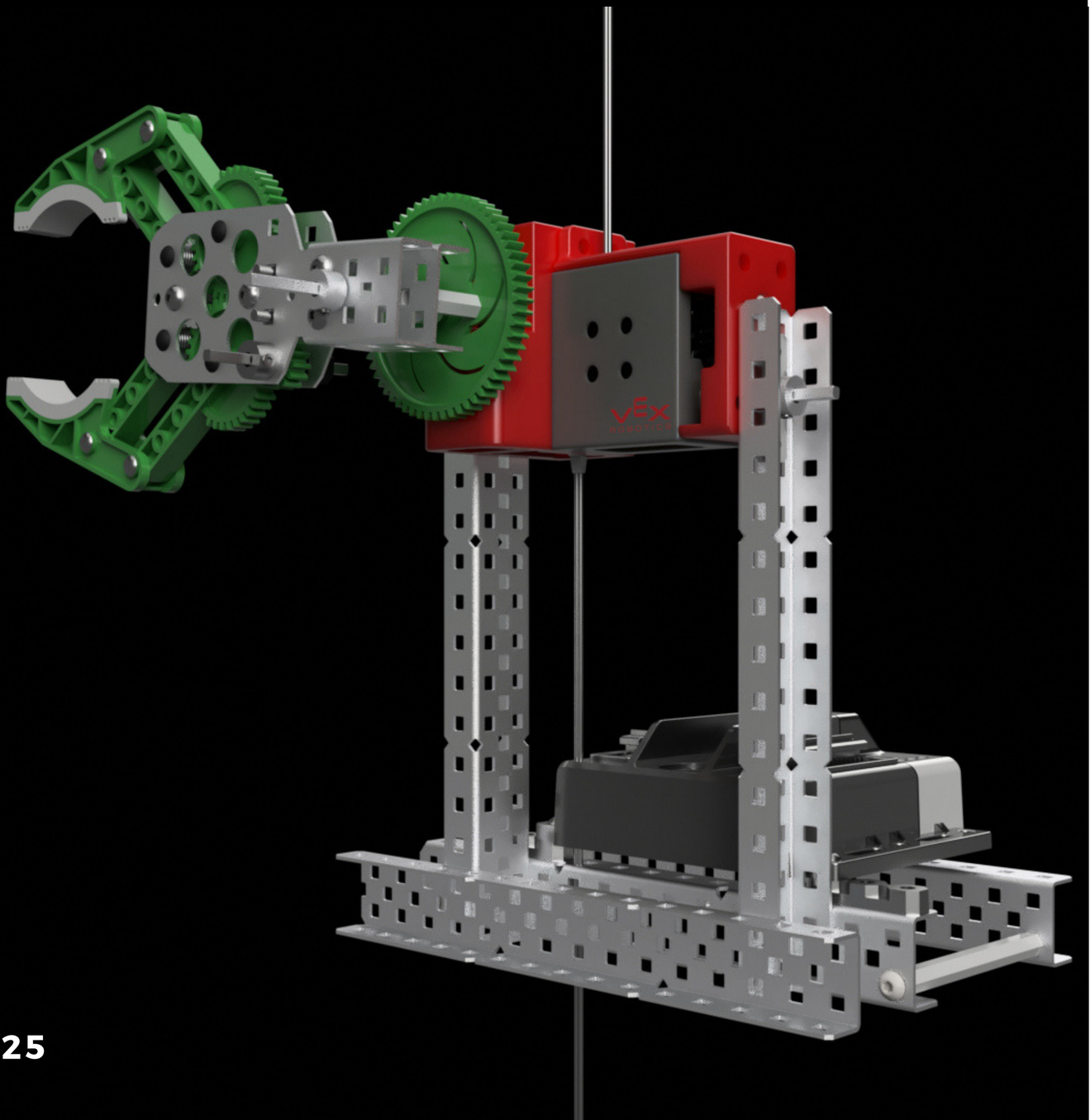
FUSION 360

Final definition of the integration of the new components developed in a mechanical platform of movements.
Experience with Fusion 360.

