MECATRON

Job Site Safety Analysis (JSA)

Mandatory Personal Protective Equipment
- Covered & Non-slip footwear   - Attire (mandatory long pants,   - Safety glasses (when operating machinery – drill/saw)   - At least one other Mecatron employee to assist any operations

Mandatory Training
All employees must complete the following mandatory online modules from NTU (on the NTULearn portal) before participating in any of Mecatron's company activities: - Basic Safety Training (OHS2BST01)   - SGSECURE Prepared Citizen Training (OHS2PCT01)   - General Emergency Preparedness (OHS2GEP01)   - Risk Management Core Module (OHS2RMM01)   - Risk Management for Workplace (OHS2RMW01)

All processes during pre-launch preparation, ROV launch, ROV operation and ROV retrieval will be closely supervised by Mecatron's Safety Officer, to ensure that all processes are carried out smoothly and safely.

Operation	Process	Potential Hazard	Mitigation	Individuals involved
Pre - Launch Preparation	Pool Check	• Falling • Severe weather	• Clear the poolside of any stray objects • Make sure all areas in use are clearly demarcated. • Check of there is any inclement weather nearby before proceeding. • Ensure operation area has a sheltered area.	Operations Team
	Control	• Tripping • Slipping	• Set up in a dry area.	Control Team

	Station Setup	• Electrocution	• Ensure a level surface is used to place the control station equipment (laptop, joystick, WiFi router, E-stop)	Pilots
	Bot Assembly	• ROV damage • Shorting	• Assembly is done in a dry area • Minimum 3 employees are present for poolside bot assembly • Ensure all components are securely in place	Operations Team
	Tether Set-Up	• Tripping	• All electronic connections are done in a dry area • No running allowed near the poolside • All members are clear about where the tether is	Operations Team
ROV Launch, Operation and Retrieval	ROV Deployment	• Physical strain • Contact injury • ROV damage	• Before moving the bot ensure all pressure seals are sealed and shut • When deploying into pool minimum 2 people carrying it and squat instead of bending over • When moving the ROV ensure all around are aware and give way	Operations Team Pilots
	ROV Boot/ Startup	• Electrocution • Contact injury	• Visual Check on the ROV ..all secure no water in the hall ,all displays good, No loose or hanging articles	Operations Team Pilots

			• Visual check connections are secure • Control check connection is good • Once Above checks done .Then run operational check ;ie movement and control response ..ensure all persons are clear	
	ROV Operation (ROV side)	• Electrocution • ROV damage • Contact injury	• While ROV is live in operation, there should be no one swimming within 4m of the ROV • Keep close watch of the ROV at all times, look out for visible anomalies within the waterproof housing / on the ROV • If any anomalies are spotted, shout "E-stop" to alert topside employees to press the E-stop button and cut ROV power immediately	Operations Team
	ROV Operation (Topside)	• Electrocution • Tripping • Slipping	• Ensure demarcated area (tether) is clear of people and enforce no running at the poolside • Keep an eye on the ROV at all times • Upon hearing "E-stop", press E-stop button immediately • If anomalies are reported via sensors, press E-stop immediately • Help to manage the tether if it gets	Pilots Control Team

			tangled with the underwater props	
	ROV Retrieval	• Physical strain • Electrocution • Contact injury	• Have Proper recovery equipment such as poles, extended gripper arms and ROV stand. • Ensure proper tether management; recover tether by pulling it back and coil tether neatly • Ensure Power cut off and E-stop activated. • Make careful and acknowledged movement. Sound out to the team members the next plan of action and request for support when necessary	Operations Team