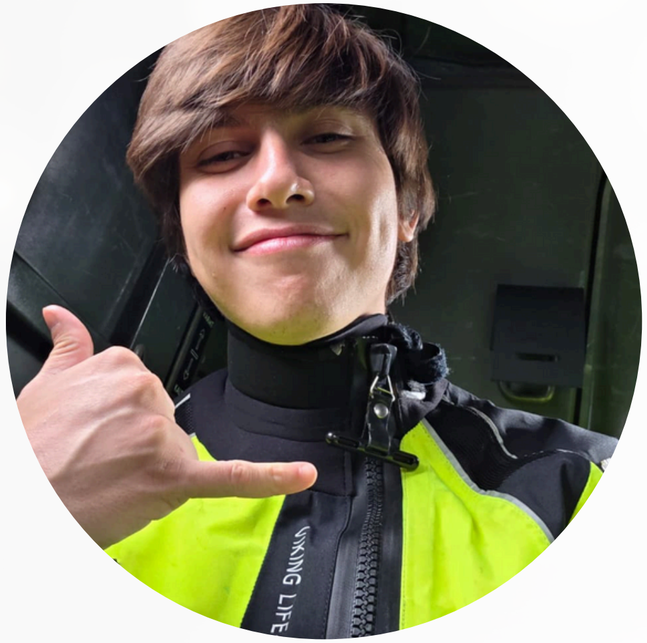
EQUIPO 2

PROYECTO FINAL

-TIER 5-

CONOCE A

NUESTRO EQUIPO



Pablo Daniel Candelas Perez

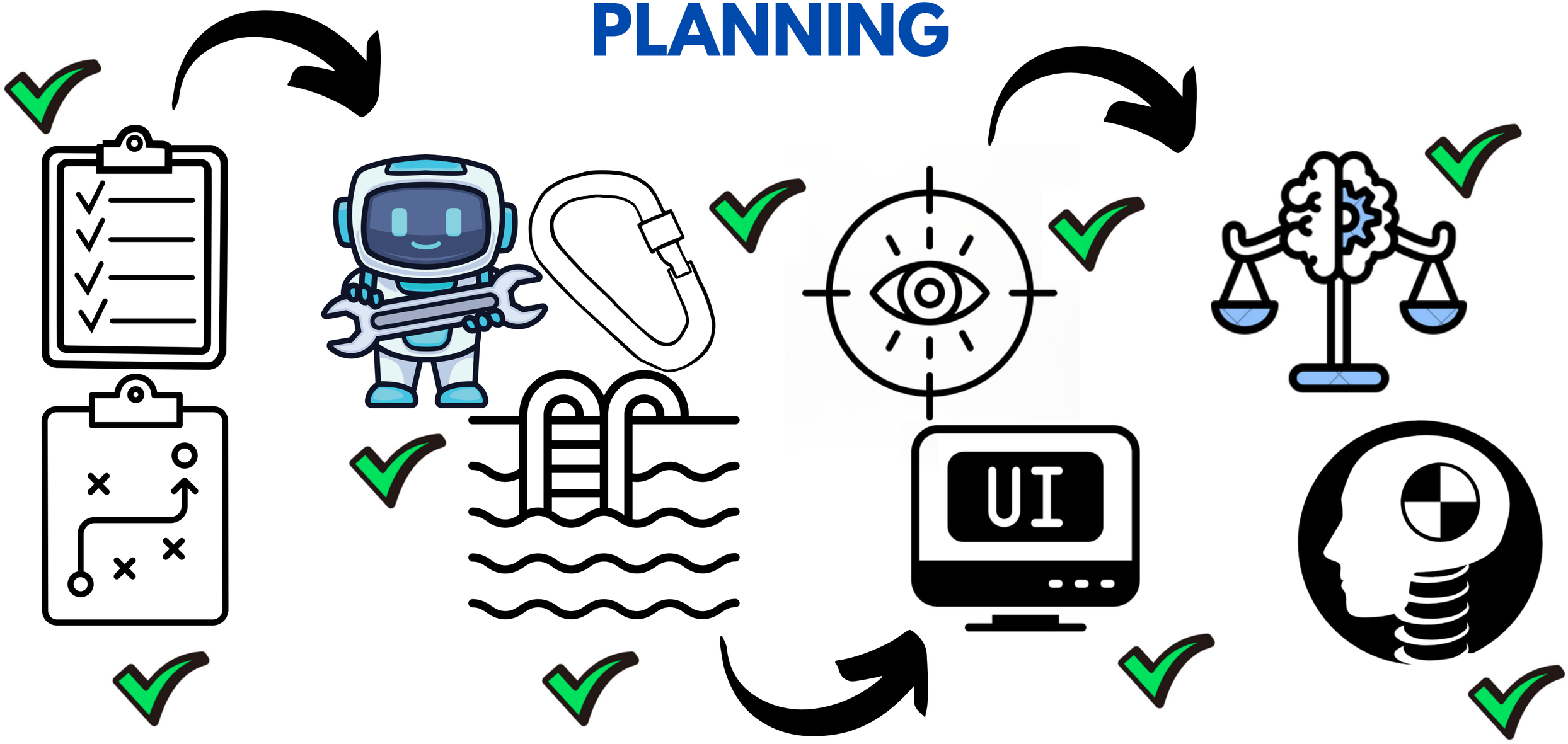
Godsfavour Ugwu-Gabriel

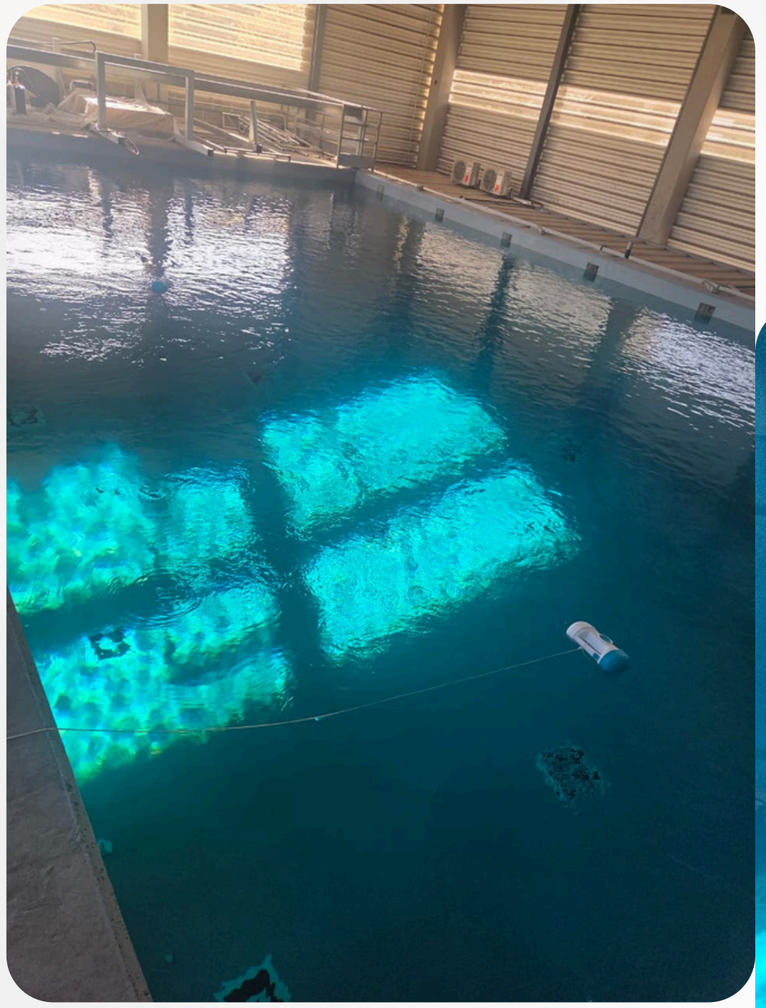
Mukesh

OBJECTIVE
OBJETIVOS

1. Recuperar una “blackbox” del fondo de una piscina usando un ROV
2. Tener un sistema autonomo cognitovo que pueda ser explicado
3. Hacer uso de una interfaz de usuario amigable para monitorear la mision y controlar el ROV

PLANNING





THE ENVIRONMENT

Cirtesu water tank

- Water tank has been filled with water
- ARuco markers IDs identified & located
- Working station in top part and visual station in lower part
- Ready to deploy ROVs

