

DESIGN AND FABRICATION OF SUBMARINE FOR CORAL REEFS MONITORING

TEAM MATES

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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 flow of fan

Literature review

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.

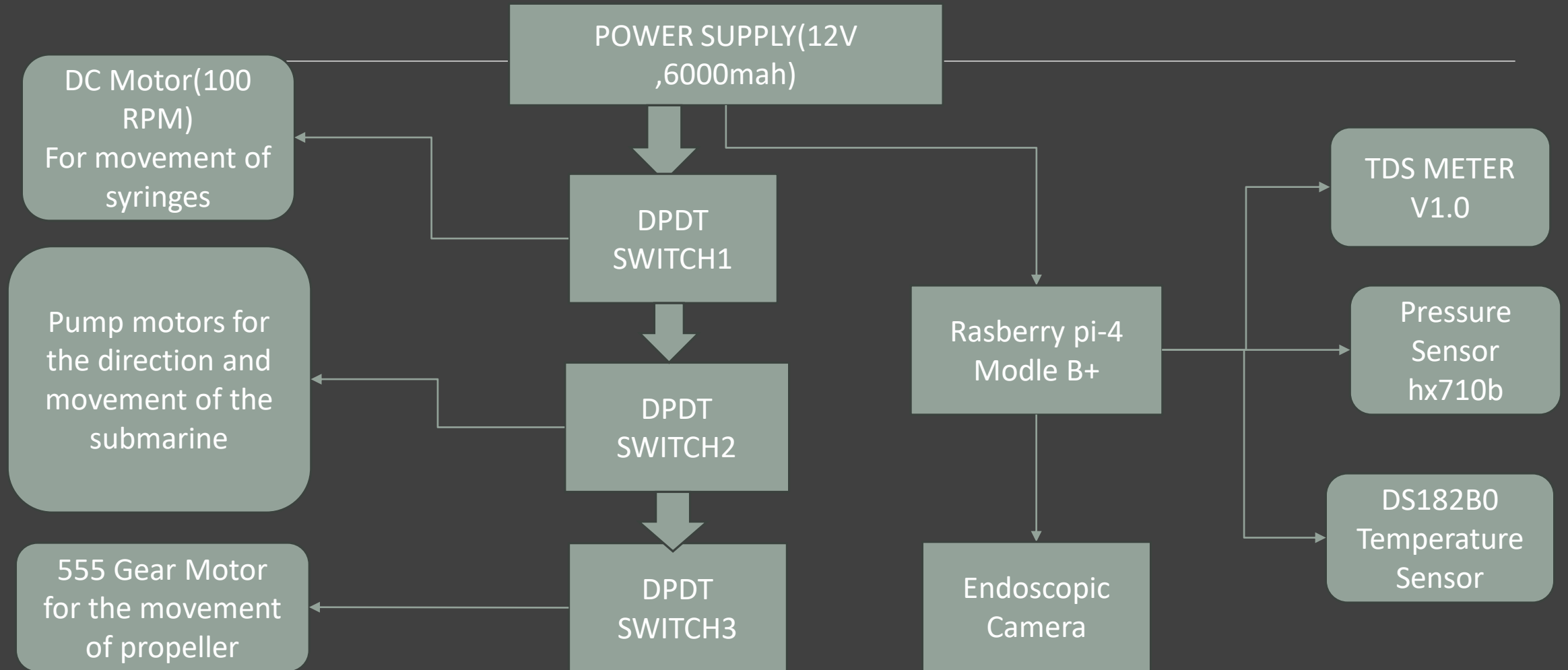
Problem statement

- 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 analysis 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



