DESIGN AND FABRICATION OF SUBMARINE FOR CORAL REEFS MONITORING

BY

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GUIDE :

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ABSTRACT

- Submarines are designed and built to perform underwater operations and Our model of submarine is a ROV model
- We measure the Quality, Temperature, Pressure, and other quantities required for the good habitable life of coral reef monitoring
- Movement of the submarine(above and below) is through controlling the in and out flow of water through the syringes and movement of the submarine in horizontal axes is done through the control of the flow of fan

S.NO	TITLE	AUTHOR	YEAR OF PUBLICATION	INFERENCE
1.	Surveillance of coral reef development using an Autonomous underwater vehicle	Mohd Murad Zool H Ismail Bin Samah Karl Sammut	2023	This paper describe the suitable design and affordable autonomous vehicle for coral reef surveillance and overcome human limitation. They have made the project using Arduino mega 2560, vision sensor, sonar and ROS.
2.	Coral identification and counting with an autonomous under water vehicle	Md Modasshir, Sharmin Rahman, Oscar youngquist, Ioanass Rekleitis.	2018	This paper discusses about low cost and power efficient Autonomous under water vehicles to survey coral reefs. It describes a novel approach to identify count and estimate coral populations, A convolutional neural network (CNN) is utilized to detect and identify different corals and a tracking mechanism provides a total count of each coral species per transect.

S.NO	TITLE	AUTHOR	YEAR OF PUBLICATION	INFERENCE
3.	Problem identification for underwater remotely operated vehicle	F. A. Azis M. Z. A. Rashid S. S. Abdullah	2012	This paper describes the problem identification of unmanned underwater remotely operated vehicle. The major problems are discussed such as control system, coupling issues, communication technique
4.	Design and development of a remotely operated underwater vehicle	Chanin Joochim, Rattanakorn Phadungthin, Sawangtit Srikitsuwan.	2017	This paper presents design and development of a small unman submarine. The vehicle equips with powerful underwater probe sensors to collect underwater data, dc brush less motor for controlling direction as well as real time camera monitoring. It transmits video data. The data is sent via underwater cable to computers base station on the coast.

S.NO	TITLE	AUTHOR	YEAR OF PUBLICATION	INFERENCE
5.	Remotely operated underwater vehicle	Jothikrishna K Rithika S M Swetha S V Kavitha K	2023	This paper describes about the ROV is a kind of submerged robot that can be controlled by a person. The ROVs come in different sizes and arrangements and are outfitted with cameras, devices, and sensors to perform undertakings in submerged conditions. It has balanced out outline, is not difficult to work, has high mobility, 1080p live feed. it has execution of Latent vector sensors SONAR (Sound Route and Going) in ROVs for submerged imaging.
6.	Monitoring coral reefs in optically deep water	R. Armstrong H. Singh S. Rivero F. Gilbes	2015	This paper discusses about remote sensing technology used in coral reefs which is a useful tool for monitoring coral reefs in water ecosystems. AUV was utilized to acquire high digital images and communicating ability to transmit the data.

S.NO	TITLE	AUTHOR	YEAR OF PUBLICATION	INFERENCE
7.	Development of a coral monitoring system for the use of underwater vehicle.	Masakazu Arima Kana yoshida Hirufomi tanai	2018	In this paper they developed a coral monitoring system for the use of underwater vehicle. This system consists of a network camera and 3 axis digital compass. Coral can be detected from an image binarised with a certain threshold and deals with coral monitoring system using ultraviolet LEDs and image analysis.
8.	Reef Rover: low cost small autonomous unmanned surface vehicles (USV) for mapping and monitoring coral reefs.	George T. Raber, Steven R. Schill.	2019	In this paper they used the recent advances in open source GPS - to design and test a low cost small unmanned surface vehicle. The vehicle is operated using Ardupilot open source software. It uses two sony a6300 cameras to monitor the underwater ecosystem.

