

Job Safety Analysis

Task	Hazards	Controls
Pre-launch		
Dry system operation test	<ul style="list-style-type: none"> ▪ Electrical fire from damaged components 	<ul style="list-style-type: none"> ▪ Inspect all hardware before test, run the propulsion system at low speed, have accessible fire extinguisher. ▪ Inspect for damaged wires / connectors before retrieving Orion. ▪ Evaluate the condition of the wires and replace cables when necessary.
Wet system operation test	<ul style="list-style-type: none"> ▪ Electrical shock or electrocution 	<ul style="list-style-type: none"> ▪ Check overall insulation and waterproofing elements.
Launching and removing Orion in/from water	<ul style="list-style-type: none"> ▪ Wrist injury from lifting heavy ▪ Slipping and falling on pool side 	<ul style="list-style-type: none"> ▪ Use proper lifting techniques and share loads if possible. ▪ Wear non-slippery shoes, stay low and keep body down.
Transportation of Orion	<ul style="list-style-type: none"> ▪ Slips / Trips / Falls ▪ Back strain ▪ Physical strain ▪ Foot injury 	<ul style="list-style-type: none"> ▪ Wear closed toed non-slip footwear ▪ Require two company members to lift Orion. ▪ Require an additional company member to direct path and watch for any obstacles. ▪ Communicate with each company member if there is any strain and stop transport immediately. ▪ Verify all company members operating near any body of water can swim or will wear lifejackets.

Setting up Orion	<ul style="list-style-type: none"> ▪ Electrical shock or electrocution 	<ul style="list-style-type: none"> ▪ Never handle with wet hands, keep electrical appliances dry, keep electrical components insulated. ▪ Verify power switches and circuit breaker on Tether Control Unit. ▪ Visually inspect the cables and connectors to check if they have been tightened and sealed. ▪ Use the proper personal equipment in accordance with the supply voltage.
Launching		
Powering Orion on	<ul style="list-style-type: none"> ▪ Electric shock ▪ Overvoltage 	<ul style="list-style-type: none"> ▪ Follow company Safety Checklist Procedures when powering any equipment or machinery on. ▪ Equipped Power supply with fuses to prevent overvoltage. ▪ Always keep power supply safely away from anybody or water.
Operating thrusters	<ul style="list-style-type: none"> ▪ Damage to fingers ▪ Damage to limbs ▪ Scalp injury 	<ul style="list-style-type: none"> ▪ Keep propellers shrouded and use proper mech. ▪ Put warning labels on the motor housings.
Setting up and managing the tether	<ul style="list-style-type: none"> ▪ Loose tether ▪ Tangled tether ▪ Tether damage from pulling 	<ul style="list-style-type: none"> ▪ Connect the tether to the control box and Orion, have one person in charge of cable. ▪ Wrap the tether properly around the tether transportation cart when going to or leaving the pool. ▪ Applying a proper strain relief.
Developing the ROV		
Accessing tools	<ul style="list-style-type: none"> ▪ Tripping on miscellaneous tools, cables and/or rubbish 	<ul style="list-style-type: none"> ▪ Have working space organized, have equipment stored in designated places.
Applying sealant	<ul style="list-style-type: none"> ▪ Eye, skin and respiratory system irritation 	<ul style="list-style-type: none"> ▪ Wear correct PPE. ▪ Have sufficient ventilation. ▪ Keep compound away from skin.
Using hand tools (hacksaws,	<ul style="list-style-type: none"> ▪ Eye injury 	<ul style="list-style-type: none"> ▪ Wear safety goggles when

files, screwdrivers, hammers, etc.)	<ul style="list-style-type: none"> Respiratory irritation Skin injury 	using saws. <ul style="list-style-type: none"> Wear gloves when using hand tools. Wear masks when needed.
Using power saws and power tools (power drills, power saw, etc.)	<ul style="list-style-type: none"> Ear injury Eye injury Skin injury Scalp injury 	<ul style="list-style-type: none"> Wear safety goggles when operating any power tools. Wear gloves when operating any power tools. Wear noise reducing earmuffs to reduce exposure to high sound levels. Keep all body parts away from moving blades, use clamps when needed. Maintain necessary saw maintenance and check for any worn blades and malfunctions prior to use.

Required Personal Protective Equipment (PPE):	Required Training:
<ul style="list-style-type: none"> Safety gloves - Tear resistant non-conductive gloves 	<ul style="list-style-type: none"> Safety Checklist Procedure training
<ul style="list-style-type: none"> Protective clothing 	<ul style="list-style-type: none"> Power supply operations training
<ul style="list-style-type: none"> Protective goggles 	<ul style="list-style-type: none"> Loading and unloading equipment
<ul style="list-style-type: none"> Close-toed shoes 	<ul style="list-style-type: none"> Soldering operations training
<ul style="list-style-type: none"> Noise-blocking earmuffs 	<ul style="list-style-type: none"> Proper operation of heavy machinery and power tools