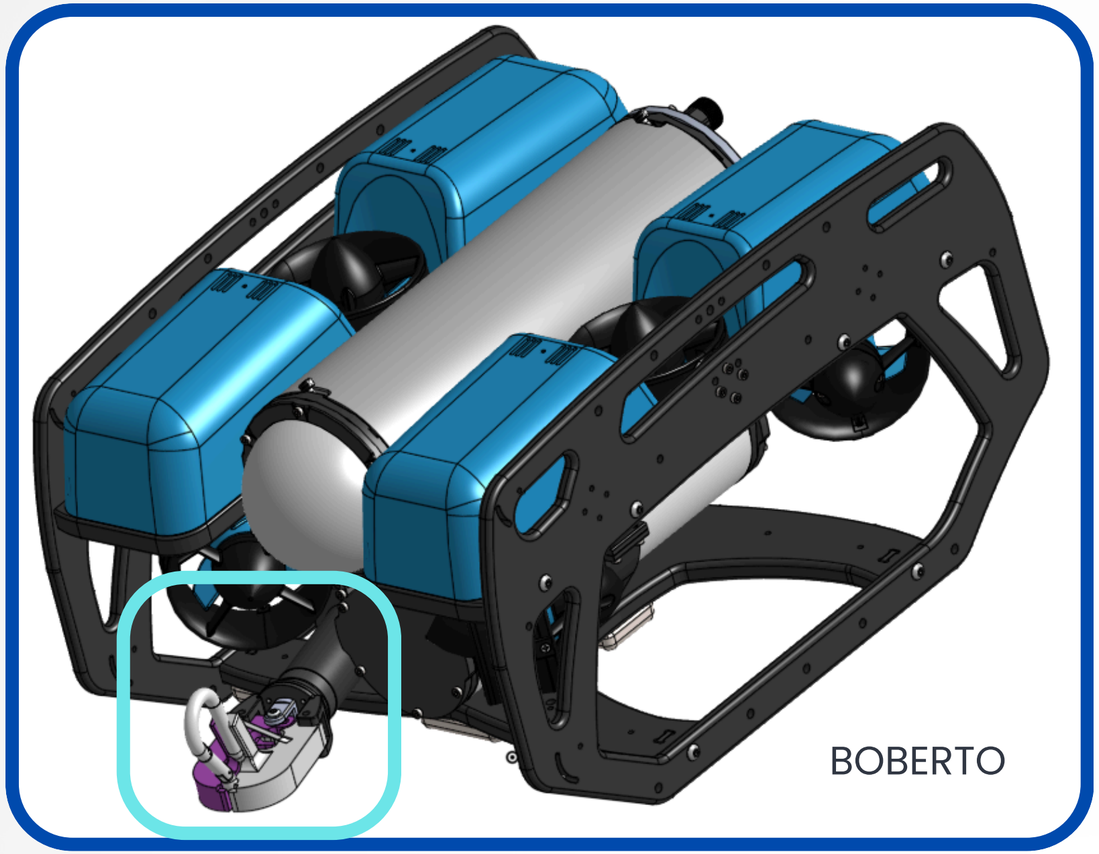
TECH
EQUIPMENT

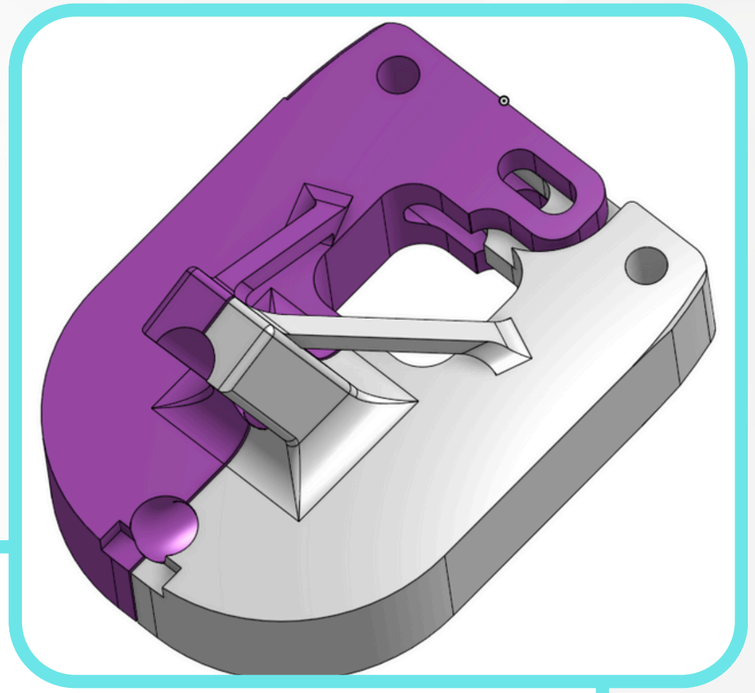
Bluerov2- heavy configuration

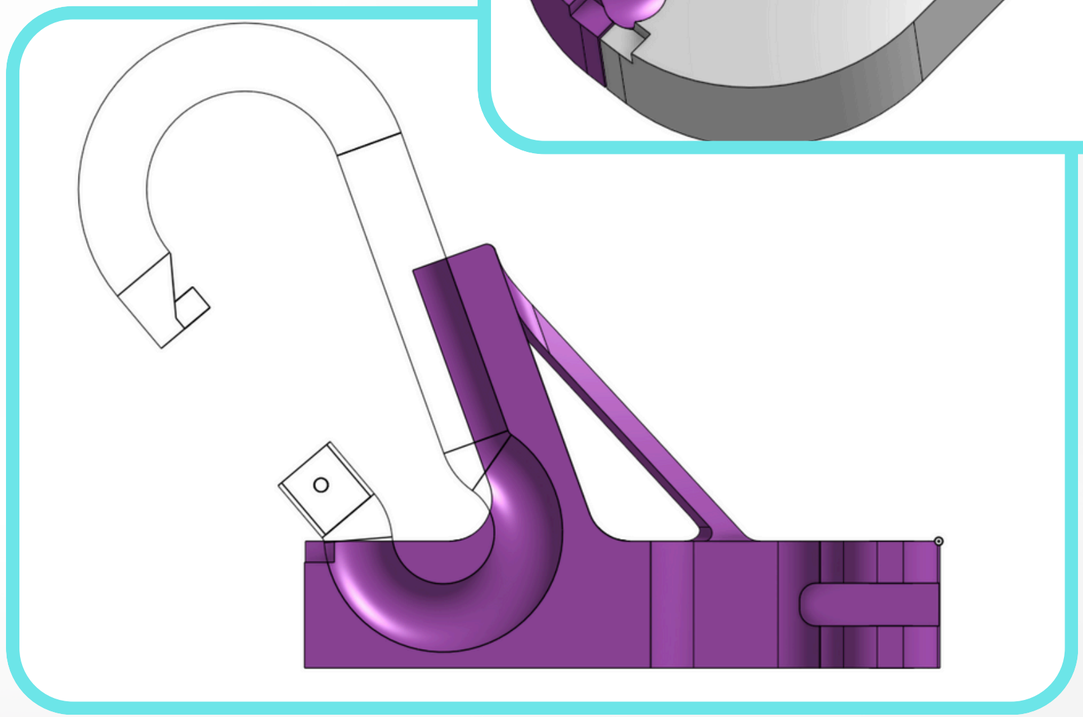
- Camera - Calibrated ✓
- IMU - Calibrated ✓
- Depth sensor - Calibrated✓
- Thethered - Correct connection ensured ✓
- Battery - Working ✓
- linear actuator (newton gripper) - controlled ✓
- 6 DoF, 8 thrusters - Controlled and correctly mapped ✓
- Lights - Controlled and pins activated ✓

