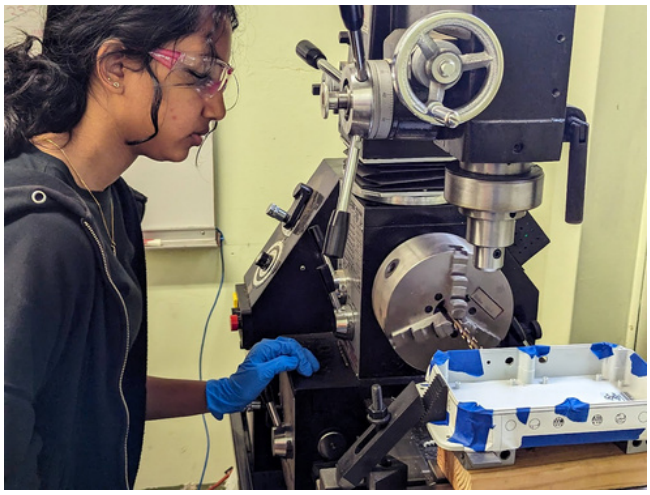
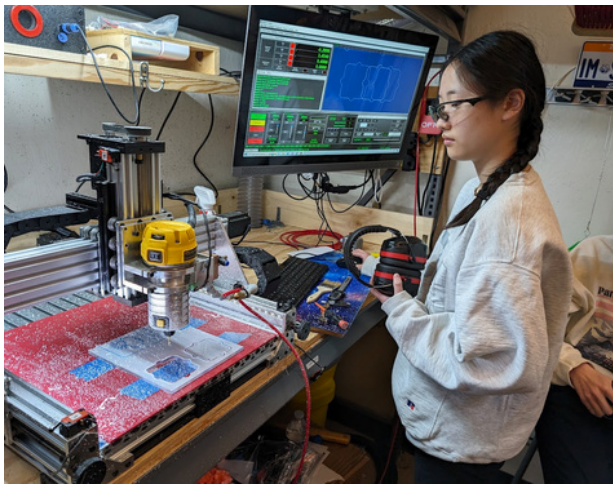
Job Safety Analysis (JSA) 2024 Report



SAFETY - SERVICEABILITY - RELIABILITY

GENESEAS

St. Francis Catholic High School

Sacramento, CA USA

TABLE OF CONTENTS

1. JSA TABLE

Task	Hazards	Controls	Responsible Person(s)	Initial
Entering/Exiting the Pool Deck	Slipping	Team members are required to tie back hair and wear closed-toed, non-slip shoes while working on deck.	Yogja Singla – Safety Manager	_____
	Damaging Equipment	*Geneseas* carefully packs and secures the equipment on our cart to avoid important equipment falling off the cart during transport and causing damage and safety hazards.	Lauren Grindstaff – CEO	_____
Deck Operations Set-up	Miscommunications	To avoid miscommunications during the set-up process, *Geneseas* has devised a deck set-up list of operations (Appendix A) and a set-up flowchart (Appendix B) that help facilitate successful and quick deck set-ups.	Lauren Grindstaff – CEO	_____
	Injury when removing ROV or equipment from the cart.	*Geneseas* team members practice setting up in accordance with the set-up flowchart (Appendix B). *Geneseas* team members are also trained on how to properly lift heavier and bulkier equipment like the ROV or the RPS. This training has helped eliminate injuries while setting-up for operations.	Yogja Singla – Safety Manager	_____
Power- up	Excessive current to ROV system	To prevent the delivery of excessive current to the ROV system, there is a 25-amp fuse that connects the MATE power supply to *Geneseas'* RPS.	Isa Gutierrez – Electrical Lead/Co-pilot	_____
Poolside Operation	Injury	To prevent injury, all *Geneseas* team members are trained on proper deck operations. Members of *Geneseas'* deck crew are also required to wear proper safety equipment such as safety glasses and hard hats in accordance to ANSI standards Z87.1 and Z89.1	Yogja Singla – Safety Manager	_____
	Injury to fingers while interacting with the ROV	To prevent injury to deck crew members, *Geneseas* has ensured that there are no sharp corners on the ROV and designed thruster guards that meet IP-20 standards so that no foreign materials or fingers can enter and be damaged by the thrusters.	Yogja Singla – Safety Manager	_____
	Tripping over the tether	The tether manager is specifically trained to keep the tether untangled and out of the way. The tether is enclosed in a bright yellow sheathing to maximize visibility.	Morgane Bertran – Tether Manager	_____