METHODOLOGY

Initializing
Controller, Raspberry pi



Controlling the submarine
using DC motor



Getting the view of the
ocean through camera's

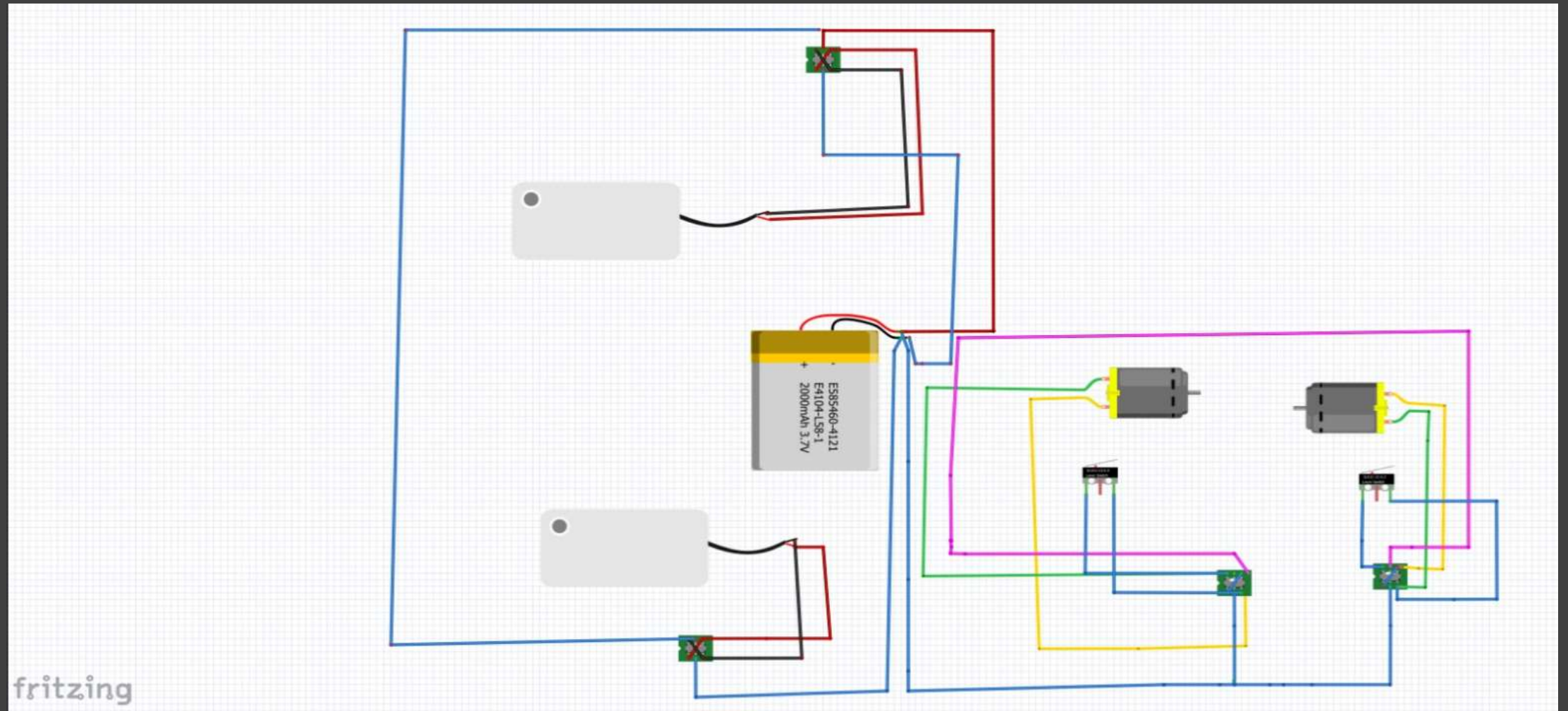


Submarine operating with
buoyancy force



Collection of coral reef
Eco-system data and
monitoring the marine life

Circuit diagram for submarine



COMPONENTS LIST