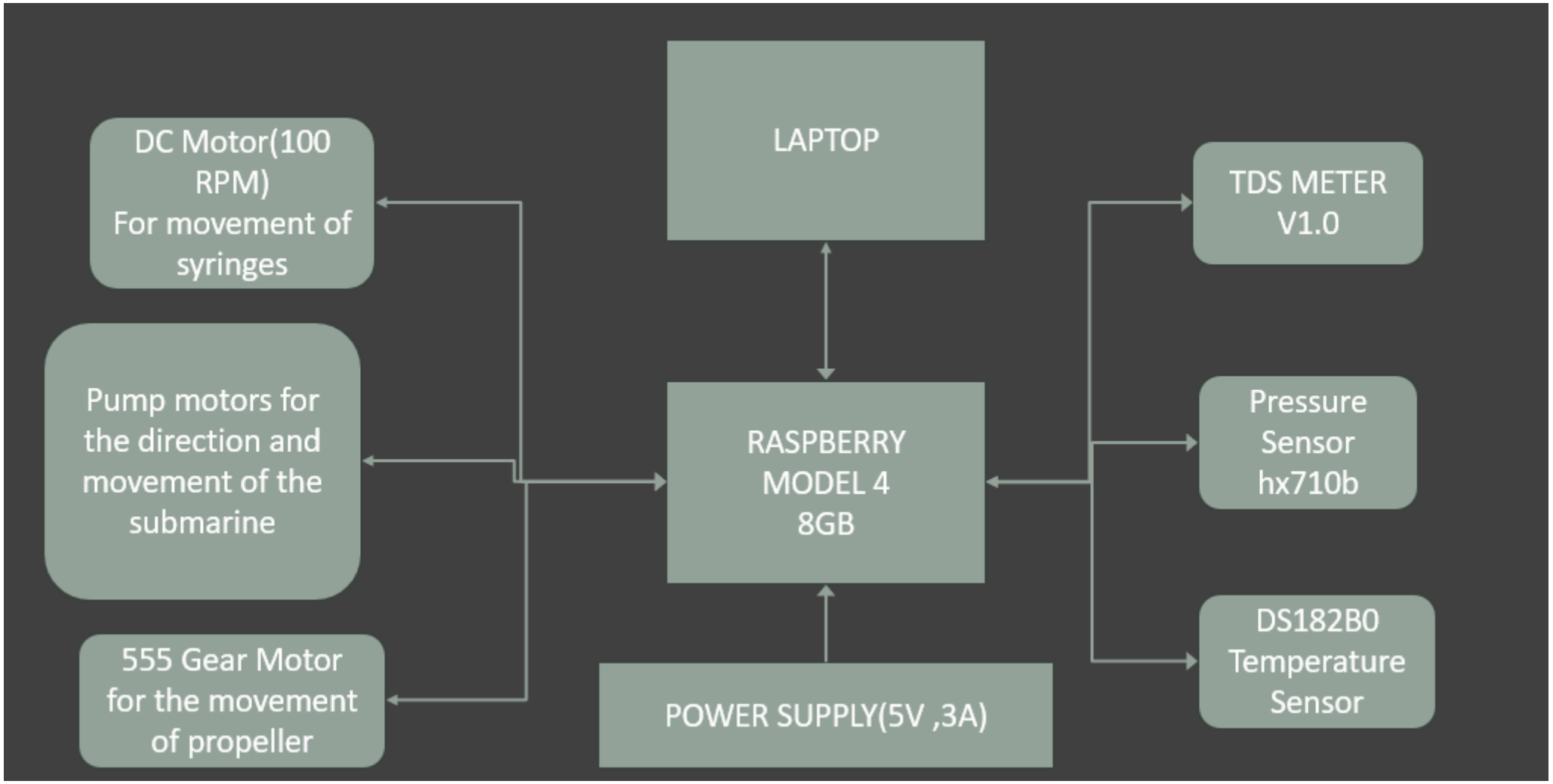
Problem statement

- Coral reefs can’t be monitored by divers for long interval of time
- Divers can’t analyse the ecosystem of coral reefs properly
- Divers may damage the coral reefs by themselves unknowingly
- Pollution, destructive fishing practices, collecting live corals for aquarium market and a warming climate are some of the many ways that cause damage to the coral reefs

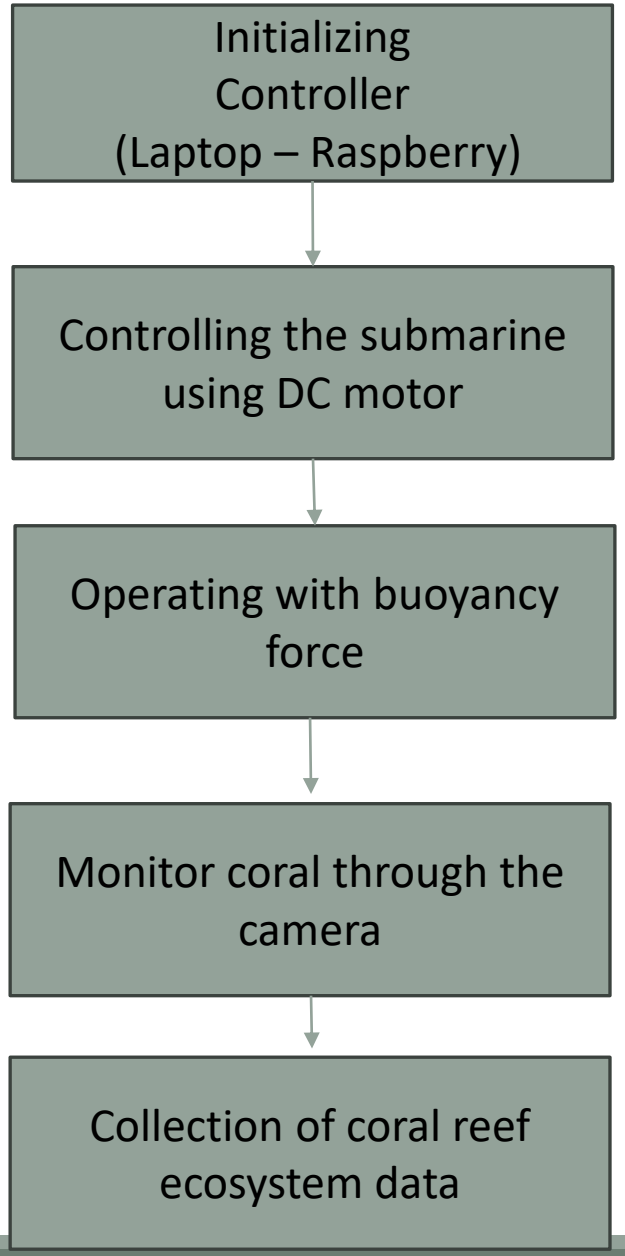
Objective

Coral reefs can be monitored using the submarine without the help of divers as we can get proper analysation of coral reefs and no damages are occurred to coral reef and measurement of various parameters of growth for coral reefs like temperature, pollution level, etc for understanding environment of the coral ecosystem