BOBERTO

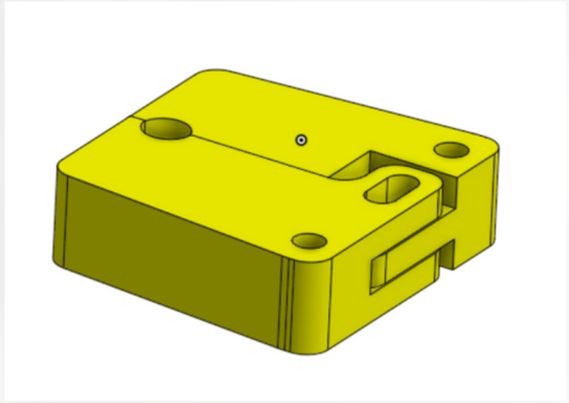
GRIPPER V1

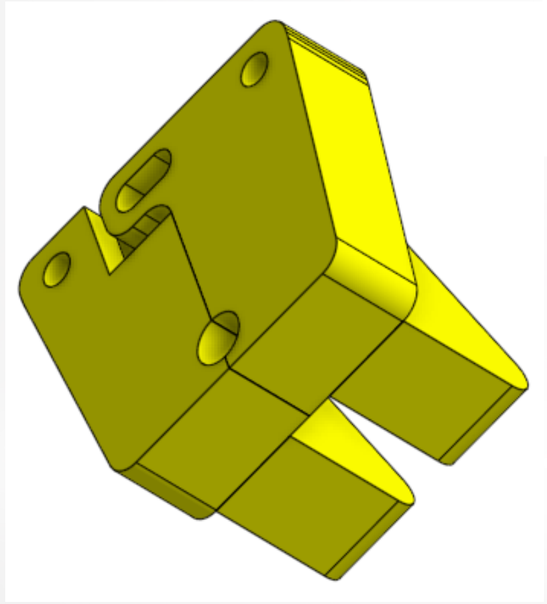


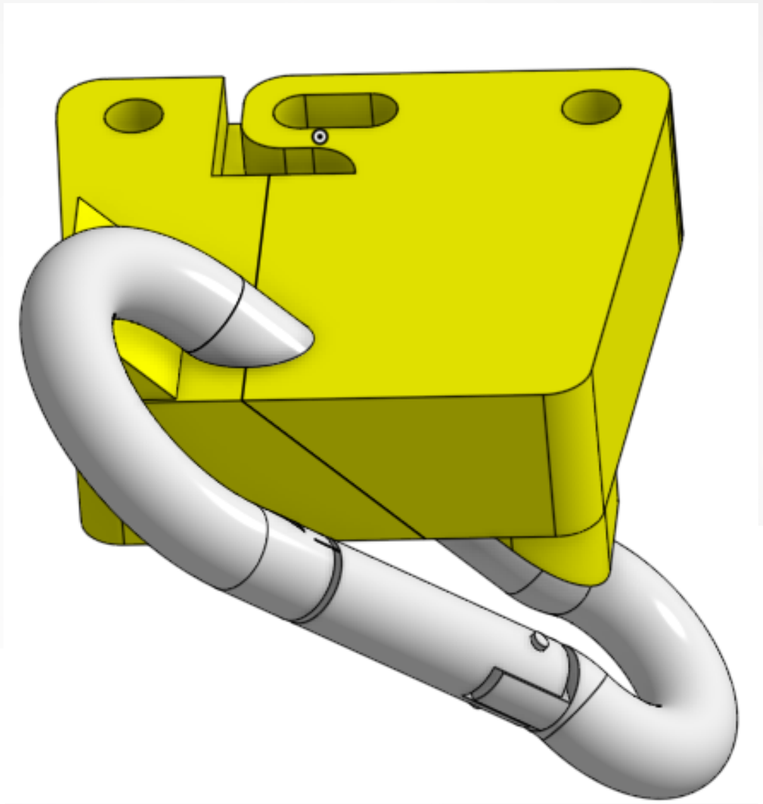


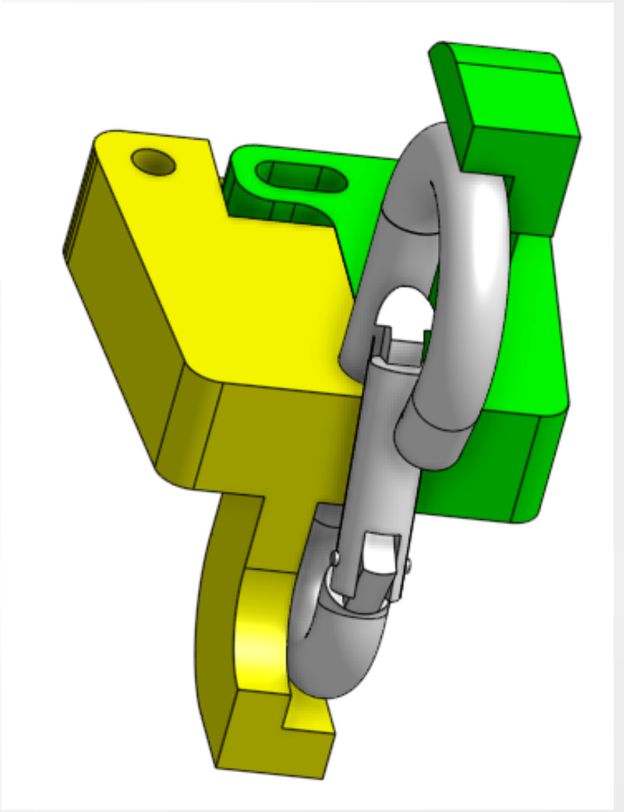


GRIPPER V2





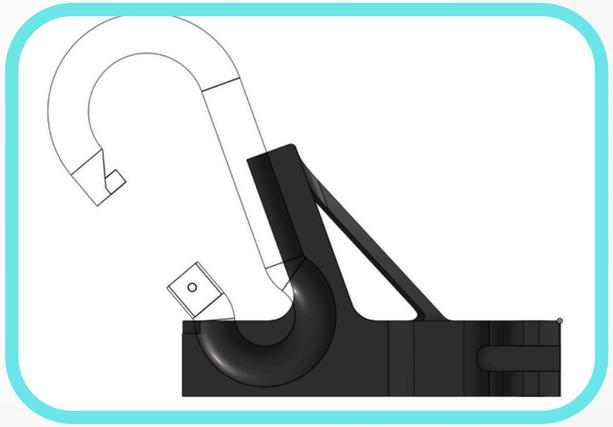




GRIPPER VF

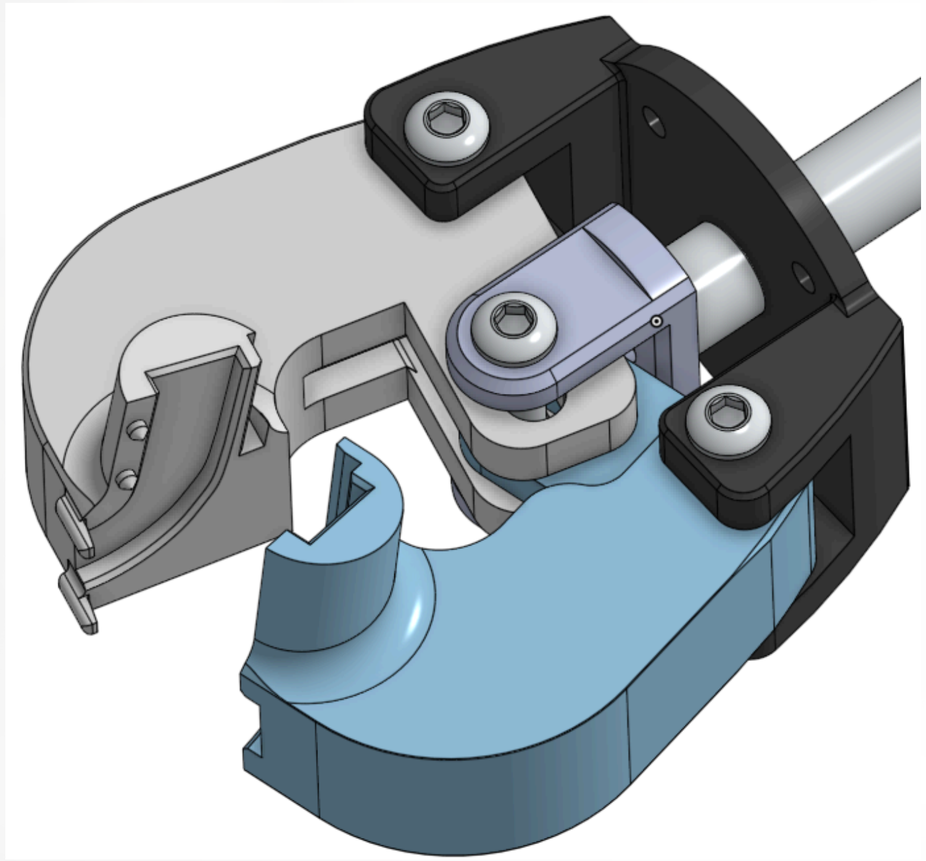
- Final carabiner selected
- Soft to use
- good size for handle

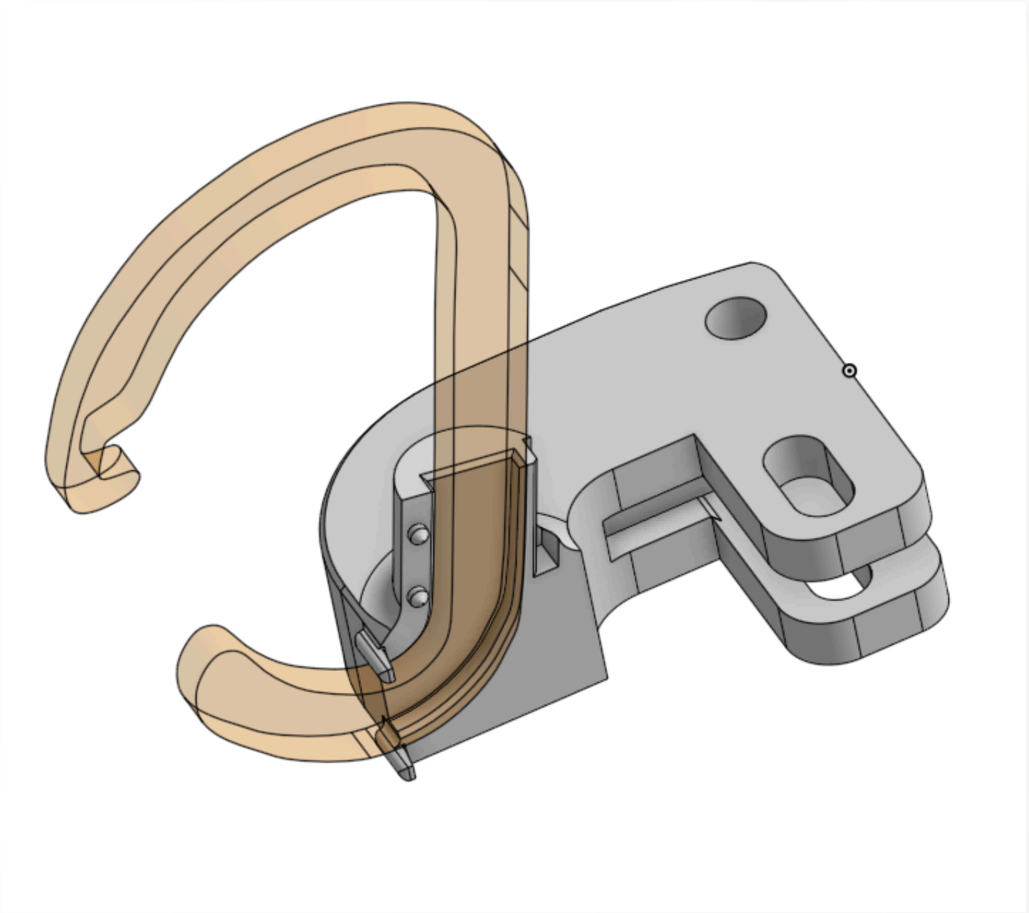
Modify to:



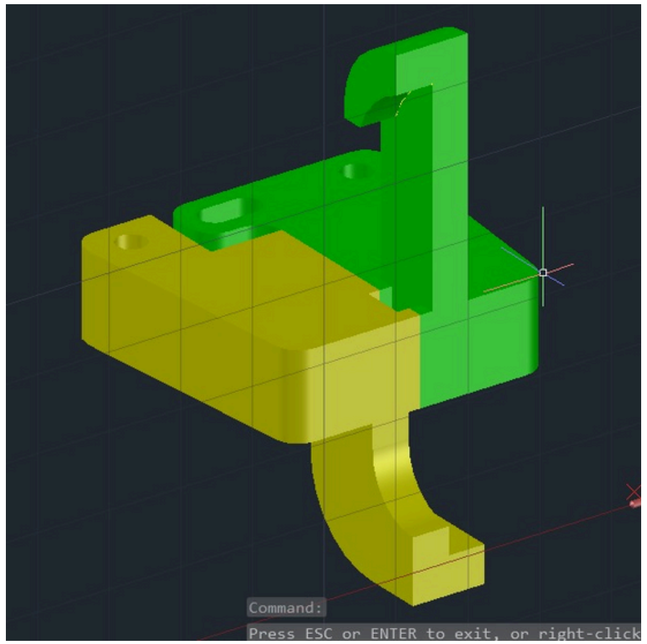
- Position with angle for easier approach
- Consider both vertical and horizontal black box poses
- Good grip, at least 3 contact points