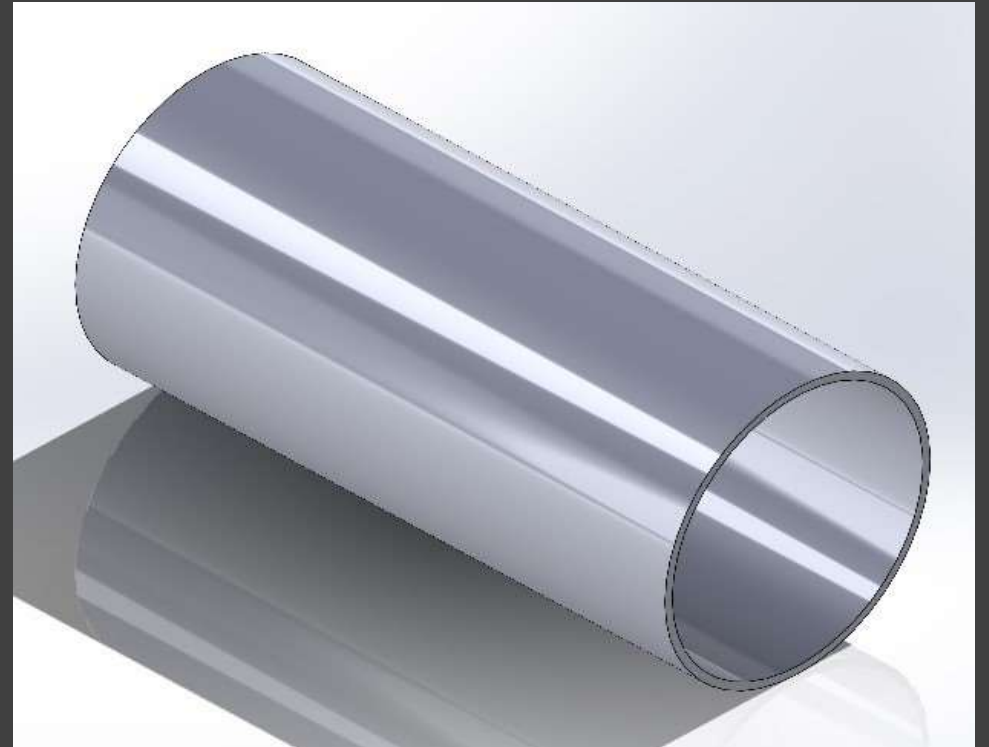
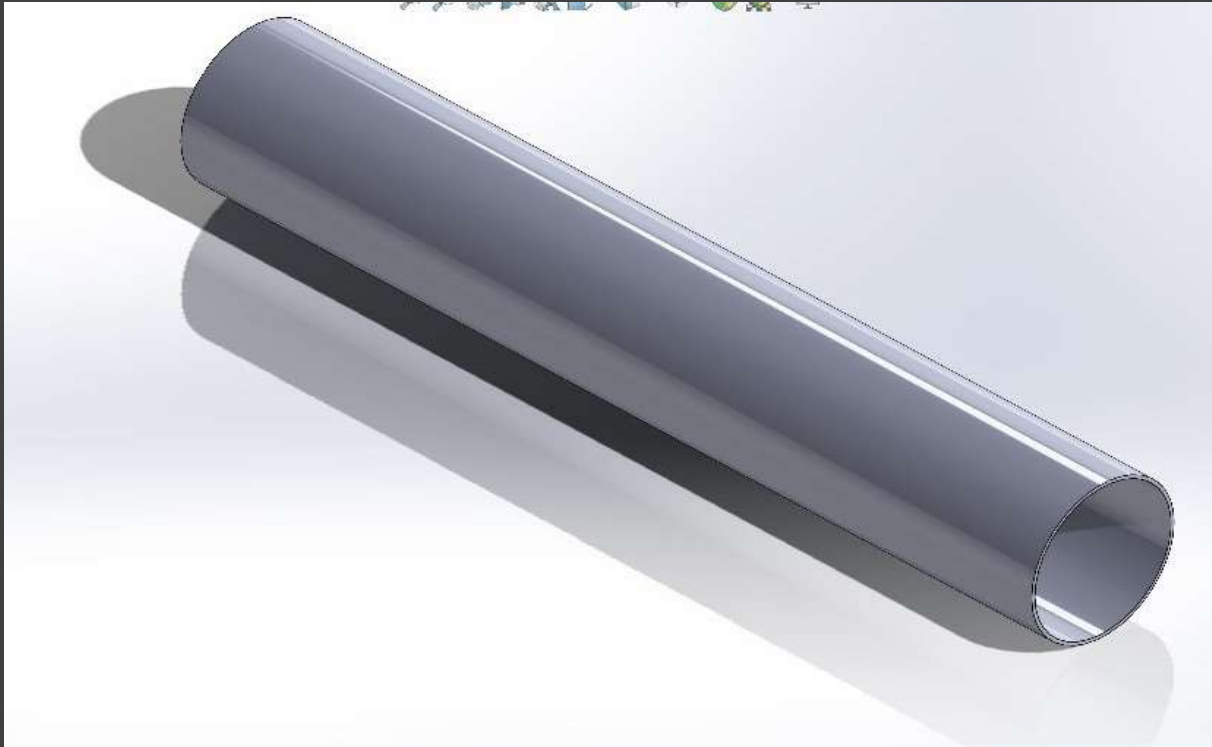
ELECTRICAL COMPONENTS

DS18B0 water proof temperature sensor
Limit switches
Arduino micro SD card
DPDT Switches
555 Gear Motor(100 RPM)
12V ,6000mah Li Ion battery
DC Motor(300 RPM)
Pressure Sensor HX710B
TDS Meter V1.0
Raspberry pi -4[modle B+]
Endoscopic camera
Buck convertor

