I. JSA TABLE

Task	Hazards	Controls	Responsible Person
Entering/Exiting Pool Deck	Slipping	Team members are required to tie back their hair, wear not loose clothes, and close-toed non-slip shoes while working in the deck.	Önder Karataş - Safety Manager
	Damaging Equipment	Our team carefully packs and secures the equipment in our cart to avoid damaging important equipment during transport and to avoid safety hazards.	Emre Sarıkaya - CPO
Preparation of Pool Deck	Injury while removing ROV or equipment from the cart	Team members practiced setting up in accordance with the set-up flowchart(Appendix A). Members were trained in how to lift heavier equipment like the ROV and how to pick up slippery equipment. In case of injury, our team has a first aid kit.	Önder Karataş - Safety Manager
	Miscommunication	To avoid miscommunication and false setup, our team has developed a deck operation checklist(Appendix B) and a set-up flowchart that successfully controls the process of deck set-ups.	Ufuk Çetiner - CEO
Powering Up	Excessive Current to the ROV	To prevent short circuits and delivery of excessive current to the ROV, our team uses a 25-amp fuse that connects the MATE power supply to our ROV.	Ufuk Çetiner - CEO
Pit Stop Operation	Injury	All team members are trained on proper deck operations. All members are required to wear safety glasses. The pit manager who will interact with the ROV is required to wear cut-resistant gloves.	Önder Karataş - Safety Manager
	Slipping	Team members will keep the deck dry as much as possible to avoid slipping accidents. They are also required to wear non-slip shoes with trousers that are not long in the lower parts.	Önder Karataş - Safety Manager

Pit Stop Operation	Injury to fingers through the interaction with ROV	*Makers* ensured there were no sharp corners on the ROV and designed thruster guards according to IP-20 standards so that no foreign materials or fingers could enter and be damaged by the thrusters.	Efe Özbal - CTO
System Breakdown	Damage to Equipment	Our team carefully packs and secures equipment on our cart to avoid damaging important equipment during transport and to avoid safety hazards.	Önder Karataş - Safety Manager
	Misplacement of equipments	A team member is always responsible for placing the equipment in its designated location.	Ufuk Çetiner - CEO

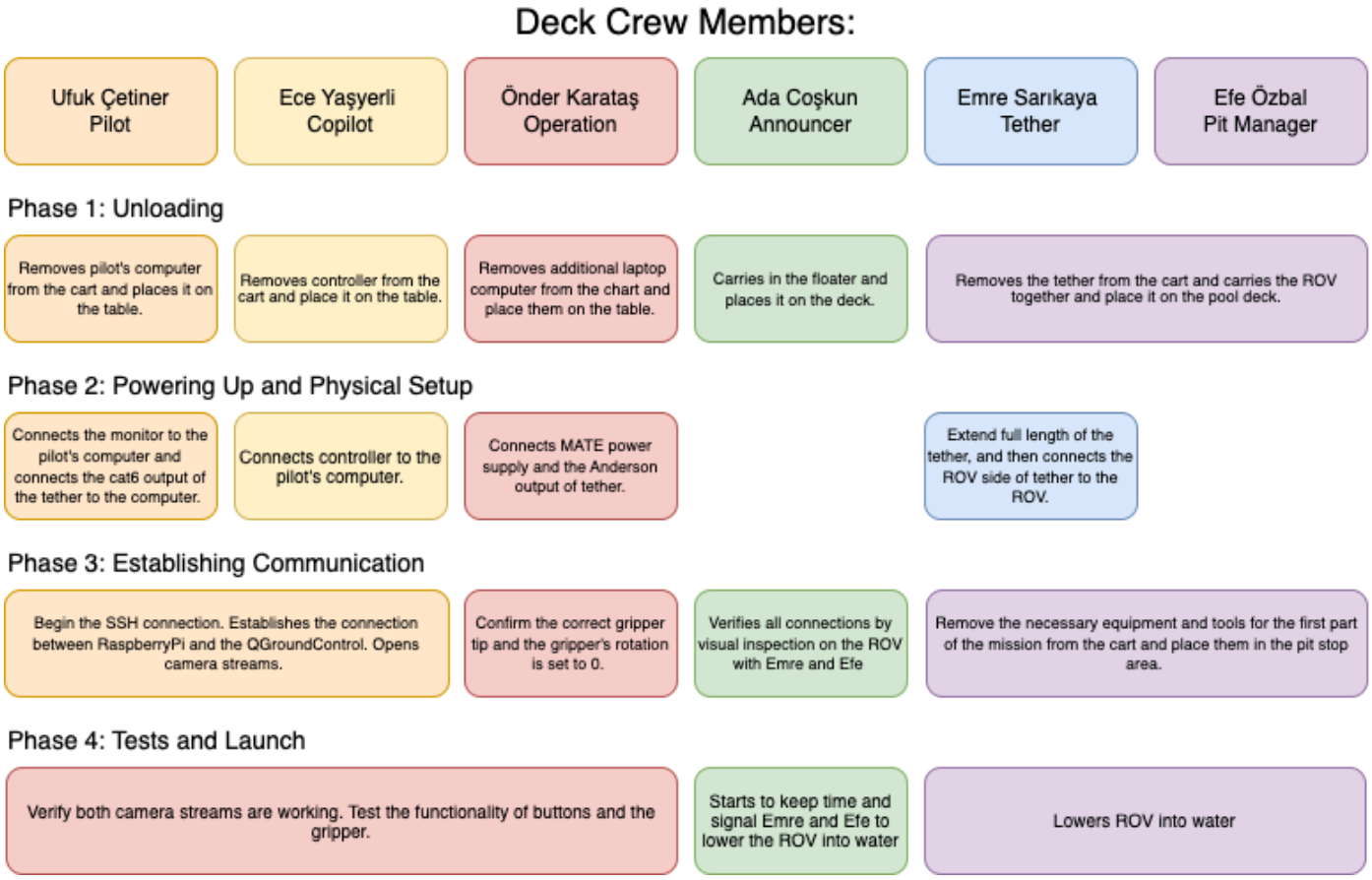
Required Training	All *Makers* members are required to undergo basic safety training including deck operation practice and setup flowchart. This basic safety training covers all lab safety and basic deck safety procedures. The pit manager and tether manager are required to undergo pit stop operations training. This advanced training is used to prepare members to handle pit stop operations with ROV such as modifying. Training includes all the possible hazards mentioned above and their responses. All members learn correct operations and how to use the checklist(Appendix B) through the setup, and takedown procedures.