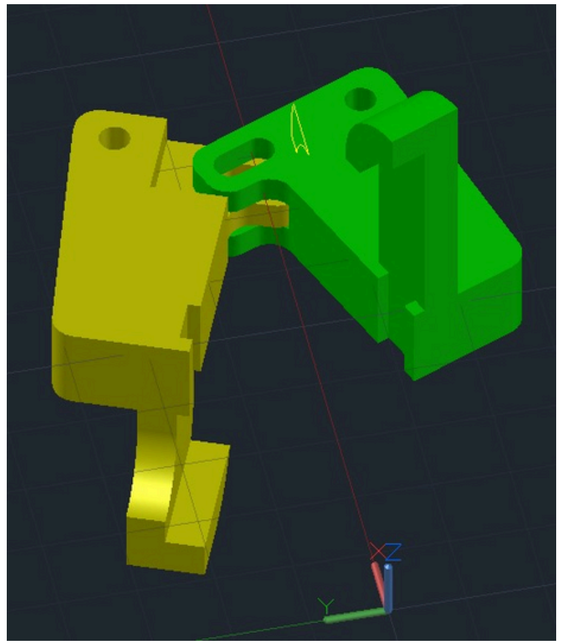
GRIPPER VF_1 BROKEN

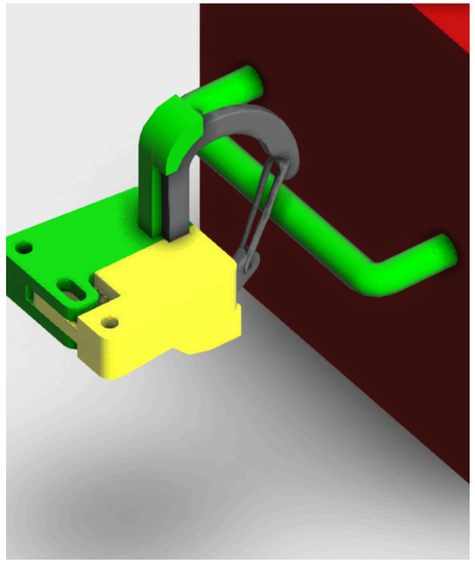


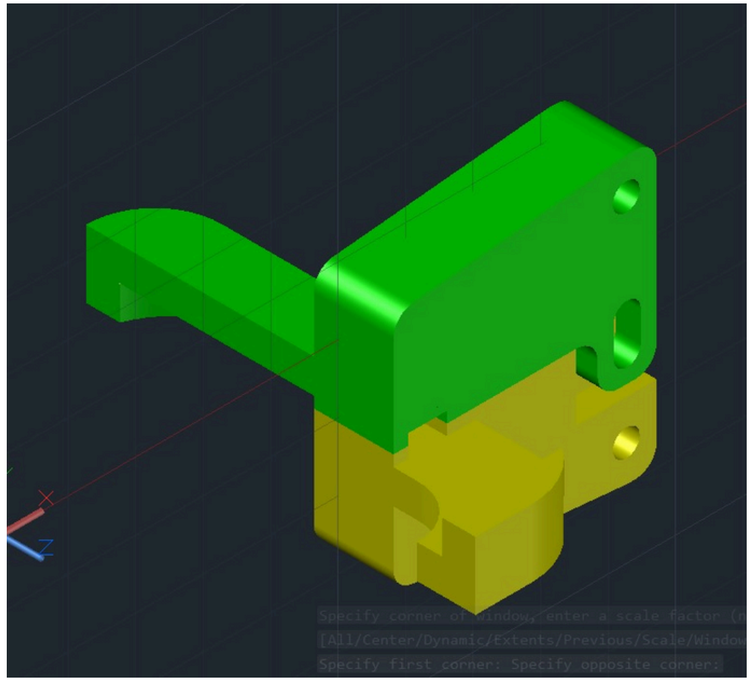


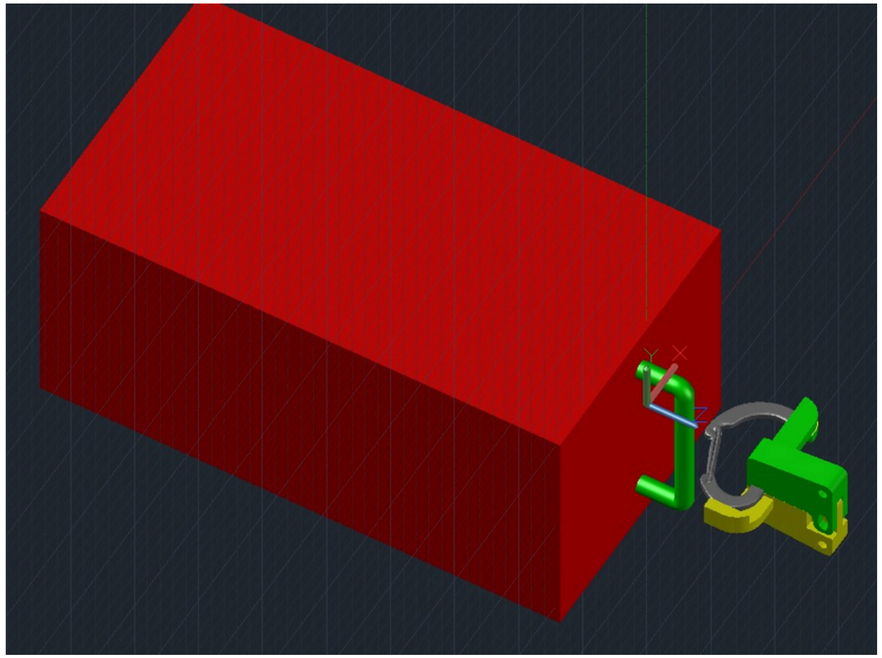
GRIPPER VF_2 GOOD





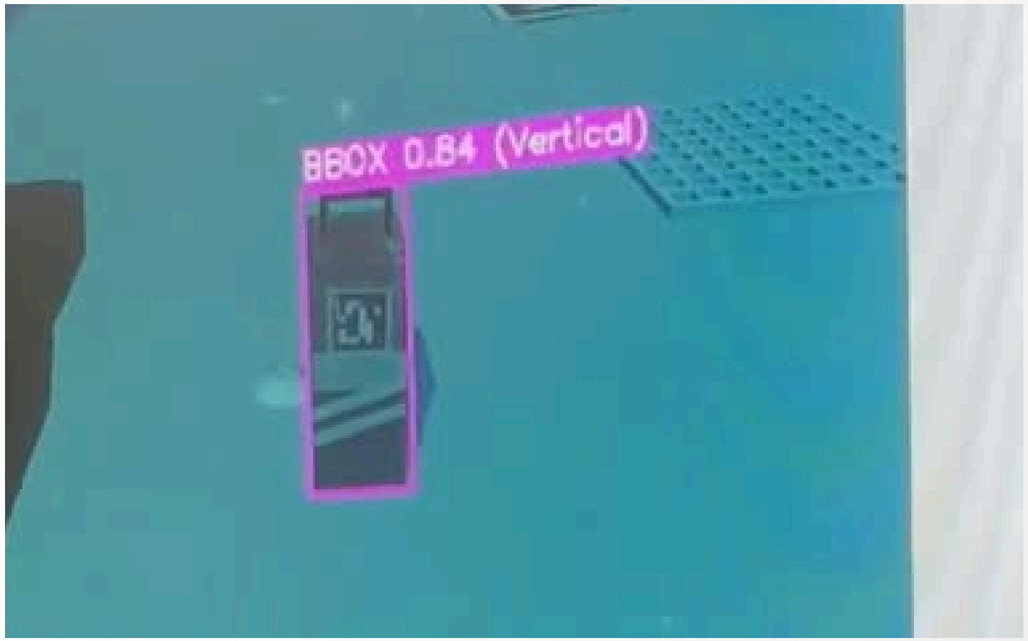






THE **SIMULATIONS**

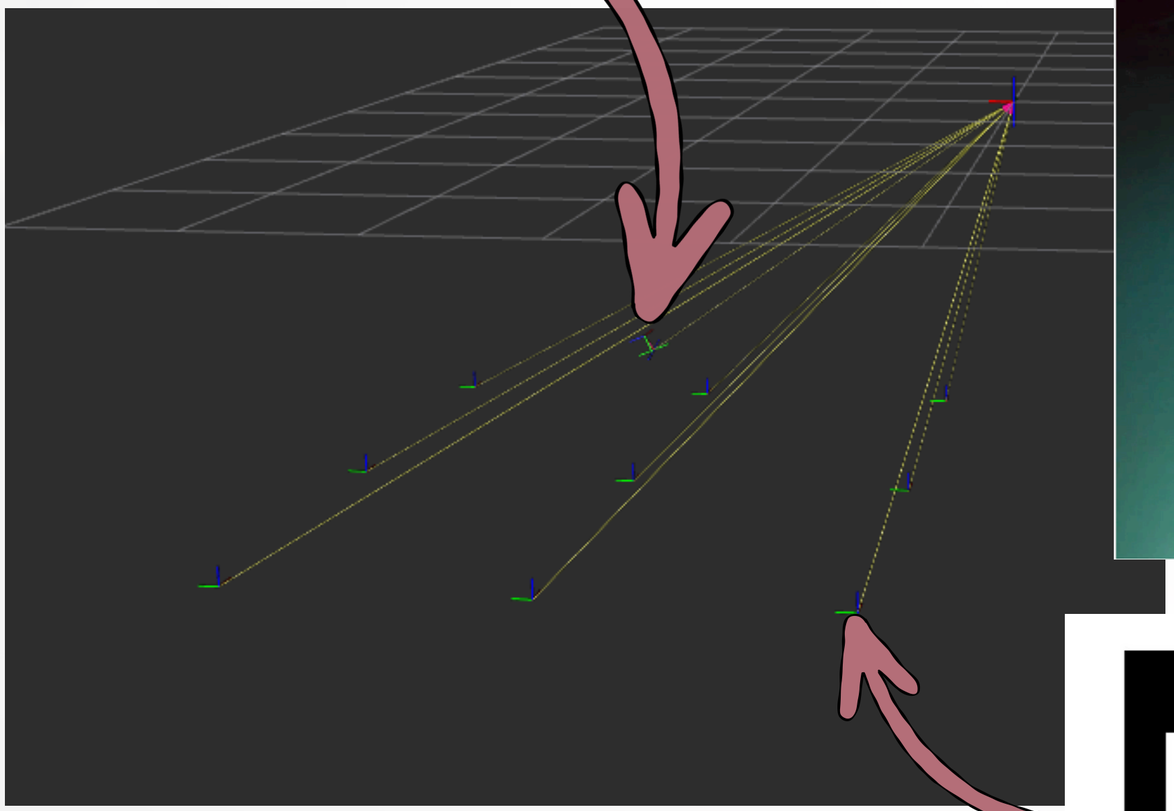
Stonefish
marine robots simulator
ROS
stonefish_ros

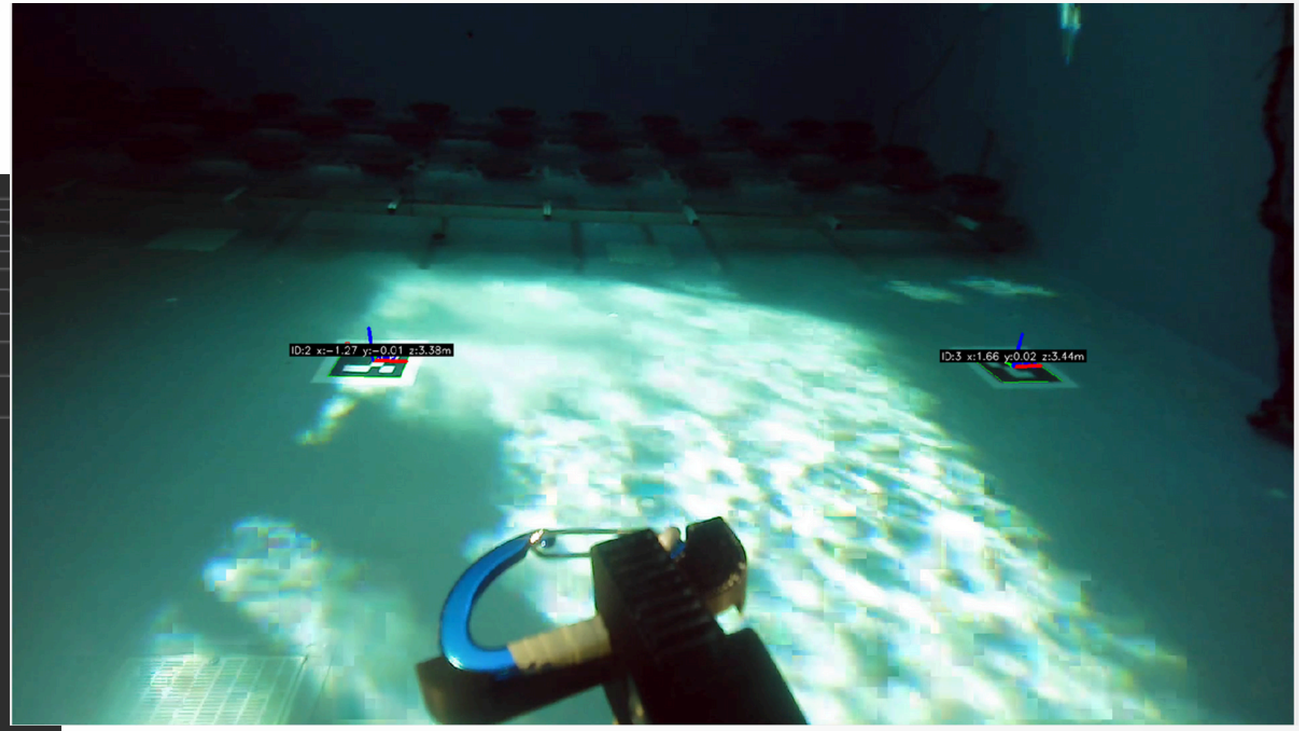


- WE TESTED OUR PERCEPTION AND CONTROL CODE IN THE STONEFISH MARINE ROBOT SIMULATOR.
- OBJECT DETECTION WAS VALIDATED USING SIMULATED SENSOR DATA UNDER DIFFERENT SCENARIOS.