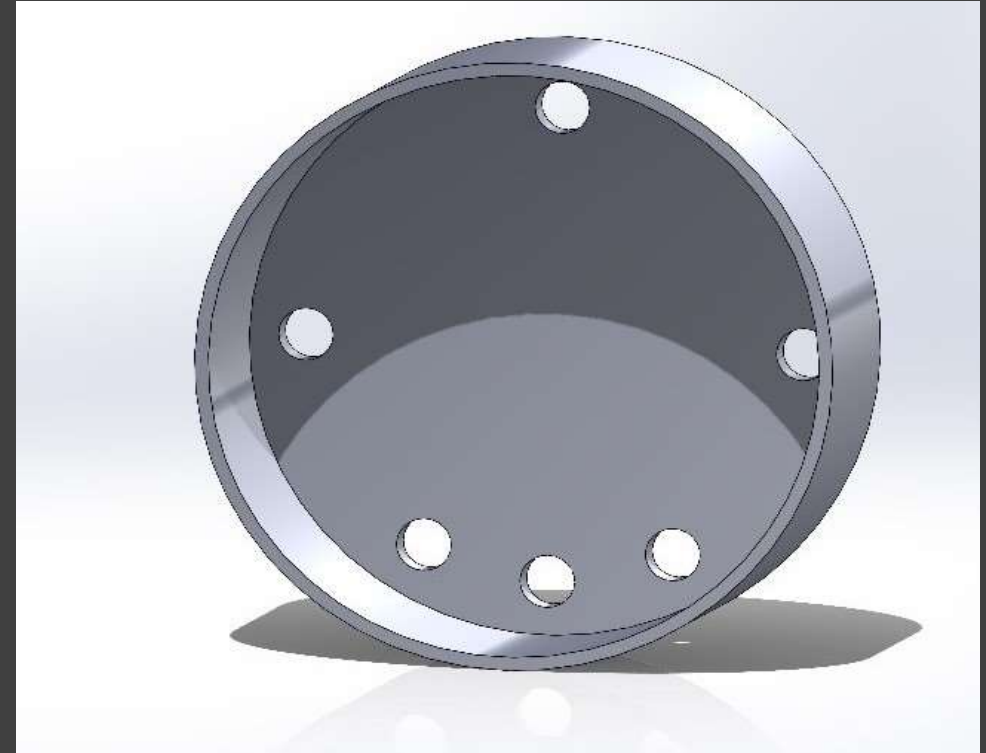
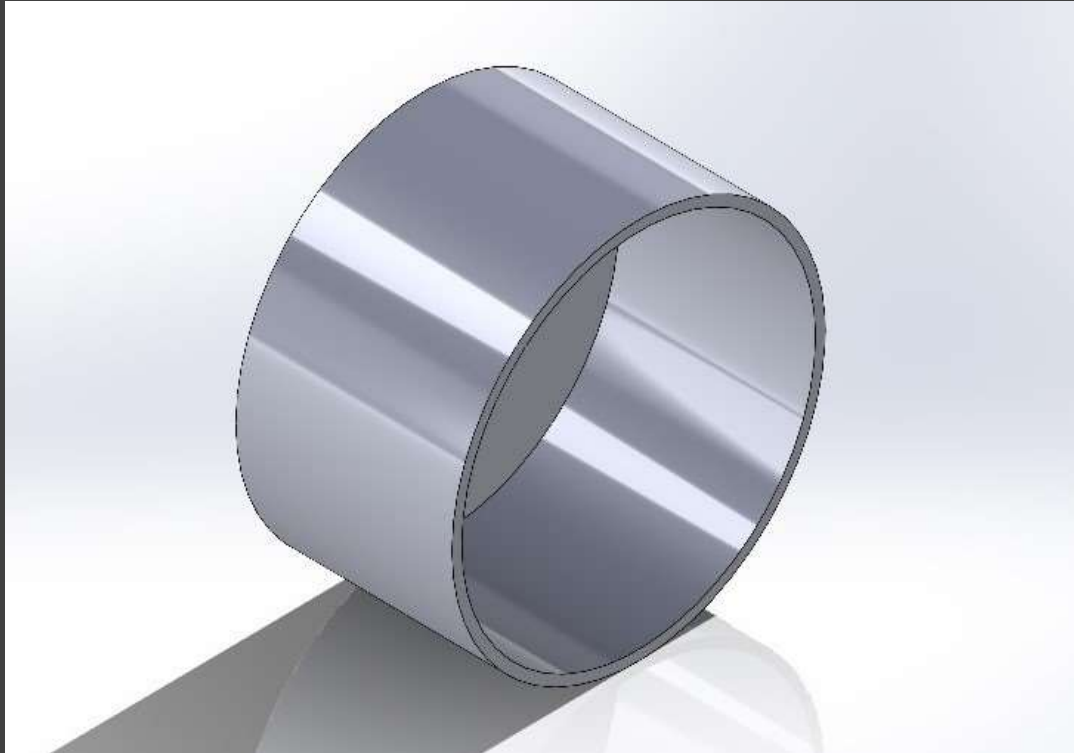
HARDWARE COMPONENTS

8mm Threaded rods
Syringes(50ml)
Acrylic sheet
Couplers
Spokes
Rubber tube
PVC pipes

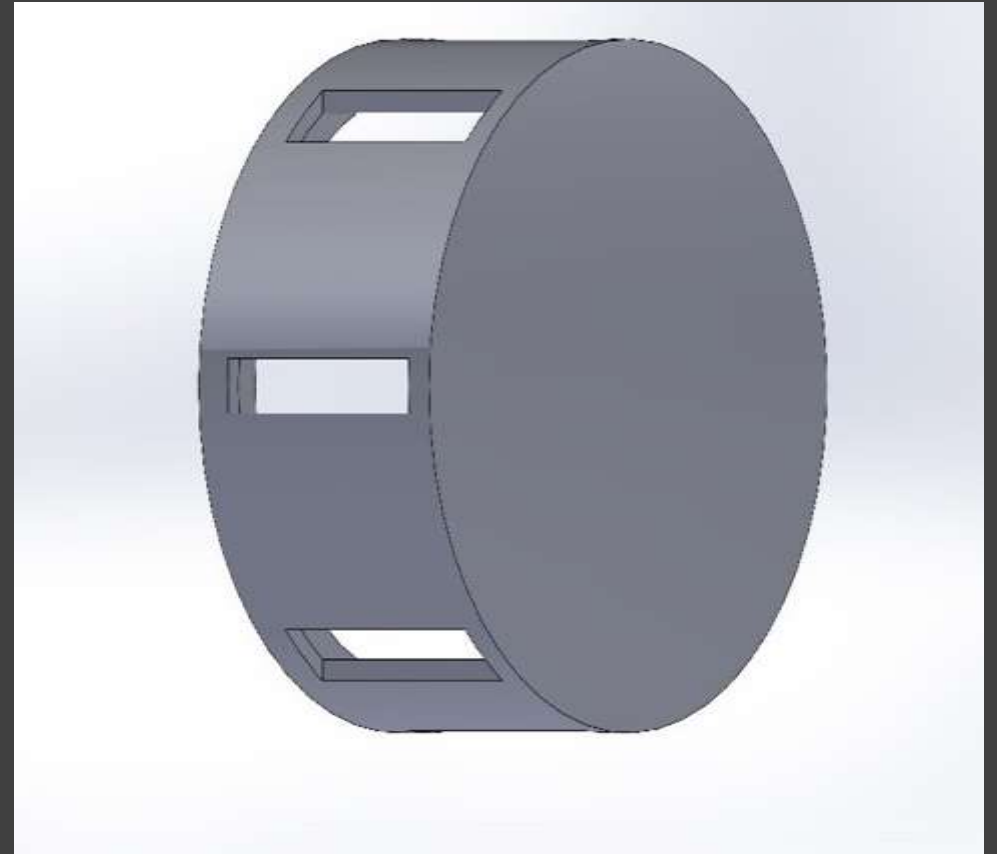
Chassis and design parts of the submarine