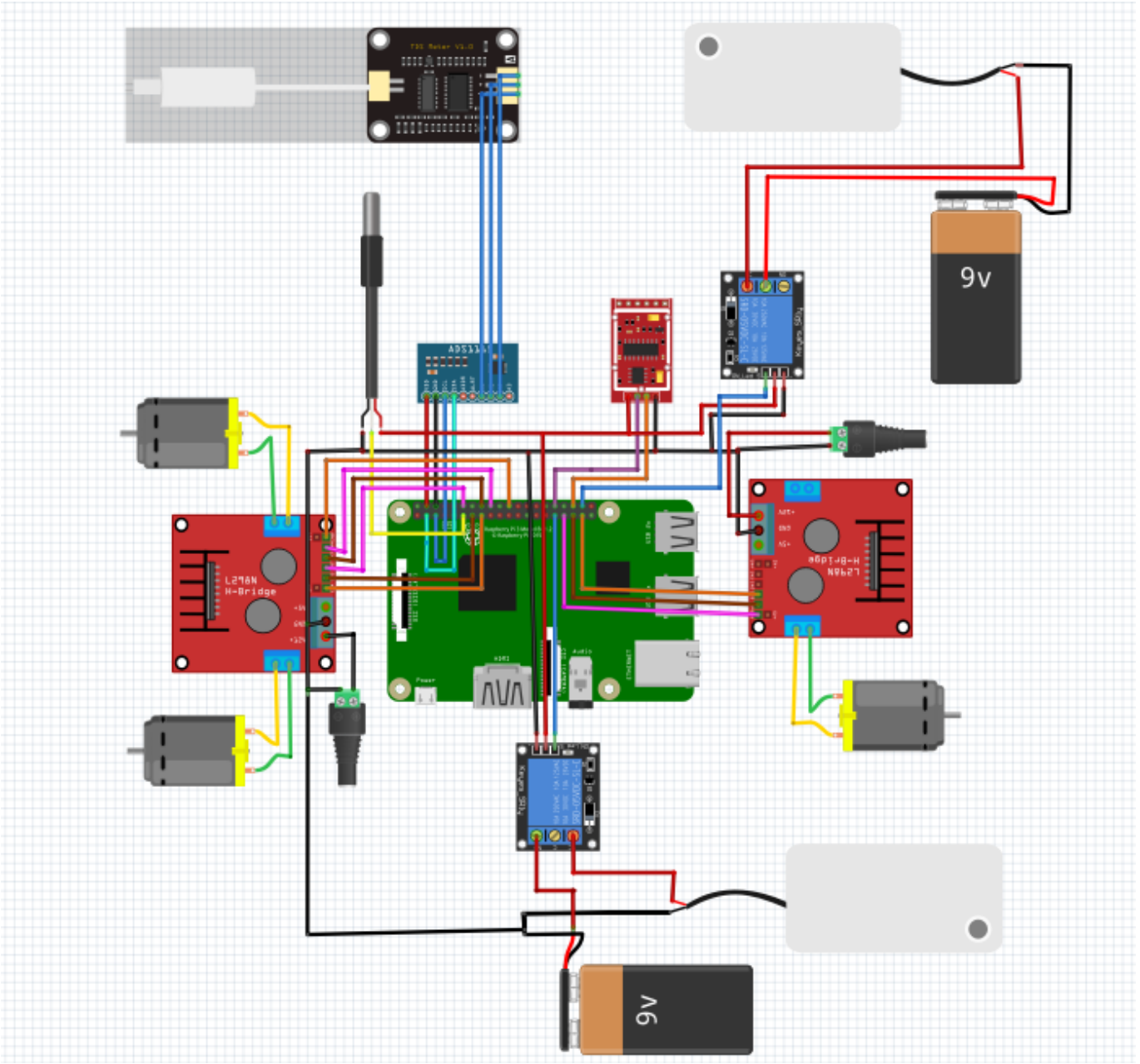
FLOW CHART


LAPTOP
DC Motor(100 RPM) For movement of syringes
Pump motors for the direction and movement of the submarine
555 Gear Motor for the movement of propeller
RASPBERRY MODEL 4 8GB
POWER SUPPLY(5V ,3A)
TDS METER V1.0
Pressure Sensor hx710b
DS182B0 Temperature Sensor

METHODOLOGY



CIRCUIT DIAGRAM



COMPONENTS LIST

ELECTRICAL COMPONENTS

DS182B0 water proof temperature sensor

Limit switches

Micro SD card

555 Gear Motor(100 RPM)

5V ,20000mah Li-Ion battery

DC Motor(300 RPM)

Pressure Sensor HX710B

TDS Meter V1.0

Raspberry-4 (8GB)

LAN cable

Raspberry bi Global shutter camera

HARDWARE COMPONENTS

8mm Threaded rods

Syringes(50ml)