Required Personal Protective Equipment(RPPE)	All team members are required to wear safety glasses whenever interacting with the ROV on deck. The pit manager is required to wear cut-resistant gloves while modifying the gripper of the ROV.

Task	ROV Deck Site Safety
Contributors	Önder Karataş (Safety Manager), Ufuk Çetiner (CEO), Emre Sarıkaya (CPO), and Efe Özbal (CTO)
Created by	May 2024

II. APPENDICES

A. Appendix A: Set-up FlowChart



B. Deck Operation Checklist

Before Powering:

- [ ] The deck area is neat and under control
- [ ] All team members are wearing glasses and the pit manager wears cut-resistant gloves.
- [ ] Inspect the tether and verify that it is freely able to move and is not damaged
- [ ] Tether is connected to the strain relief and secured to the ROV
- [ ] Cat6 output of tether is connected and secured to the pilot's computer
- [ ] Verify the vacuum tube is sealed
- [ ] Visual inspection to check for damaged or loose connections

Powering Up:

- [ ] Ensure that the pilot's computer is on and running
- [ ] Co-pilot calls out, "Power On"
- [ ] Anderson output of tether is connected to the power supply and secured
- [ ] Vacuum check of the ROV(see Vacuum Control below)
- [ ] Co-pilot calls out, "Thruster Test"
- [ ] Pilot test thrusters and check that they are working properly
- [ ] Verify the video stream from the ROV's cameras
- [ ] Ensure the camera's angle is right
- [ ] The robot arm's rotation is set to 0 angles and close.

Vacuum Control:

- [ ] Verify the electronics tube is properly sealed by utilizing a vacuum pump
- [ ] Check the pressure after vacuuming the tube and see if it rises. If the pressure rises refer to leak detection.

ROV Launch:

- [ ] The pit manager calls out, "Hands On"
- [ ] Carefully place the ROV in the water
- [ ] Check for the bubbles
- [ ] Visually inspect to check if there is a water leak in the tube
- [ ] If there are large bubbles on the surface, recover the ROV immediately and proceed with Leak Detection
- [ ] If there are no issues detected, call out "Launching!"
- [ ] Pit manager calls out, "Hands Off"
- [ ] Co-pilot calls out, "Ready to Fly" and the pilot begins the mission plan.

ROV Retrieval:

- [ ] The pilot calls out, "Pit Stop"
- [ ] Pit manager calls out, "On the Surface, Disable"
- [ ] Co-pilot calls out, "Thrusters Off"
- [ ] Pit manager calls out, "Hands On" and removes the ROV from the water
- [ ] After securing the ROV, the pit manager calls out, "ROV Secured"
- [ ] According to the mission plan, the pit manager modifies the ROV. (see below Pit Stop Modify)
- [ ] If missions are ended, the co-pilot calls out, "Power Off" and powers down the system
- [ ] Team begins demobilizing

Leak Detection:

- [ ] Immediately power down the ROV and remove the ROV from the water if a mission is occurring
- [ ] Visually inspect the ROV to check if there is any source of leak. Do not disassemble the ROV until the source of the leak is detected
- [ ] Use soapy water to verify the source of the leak
- [ ] Create a plan and fix the leak
- [ ] Check all systems for any damage and replace damaged electronics
- [ ] Log the source and the cause of the leak. Detail the possible corrective design changes made and the actions taken

Communication Lost:

- [ ] Check if the cat6 cable and the Anderson connector are still connected.
- [ ] Unplug the cat6 and replug it to reboot communications.
- [ ] If communication is restored, confirm there are no leaks and continue the mission
- [ ] If all else fails, power down the ROV, and retrieve via tether.
- [ ] Check the fuse. If blown, check for leaks and verify the integrity of waterproofed elements.
- [ ] Begin troubleshooting procedures and isolate the issue Investigate whether the problem is related to hardware or software
- [ ] Log the problem and the cause of the loss. Detail the possible corrective changes made and the actions taken

Pit Stop Modify:

- [ ] Pit manager calls out, "Modifying" and either switches the gripper tip or gives/ retrieves parkour items for the next mission
- [ ] Verify all the changes are secured and done
- [ ] Pit manager calls out, "Changes Done" and proceeds with ROV Launch

Pit Maintenance:

- [ ] Pit is neat and free of debris
- [ ] All equipments are safely stored in their designated space and there are no tripping hazards
- [ ] Check all electrical cords and correct any electrical hazards

C. *Makers* Traning Tracking Log

Team Member Surname, Name	Basic Safety Training	Pit Operation Training
Coşkun, Ada	☑	
Çetiner, Ufuk	☑	
Karataş, Önder	☑	
Özbal, Efe	☑	☑
Sarıkaya, Emre	☑	☑
Yaşyerli, Ece	☑	