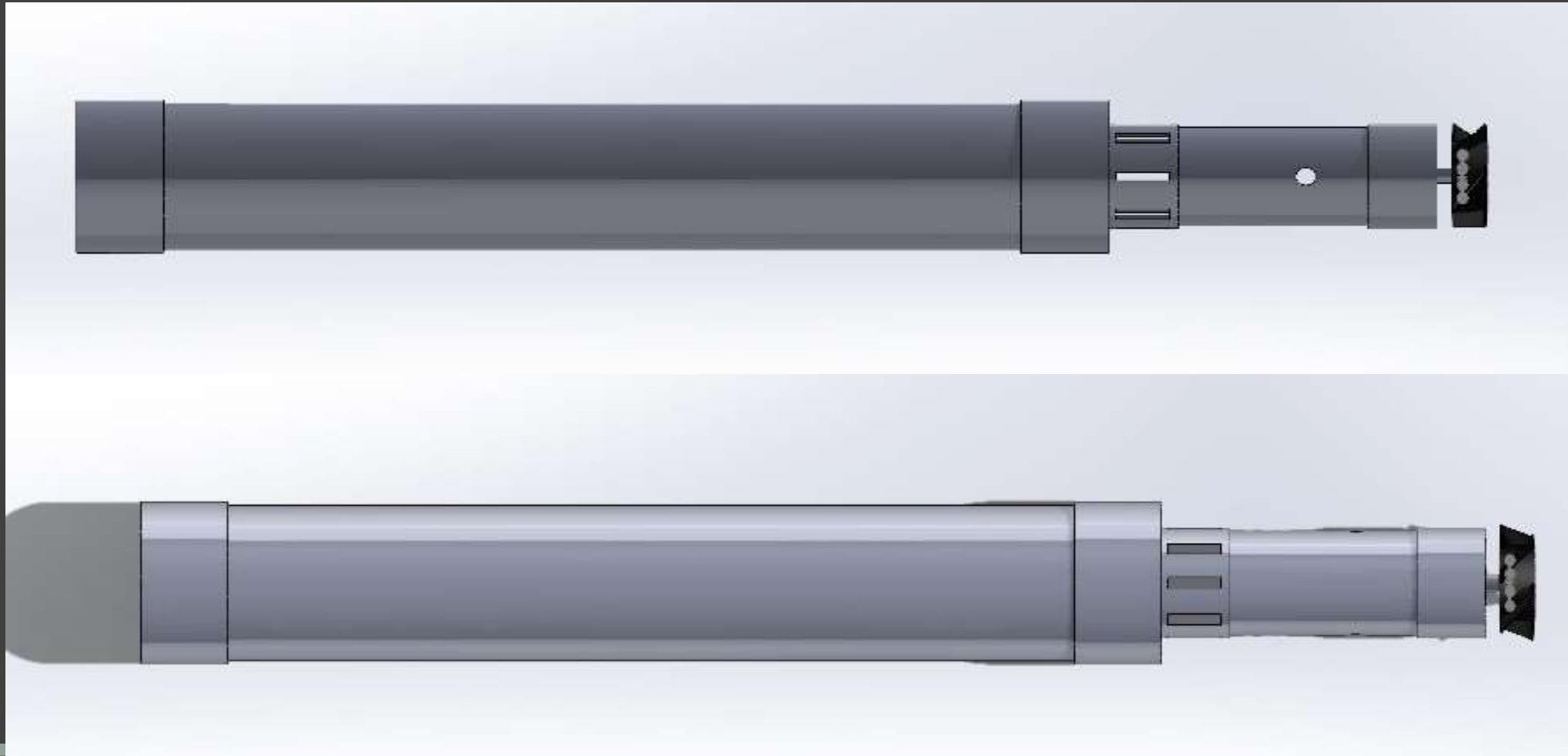
Chassis and design parts of the submarine