Acrylic sheet

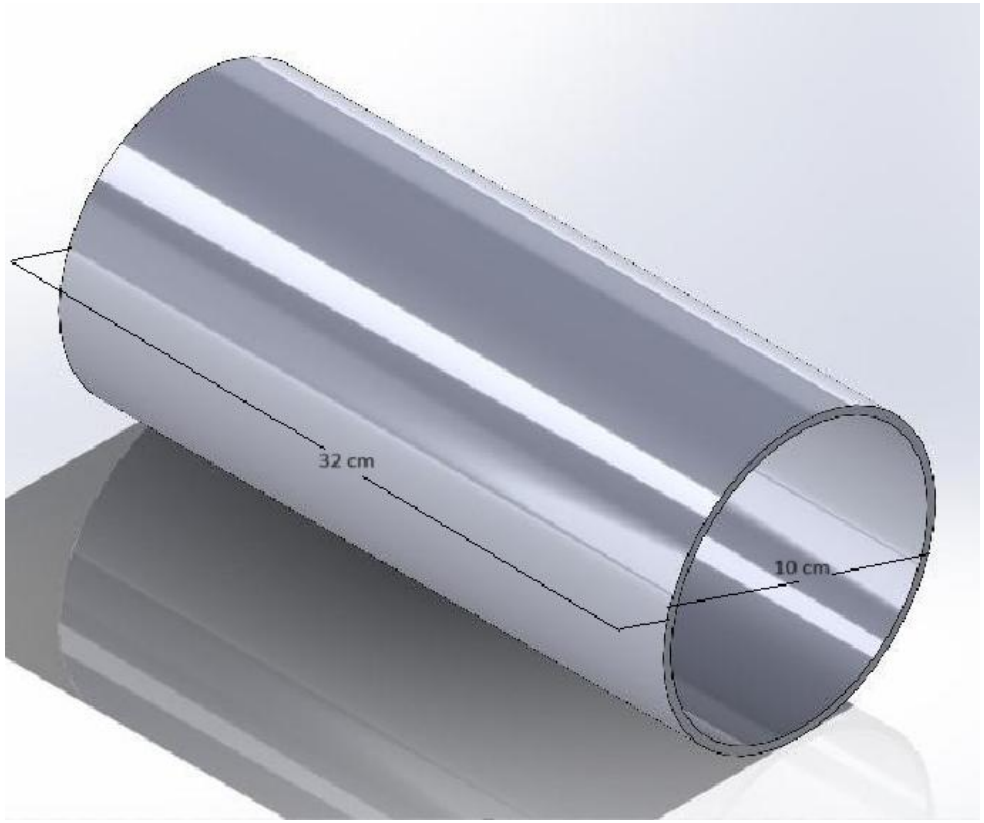
Couplers

Spokes

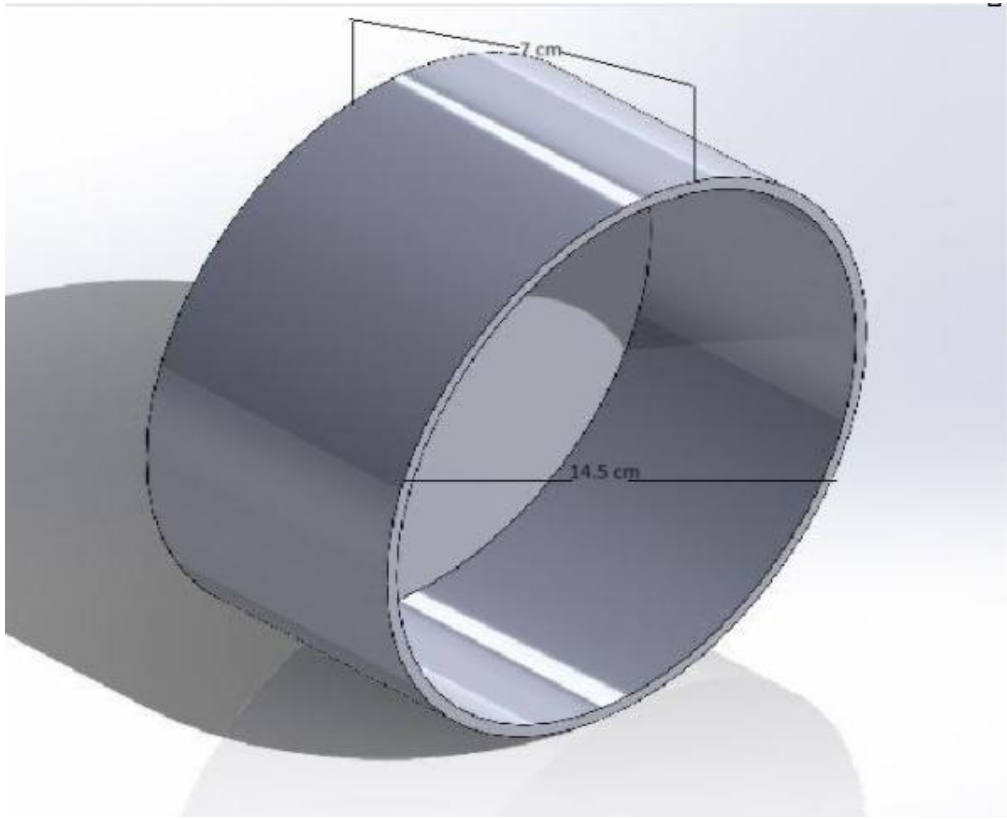
Rubber tube

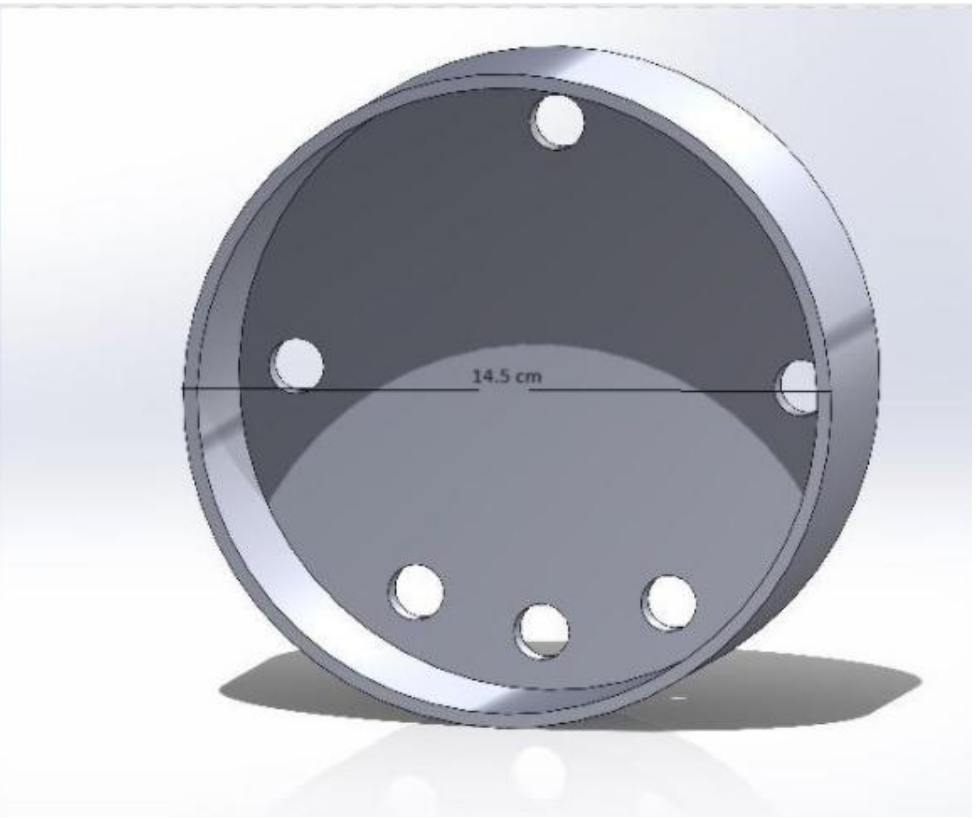