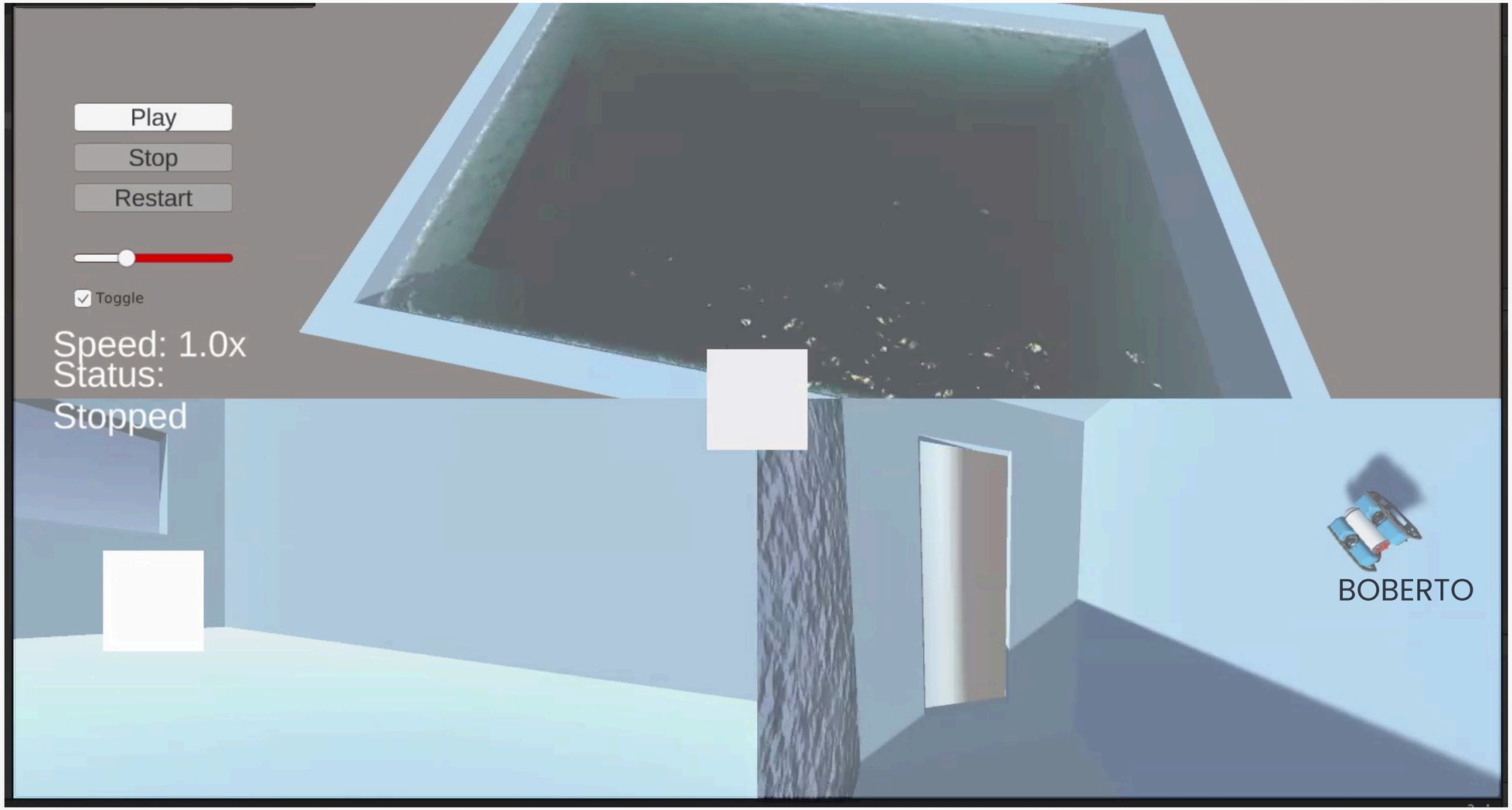
LOCALIZATION

BOBERTO





3D VISUALIZATION



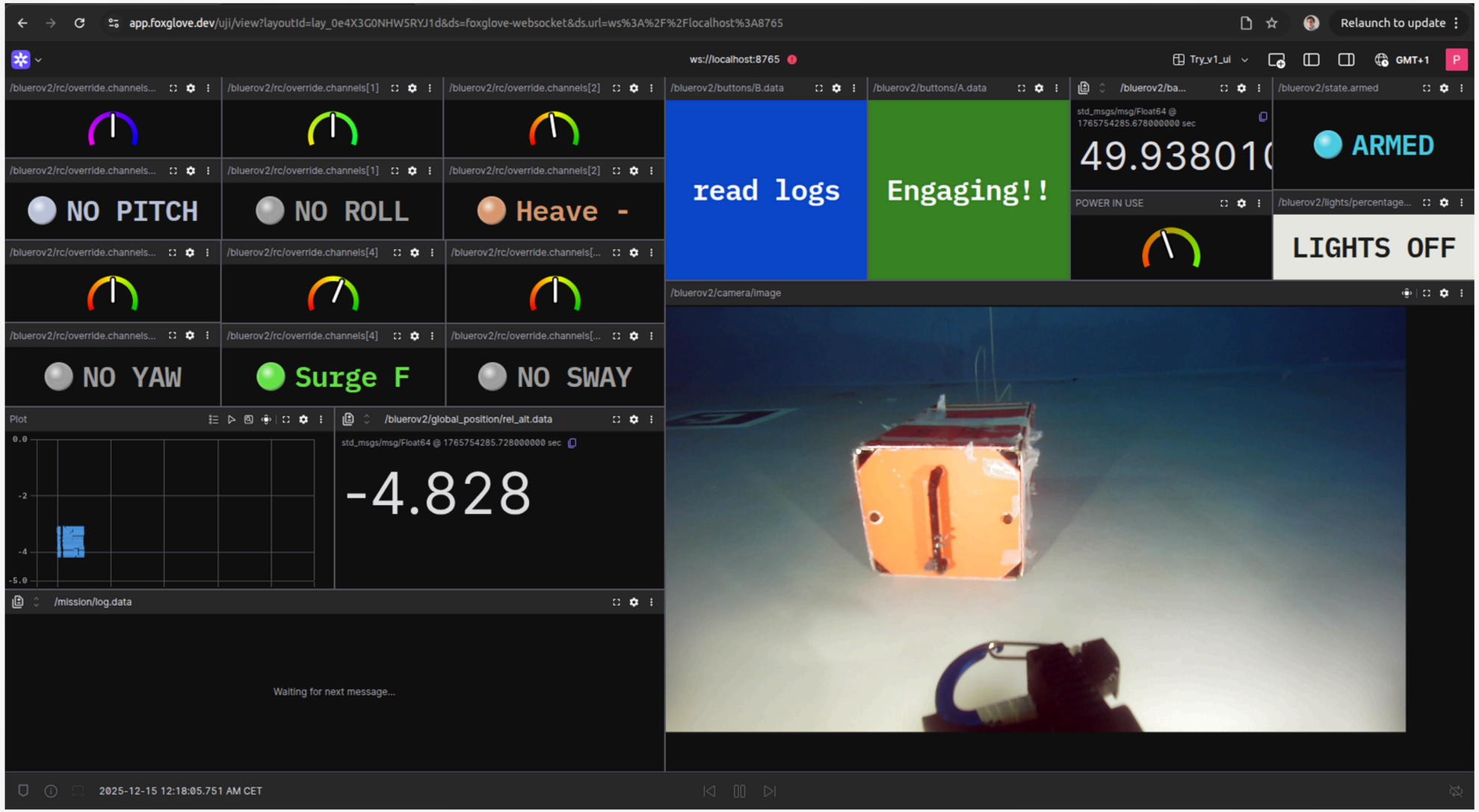
3D VISUALIZATION


Unity - Unity_1 - SampleScene - Windows, Mac, Linux - Unity 2022.3.62f3 <OpenGL 4.5>
ROS2 IP: 127.0.0.1:10000
TF CONFIGURABLE CONTROLLER
Receiving: YES
Updates: 580
Mode: Mode2 StandardROS
Pos: (-4.41, -4.11, 1.87)
Rot: (60.9, 8.3, 119.6)
Press 'R' to cycle rotation modes
Next Rotation Mode
Start Detection
Play
Stop
Restart
Toggle
Speed: 1.0x
Status:
Playing
(Looping,
1.0x)
PID:
277672
Talking: Oluwagbotemi Iseoluwa

OUR

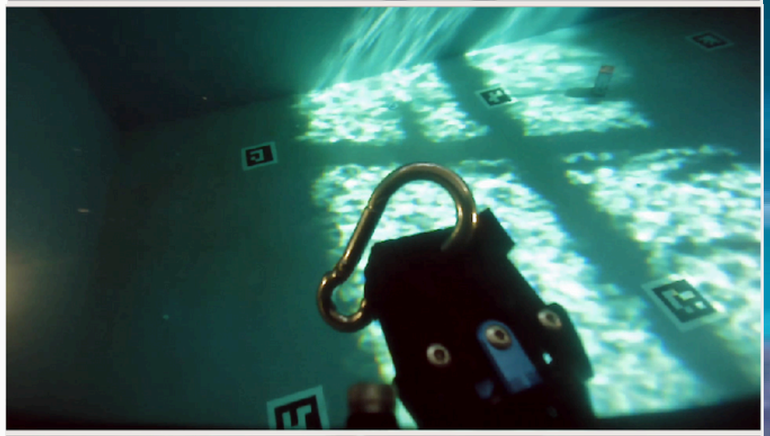
USER INTERFACE

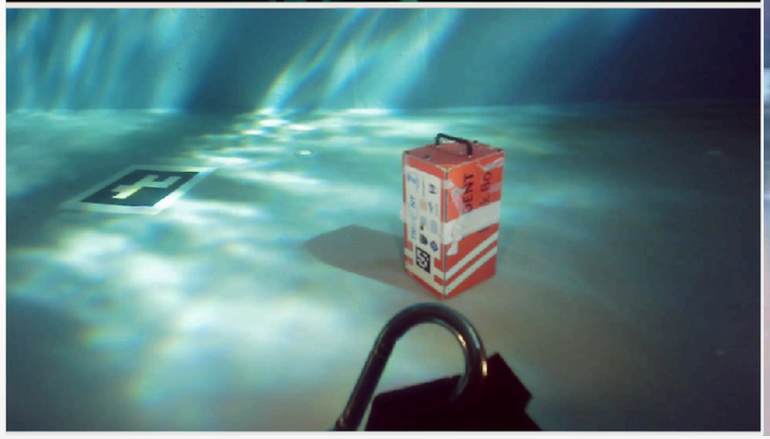
FOXGLOVE



FIRST **TRIALS**

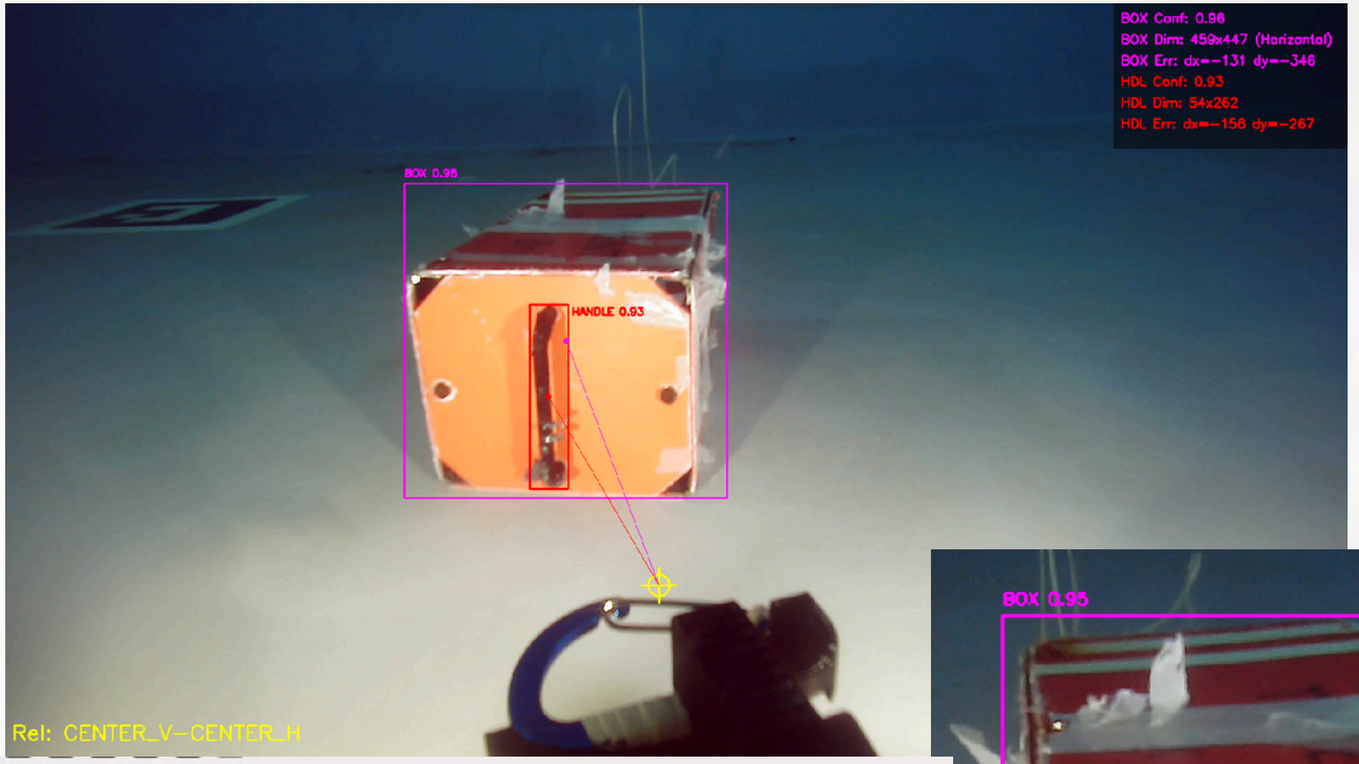
- Testing system in teleoperation mode
- Visual dataset recollection
- Understanding considerations for new gripper design