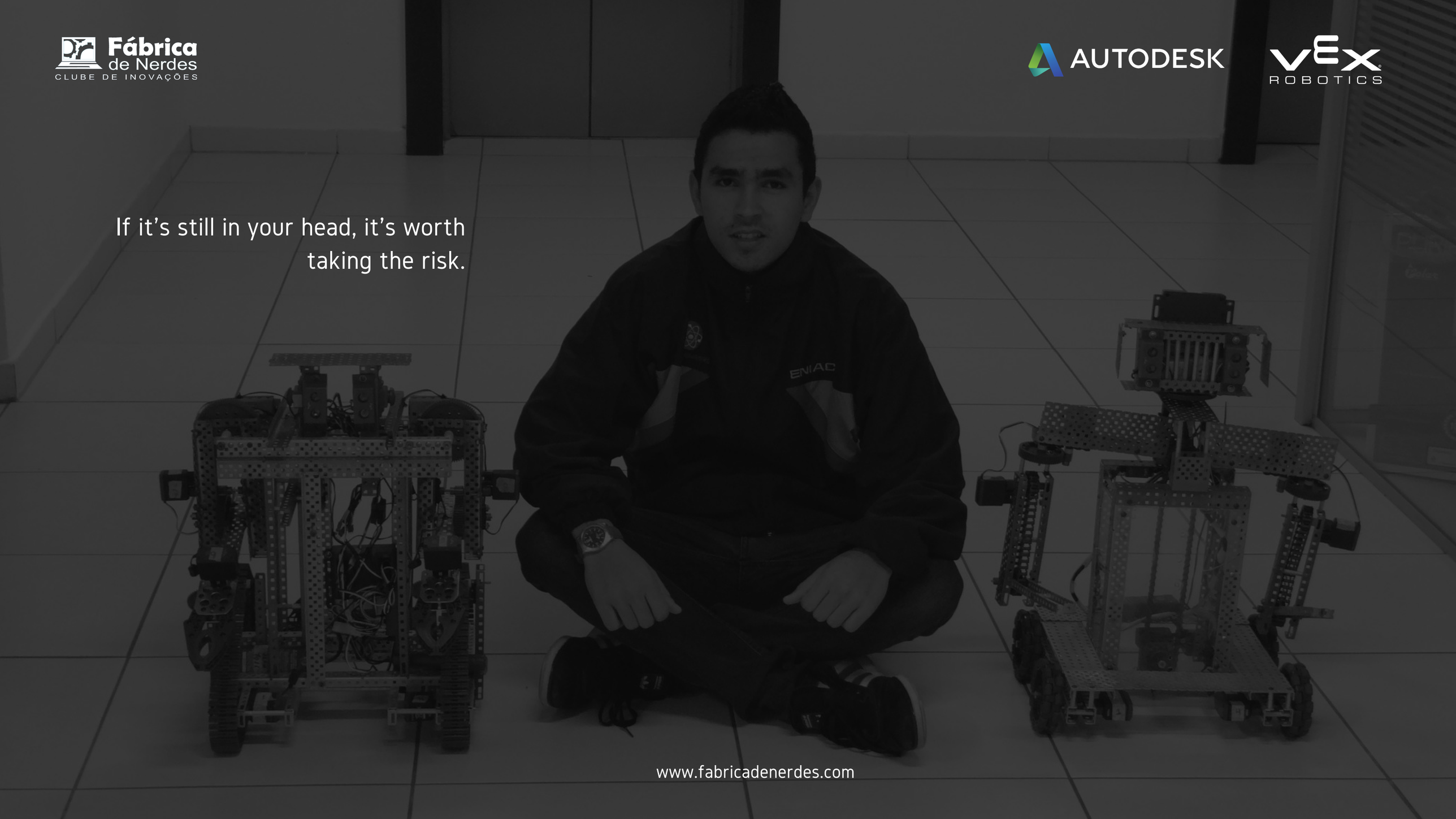


FUSION 360





THANK YOU! SUPPORTERS



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THANK YOU!

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