PVC pipes

Chassis and design parts of the submarine



Chassis and design parts of the submarine





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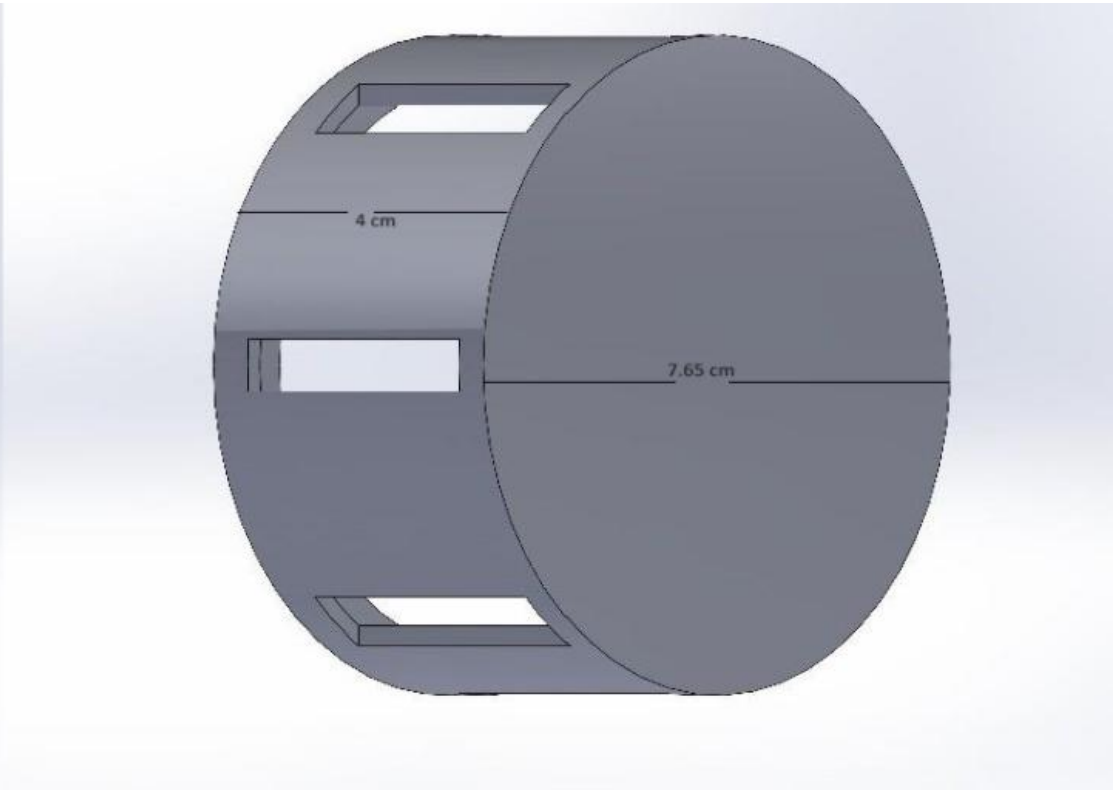
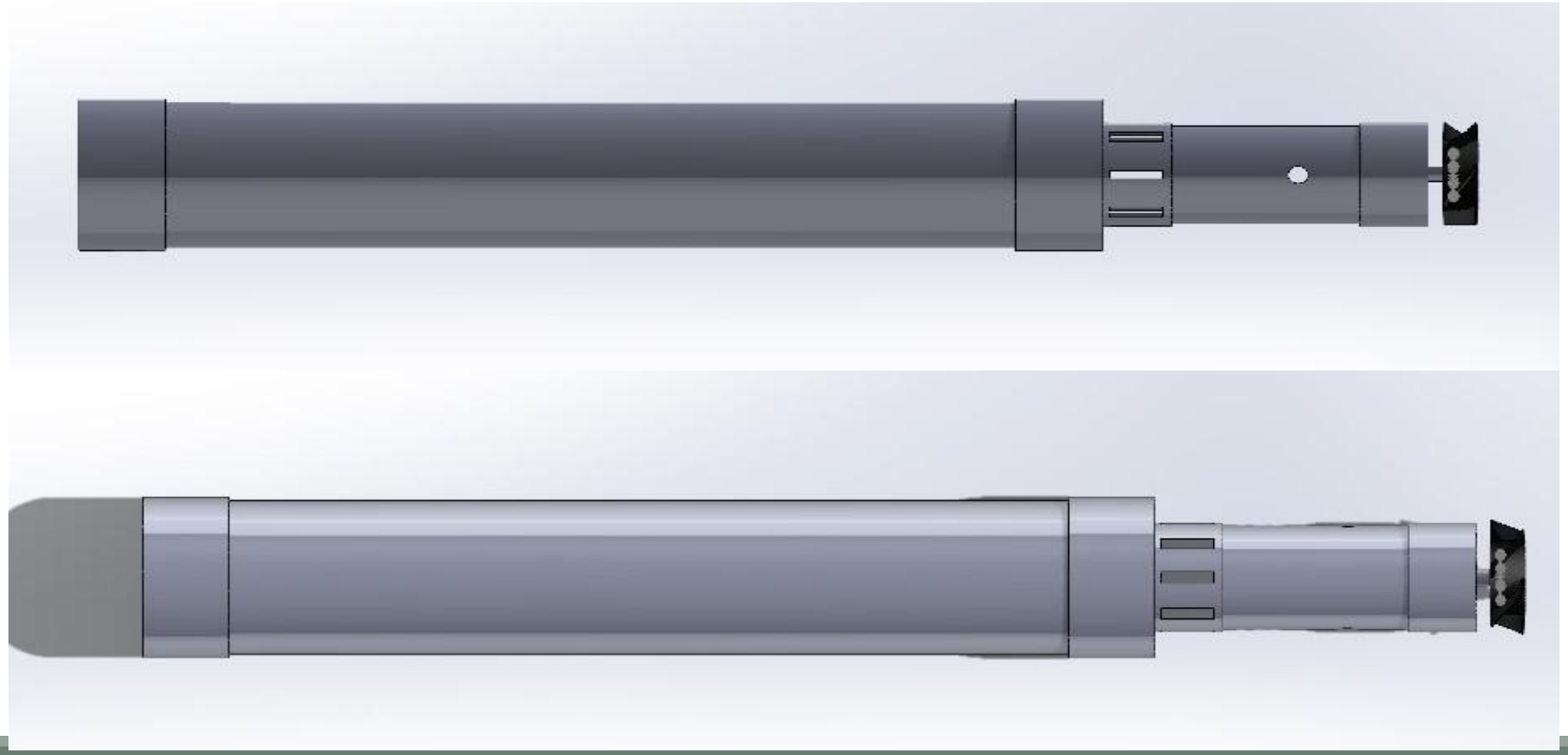
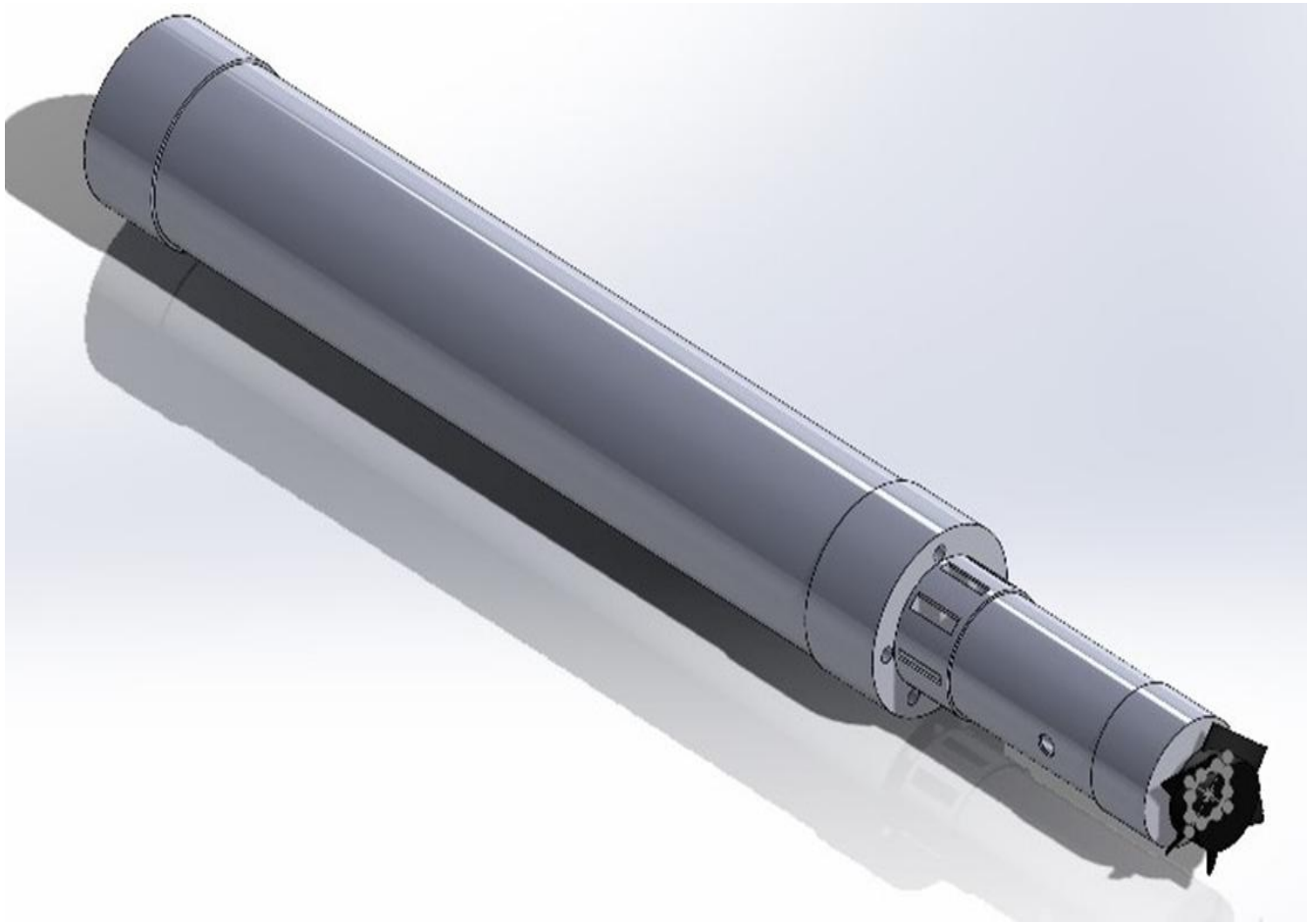
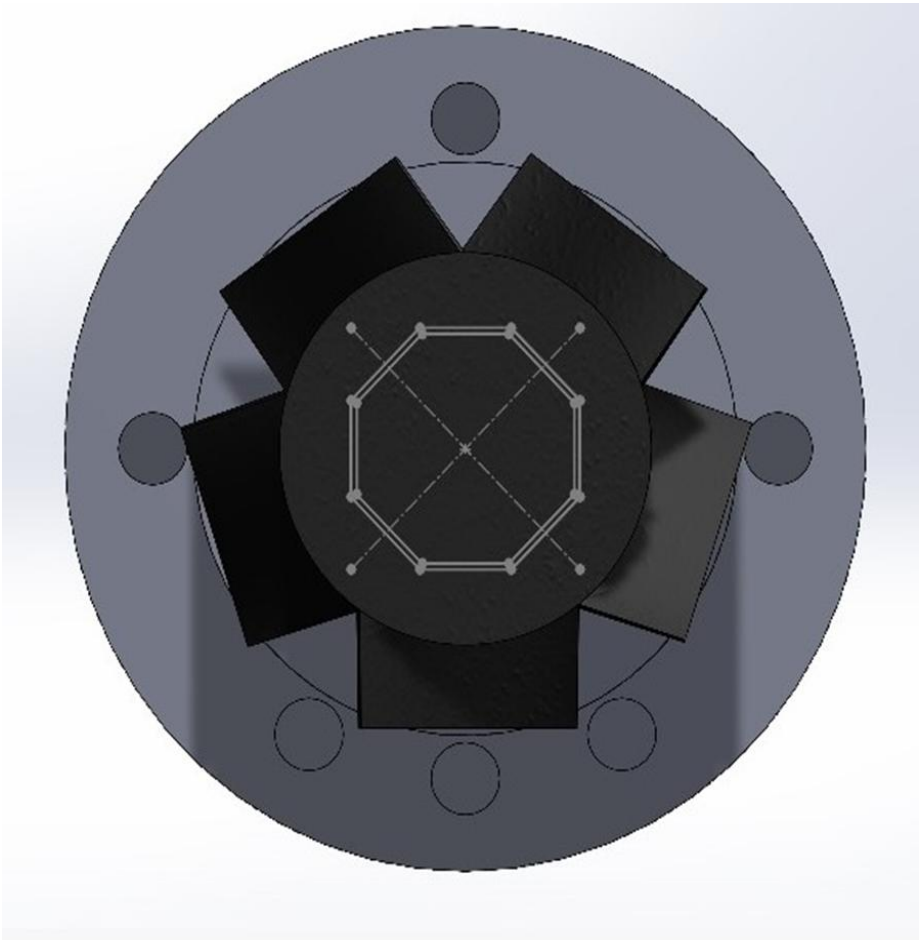