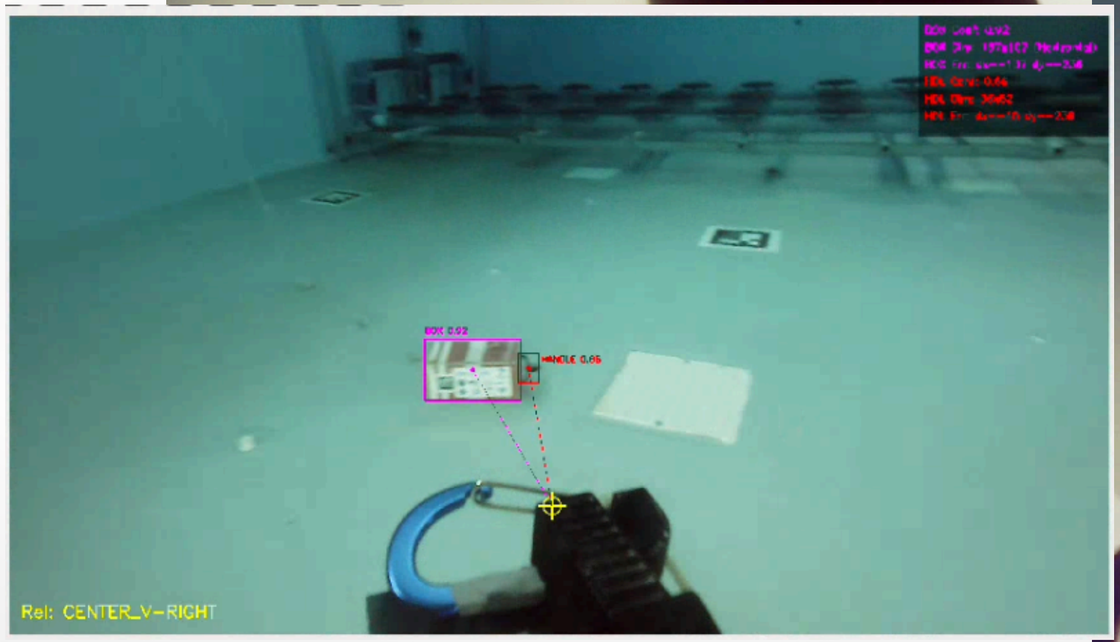


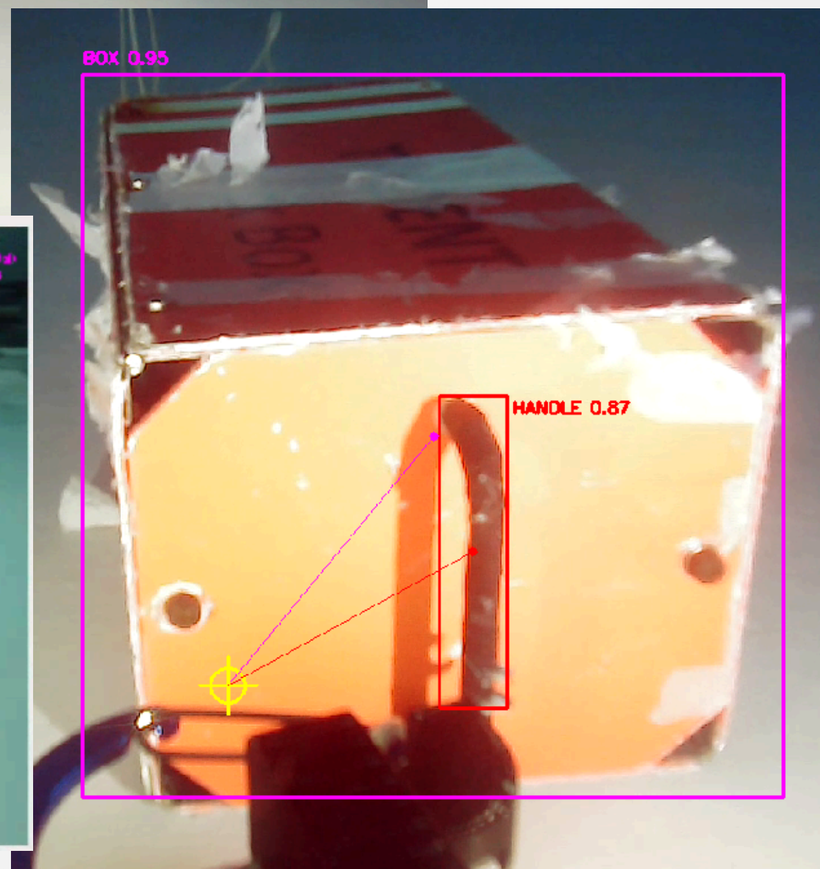


SUCCESFUL **TRIALS**

- YOLO V8n model successful detection
- Detection of the bbox from far away
- Handle detection when closer with proper lights (for high confidence)



