ROV Research:

Communication System:

- Radio Communication:
    - Radio is greatly attenuated underwater due to water being greatly attenuating and its dispersive nature limits the signal range and increases signal loss. In other words, radio waves are quickly absorbed by water.
    - Only effective above surface making NRF24L01 the best radio transceiver that is reliable for float to mission station. However, a tether cable must be able to provide power and communicate to and from the mission station for the ROV.

Estimating Theoretical Flow Rates of the T200 Propeller Under Ideal Conditions (Wil Lloyd)

- T200 Propeller Purchase Link: https://bluerobotics.com/store/thrusters/t100-t200-thrusters/t200-thruster-r2-rp/
- From BlueRobotics - flow rate
    - "We do not have the tools to measure this empirically, but with some estimates and a little math we can provide a reasonable theoretical value for the flow rate under ideal conditions:
      The T200 propeller has a 76.2 mm outer diameter, and a 40 mm diameter central hub. It also has a pitch of 22.5° at 75% of its radius, and spins at about 3075 RPM full throttle 12 V, and 3600 RPM 16 V. Using the pitch and RPM approximation, this results in a theoretical maximum flow speed of 4.45 m/s at 16 V, and 3.80 m/s at 12 V. The propeller has an area of about 0.00330373 m^2. Multiplying this area by the flow speed results in a volume of about 0.014702 m^3/s (or 14.7 liters/s or 3.88 gallons/s) at 16 V, and 0.012554 m^3/s (or 12.5 liters/s or 3.32 gallons/s) at 12 V.
    - Bear in mind these speeds and flow rates are rough estimates based on some math and not true measurements, you should expect the real number to be lower. However, they should be reasonably accurate for estimation purposes."
    - Reference: Blue Robotics. (n.d.). *T200 Thruster for ROVs, AUVs, and marine robotics*. [online] Available at: https://bluerobotics.com/store/thrusters/t100-t200-thrusters/t200-thruster-r2-rp/.

Enhanced Bidirectional Electronic Speed Controller for T200 Thruster:

- A simple bidirectional electronic speed controller for the T200 Thruster. It's based on the BLHeli ESC design with upgraded features and performance!
- Purchase Link: https://bluerobotics.com/store/thrusters/speed-controllers/besc30-r3/

Water Blocking Cables:

- Useful Reference: **https://www.habia.com/en/knowledge-hub/water-blocked-cables/**

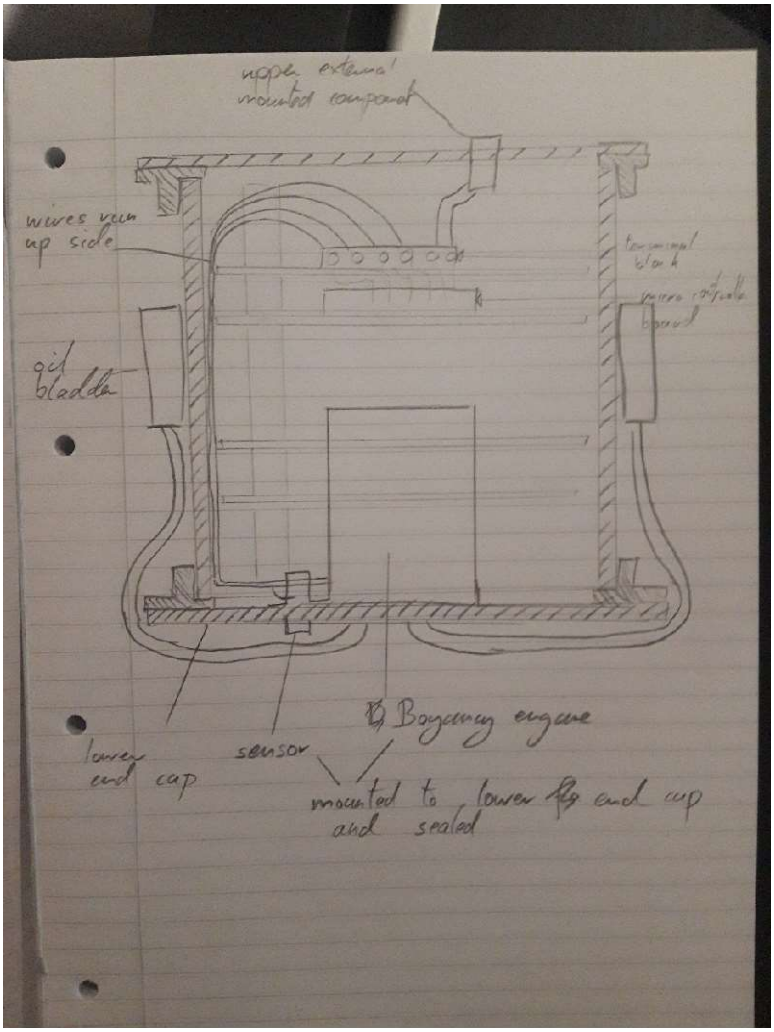
Float Documentation of the teams that competed in 2022:

- **https://drive.google.com/drive/folders/121Tz7x0-EfkKMqCjBjuEYqYDveyaxTBM**

Technical Report from winner for Pioneer competition:

- **Technical Report : Winner Pioneer 2022**
  https://drive.google.com/file/d/1vniAOG5fuoXlKJONgs2LZRRYQhfBqPbc/view

Proposed Design of the Float:



Waterproof DC-DC Converters:

- **Do not purchase this product and only use suppliers trusted by the University. This should only be reference.**
- **Link: https://componentauthority.com/products/waterproof-48v-to-24v-20a-step-down-dc-dc-power-converter-regulator?currency=GBP&variant=44175215722786&utm_medium=cpc&utm_source=google&utm_campaign=Google%20Shopping&stkn=560cdb9ed581&gad_source=1&gclid=EAIaIQobChMIi-zdu53VggMVyZGDBx3KIwQ9EAQYECABEgLCP_D_BwE**