Design of the submarine

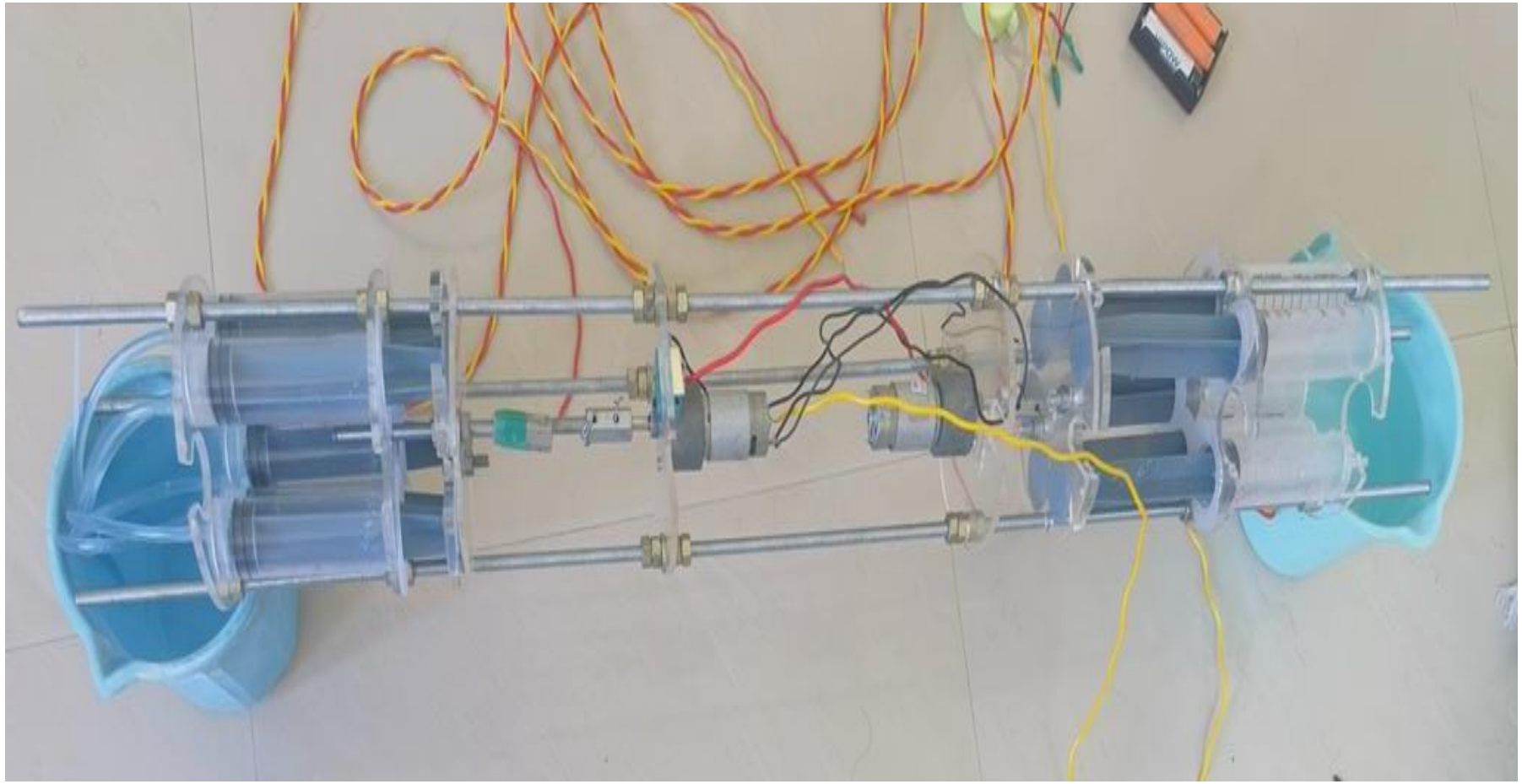


Design of the propeller





Fabrication of the submarine



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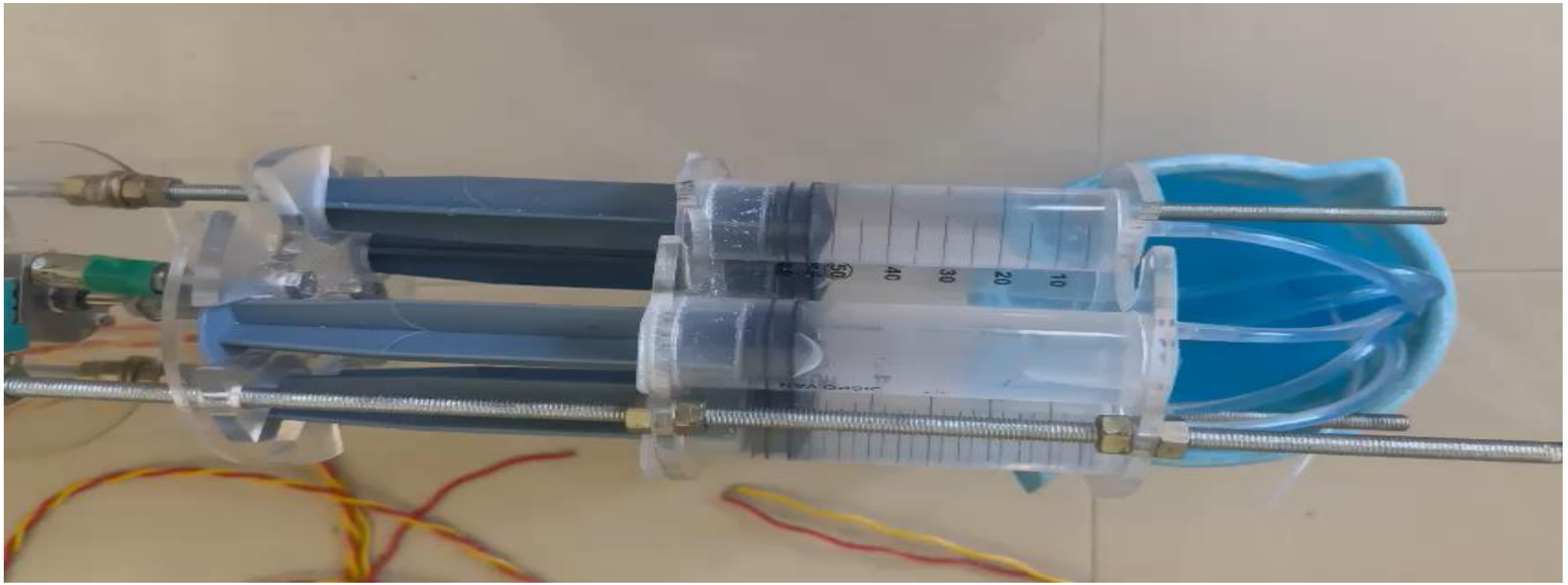
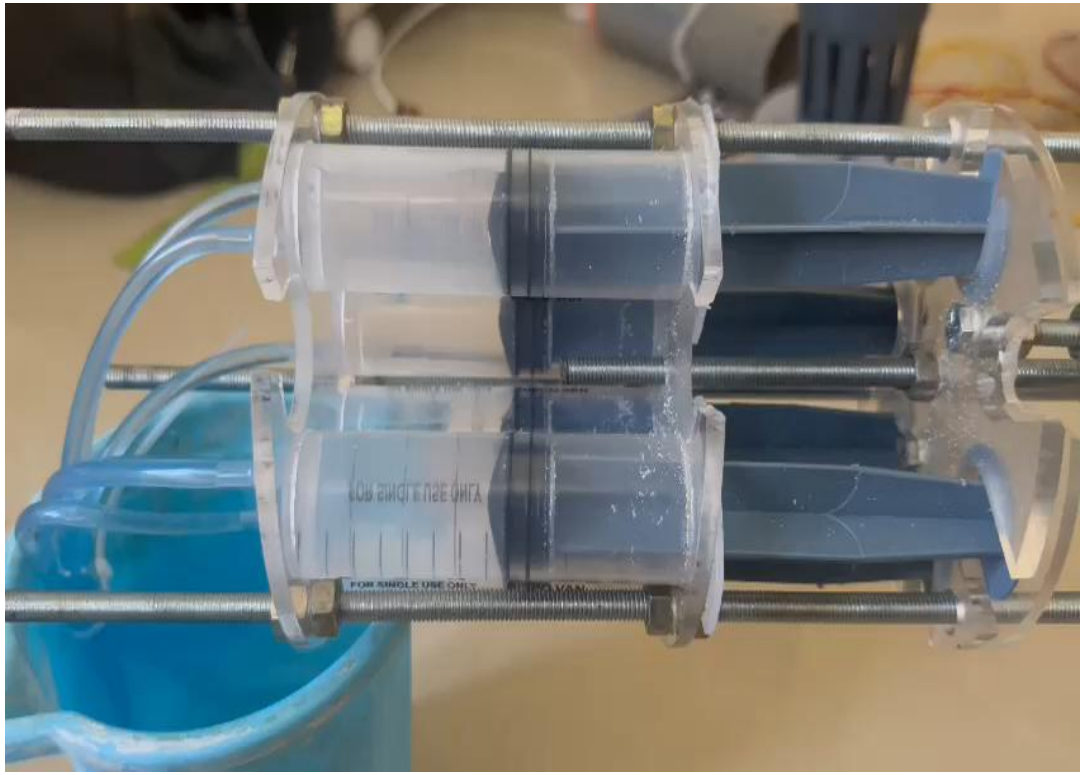