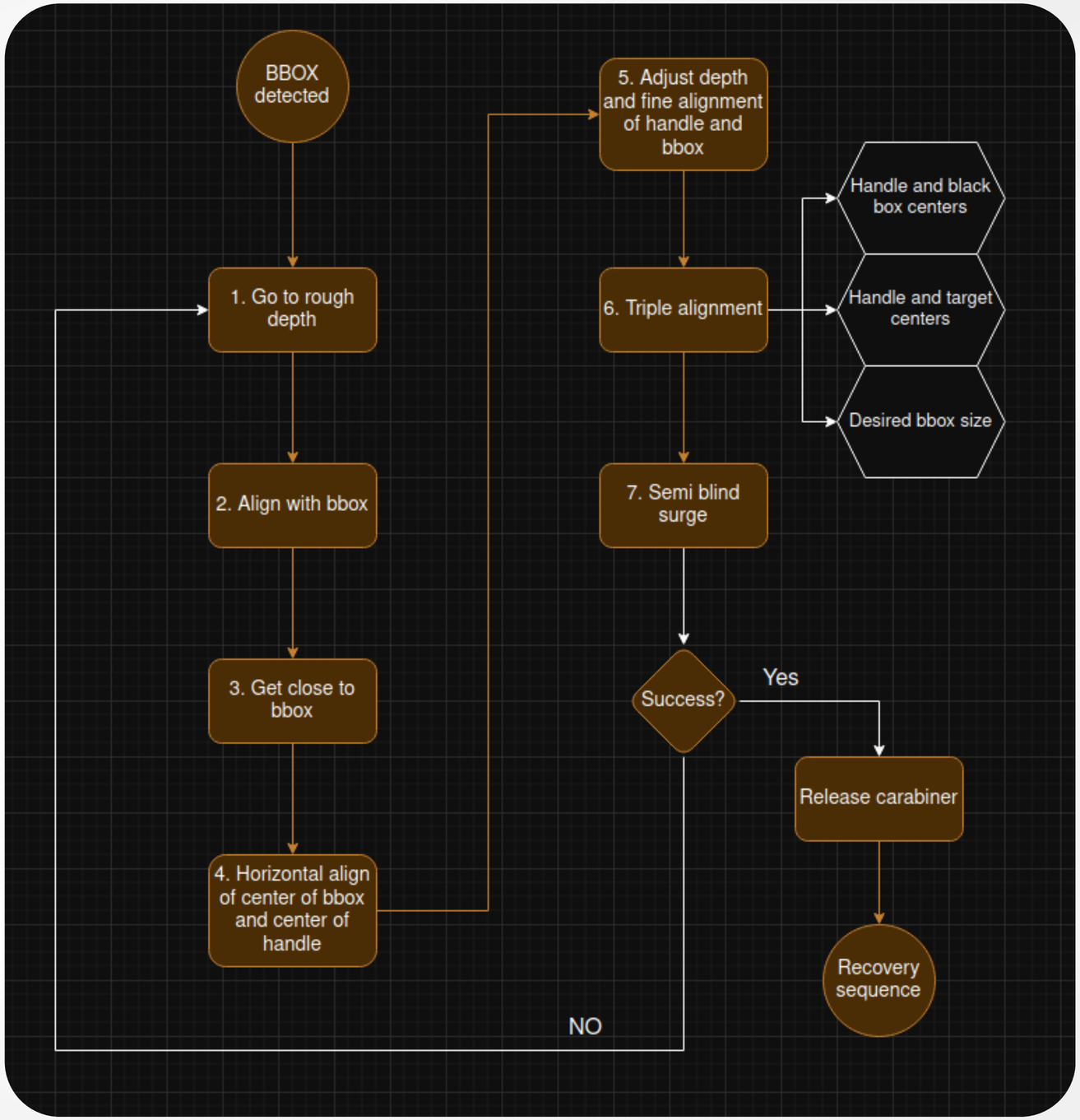




SUCCESFUL **TRIALS**

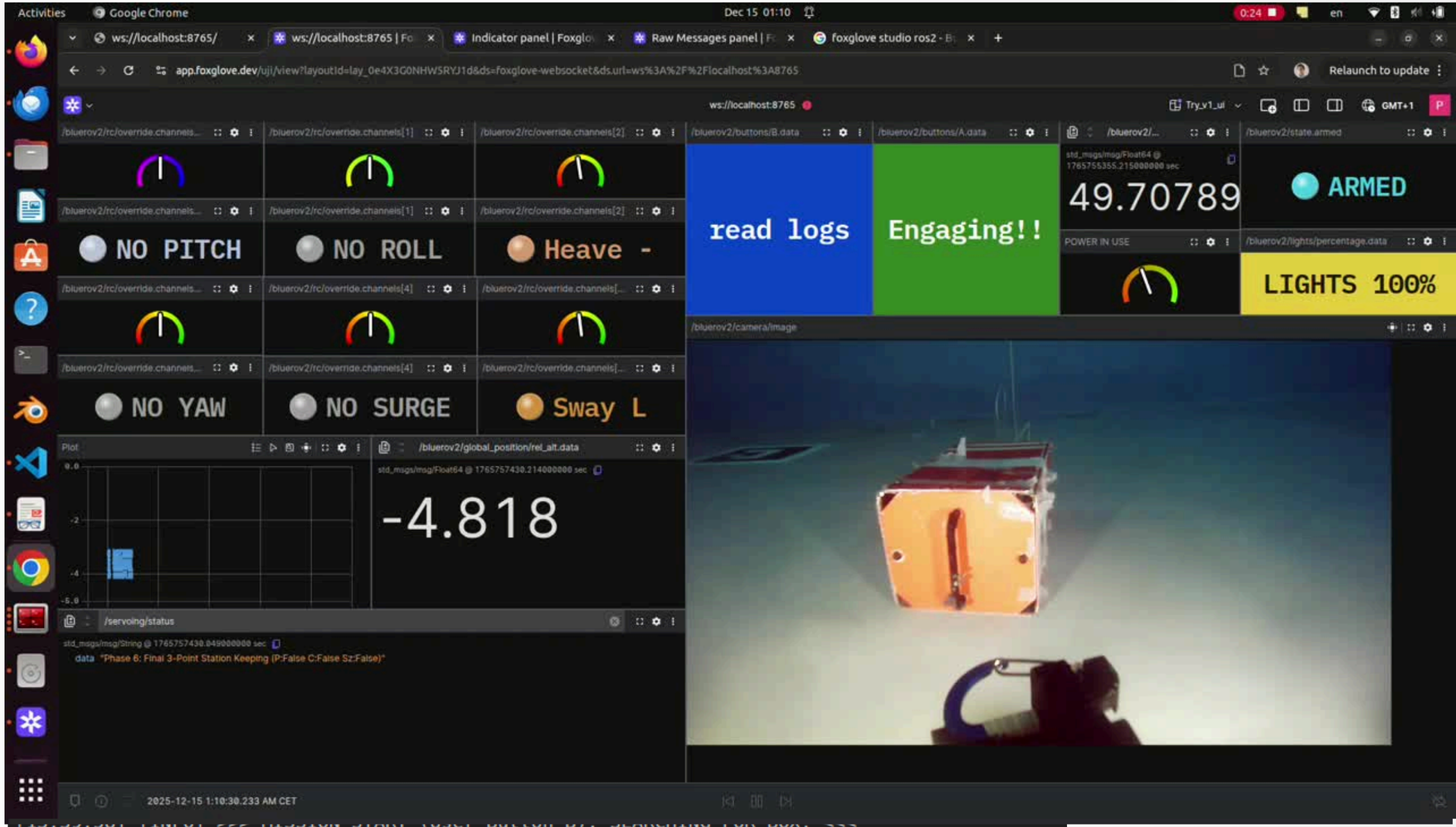
Visual servoing approach:

- State machine
- Death man switch on
- PID controllers for each type of motion



SUCCESFUL **TRIALS**

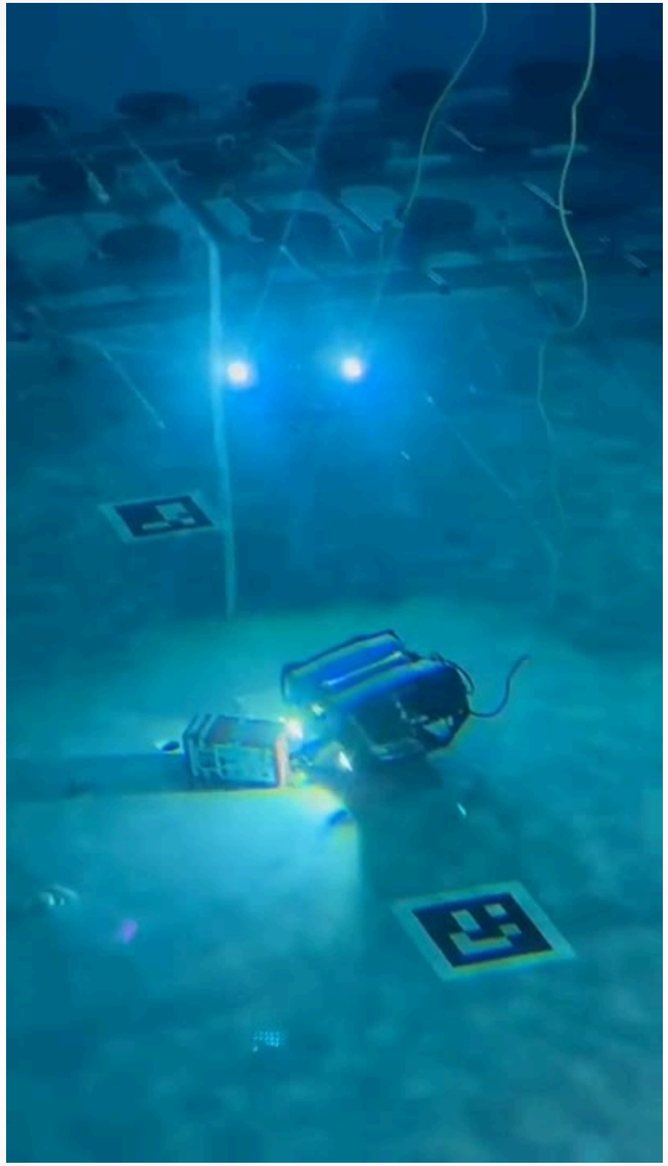
- YOLO V8n model succesful detections
- Visual servoing succesful approach
- LOGS of mission succesfully recorded

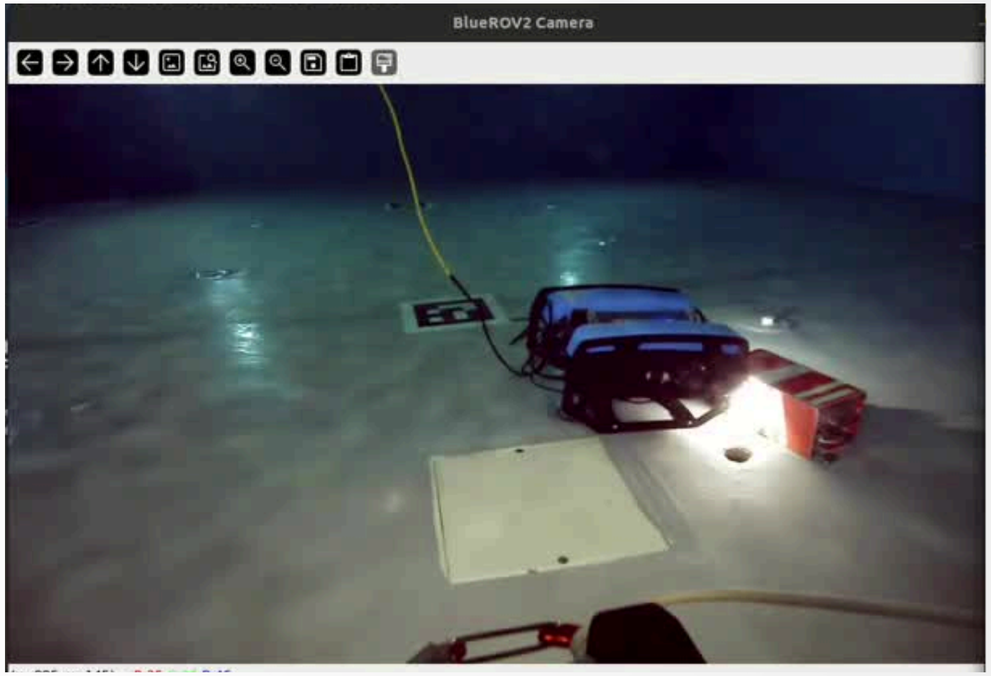



```
[13:40:21] [INFO] BOX DETECTED (Stable). Determining Orientation...
[13:40:25] [INFO] >>> ORIENTATION LOCKED: Horizontal <<<
[13:40:25] [INFO] Target Found. PRESS 'B' TO CONFIRM AND START APPROACH.
[13:40:31] [INFO] USER CONFIRMED (Horizontal). Switching to Approach Mode.
[13:40:31] [INFO] Phase 1: Going to approximate depth to initiate approach...
[13:40:31] [INFO] Please HOLD BUTTON A to engage thrusters for Visual Servoing.
[13:40:54] [INFO] SERVOING UPDATE: Phase 1: Going to approximate depth -4.65m (Curr: -4.00)
[13:40:54] [INFO] SERVOING UPDATE: Phase 1: Going to approximate depth -4.65m (Curr: -3.99)
[13:40:54] [INFO] SERVOING UPDATE: Phase 1: Going to approximate depth -4.65m (Curr: -3.98)
```

SUCCESFUL **TRIALS**

- YOLO V8n model succesful detections
- Visual servoing succesful approach
- LOGS of mission succesfully recorded





THANK YOU