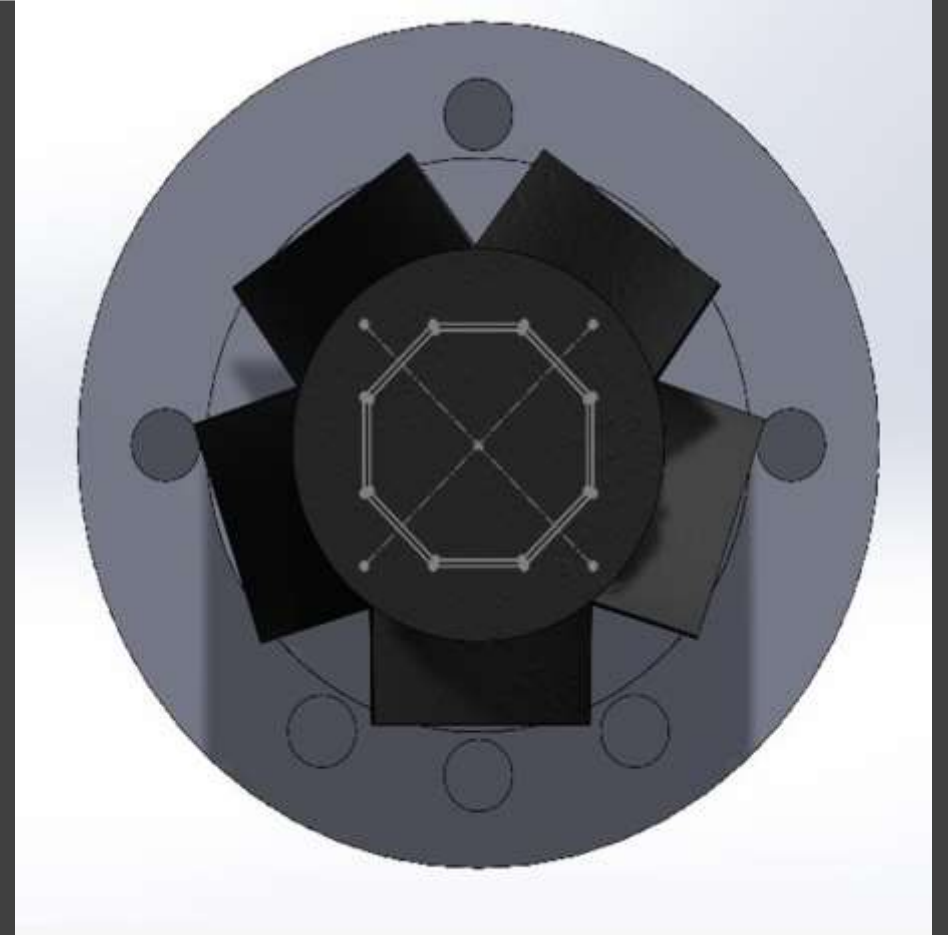
Chassis and design parts of the submarine