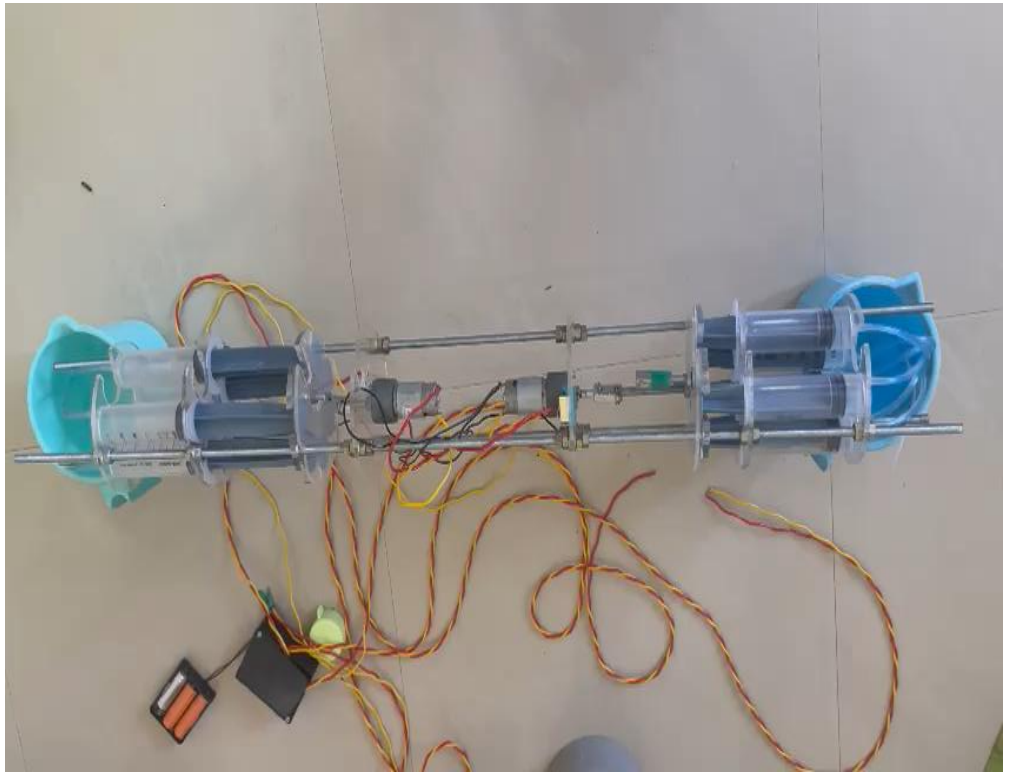
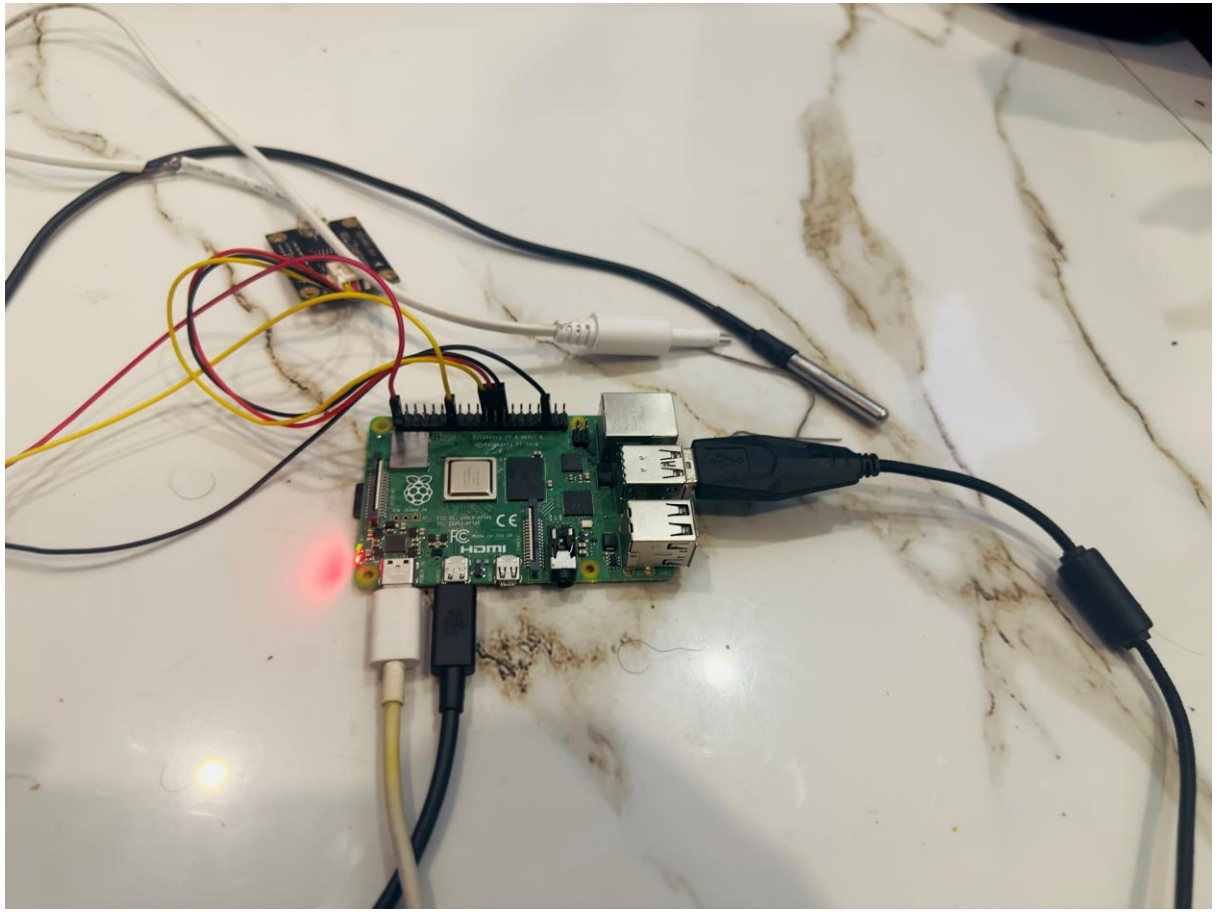






Raspberry Pi 4 circuit



Storage data of micro SD card module

File Edit View

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References

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THANK YOU