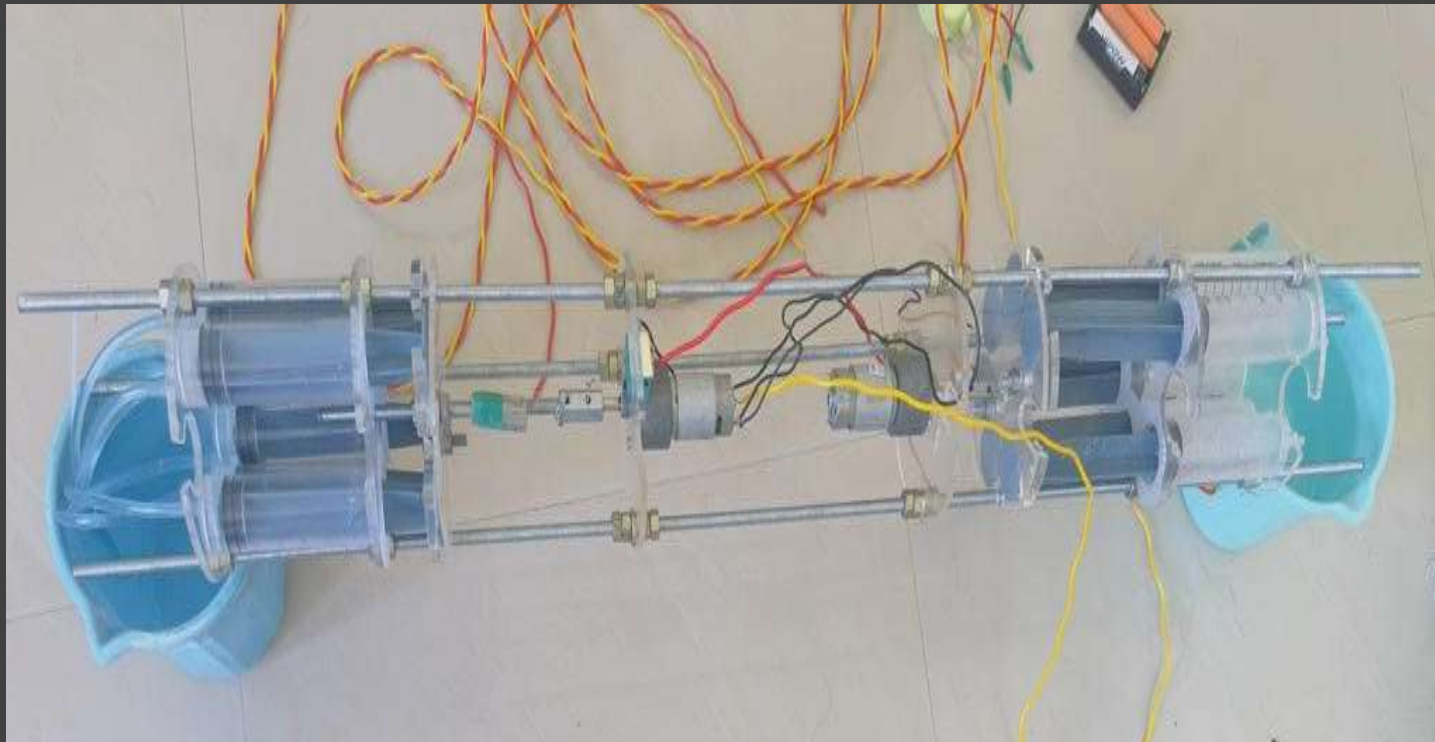
Design of the submarine



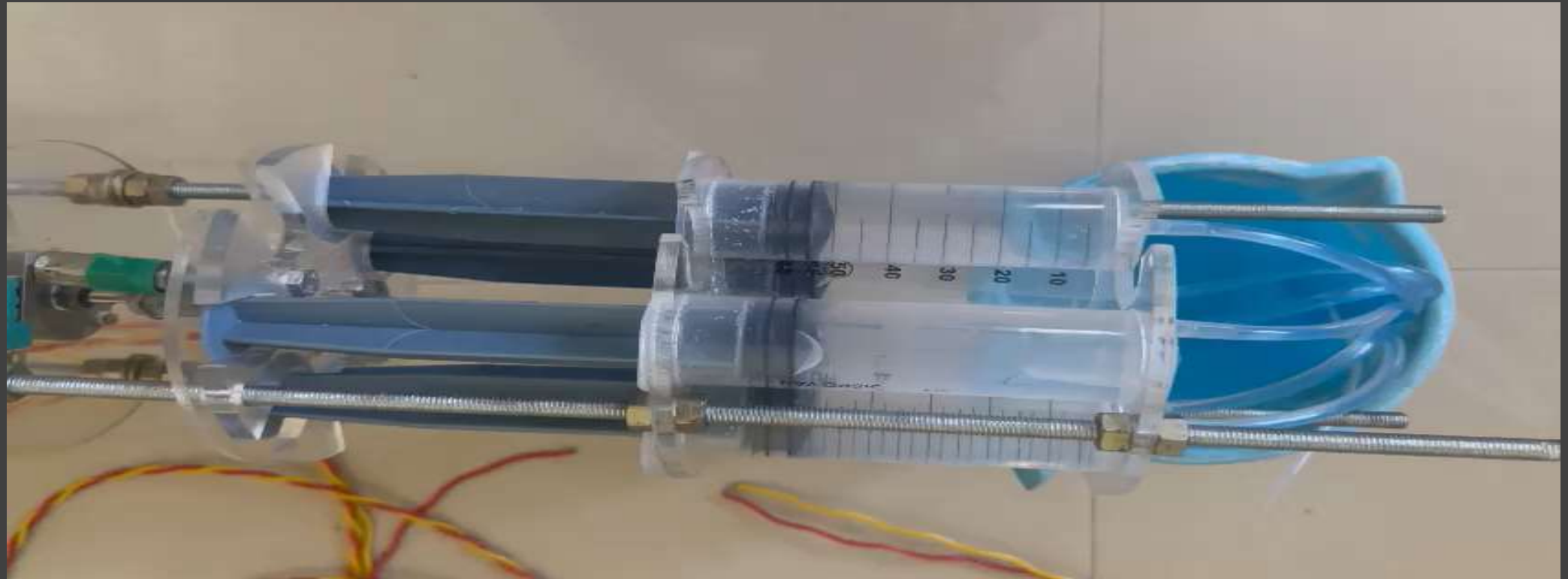
Design of the propeller



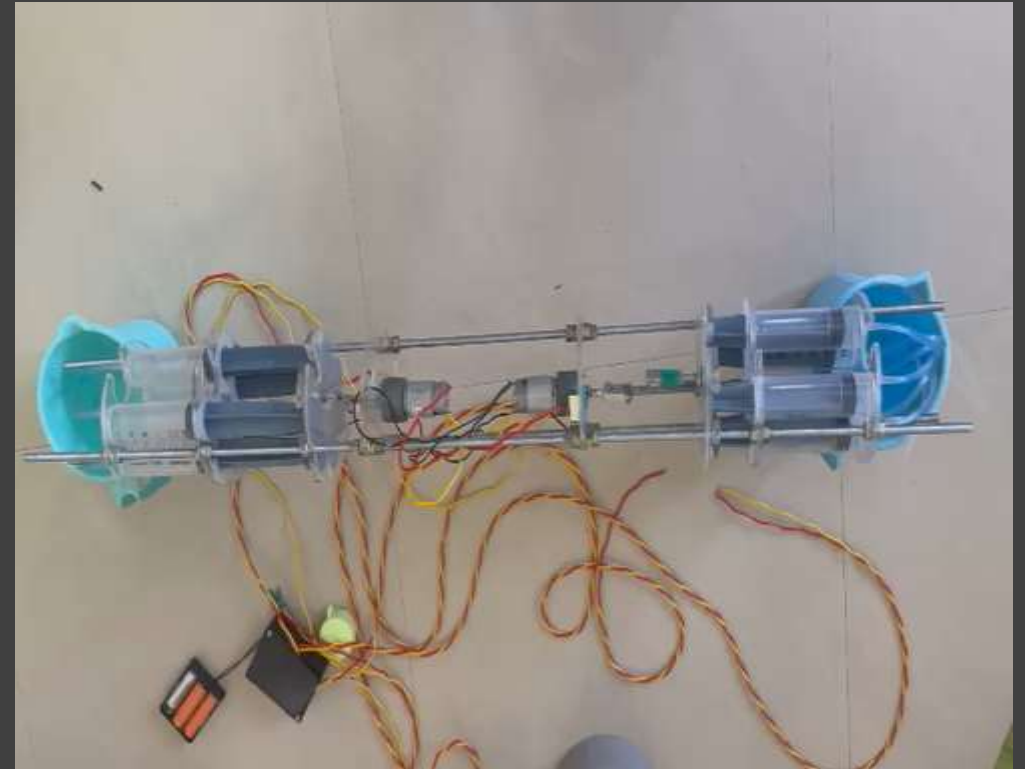
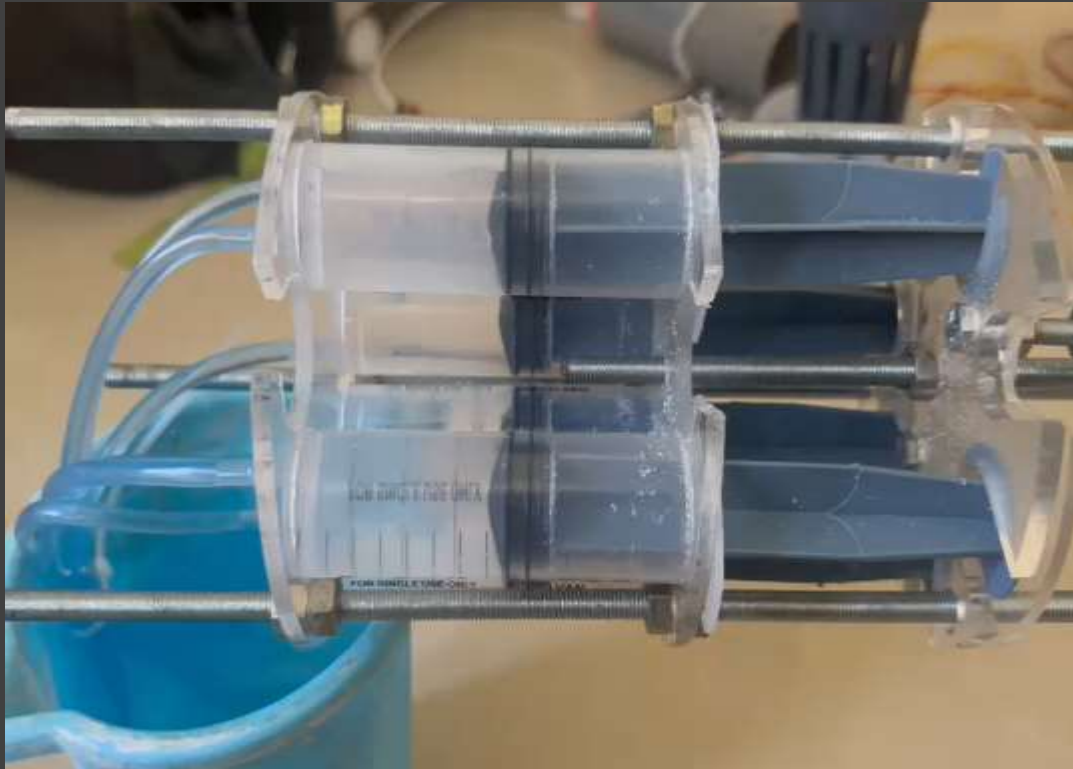
Fabrication of the submarine



Fabrication of the submarine



Fabrication of the submarine



Storage data of micro sd card module

[illegible]

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TDS Value: 20  
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Temperature: 7°C, Pressure: 29 hpa, TDS: 20 PPM  
  
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References

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- **Coral Identification and Counting with an Autonomous Underwater Vehicle** [Md Modasshir](#); [Sharmin Rahman](#); [Oscar Youngquist](#); [Ioannis Rekleitis](#) 2018 IEEE
- Monitoring coral reefs in optically-deep waters R. A. Armstrong¹ , H. Singh² , S. Rivero¹ , and F. Gilbes Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, Florida, 7-11 July 2008 Session number 17

THANK YOU