Task	Hazards	Controls	Responsible Person(s)	Initial
Poolside Operation	Electronics shorts	To prevent the risk of electronic shorts, all wires within the bottom-side electronics housing and RPS are well organized and clearly labeled to reduce the risk of any wires being misconnected. *Geneseas* also utilizes a highly reliable, watertight polycase box and o-ring to reduce the risk of water leakage and damage to our electronics. Given that there are any electronics damage during operation, deck crew membebers will cut power to the system immediately using the emergeny power-off switch.	Isa Gutierrez – Electrical Lead/Co-pilot	_____
	Excessive delivery of air pressure	To prevent any pneumatics related risks, the pressure regulator is monitered by the co-pilot during mission runs. The pressure is always between 25-35 psi. After each use, Geneseas ensures the pressure is released to prevent rusting in the air compressor.	Isa Gutierrez – Co-pilot	_____
System Breakdown	Damage to Equipment	*Geneseas* carefully packs and secures the equipment on our cart to avoid important equipment falling off the cart during transport and causing damage and safety hazards.	Lauren Grindstaff – CEO	_____
	Misplacement of equipment	*Geneseas* prevents the misplacement of equipment by always having the person in-charge of each piece of equipment place it in its designated location.	Lauren Grindstaff– CEO	_____
	Miscommunications	*Geneseas* team members employ a set deck breakdown procedure that helps facilitate successful and quick deck breakdowns.	Lauren Grindstaff – CEO	_____

Required Training

All Geneseas team members are required to undergo basic safety training. This safety training covers all lab safety and basic deck safety procedures. Geneseas deck crew members are required to undergo operations safety training, specific to poolside and mission operations. This is a more in-depth training that covers all of the hazards and responses the above categories and features practice sessions to learn correct operations, set-up, and takedown procedures.

Required Personal Protective Equipment (PPE)

All Geneseas team members are expected to wear safety glasses whenever interacting with the ROV on deck. Deck crew members are required to wear safety glasses and hart hats while operating the ROV.

Task:	ROV Deck and Water Safety
Contributors:	Lauren Grindstaff (CEO) and Yogja Singla (Safety Manager)
Created:	May 2024

2. CORRECTIVE AND PREVENTATIVE ACTION (CAPA)

Corrective and Preventative Action (CAPA)
When there is a safety violation, *Geneseas* team members and coaches come together and create a plan based on Corrective and Preventative Action (CAPA) guidelines. First, members start by identifying the problem, severity, and root cause. Then employees and coaches create a corrective and preventative action plan to avoid similar safety violations in the future.

Our Experience and Use of CAPA:

CAPA Step	Our Response
Problem Identification & CAPA Initiation	Soldering iron left directly on the lab bench while still hot and powered on
Risk Analysis	Could have potentially started a fire, hurt somebody, or damaged soldering iron
Correction	Scheduled a meeting dedicated to performing CAPA analysis. Included entire team in discussion to ensure complete understanding of risks and preventative actions.
Investigation/Root Cause Analysis	Employees did not have an established routine when exiting the soldering station or lab. Did not have enough holders to accomodate all soldering irons.
Preventative Action	Implement an automatic shut-off timer on the soldering iron. Purchase more soldering iron holders. Permanently mounted a silicone mat at the soldering station. Enforce a routine when leaving the lab to check all soldering stations, power tools, and electronic devices.

3. APPENDICIES

Appendix A: Deck Operations Checklist

Pre-Power (Pilot, Co-pilot, and Deck Crew)

- [ ] Area is clear and safe (no tripping hazards or obstructions)
- [ ] All team members are wearing safety glasses
- [ ] Verify RPS power switches are off
- [ ] Tether laid out on the deck and is free of damage
- [ ] Tether is connected and secured to the RPS
- [ ] Tether is connected to strain relief and secured to ROV
- [ ] Power source connected to RPS
- [ ] Verify electronics housing is properly sealed and fasteners are tightened
- [ ] Visual inspection of electronics for damaged wires or loose connections
- [ ] Vacuum test electronics housing (see Vacuum Test below)
- [ ] Vacuum port is securely capped
- [ ] Thrusters are free from obstructions

Vacuum Test (Deck Crew)

- [ ] Verify electronics housing and CEH are properly sealed
- [ ] Connect vacuum pump to the electronics housing and CEH
- [ ] Vacuum down the electronics housing and CEH to ~10 Hg and verify they hold this pressure for 10 minutes
- [ ] Remove vacuum pump and securely cap vacuum port
- [ ] Return vacuum hand pump to case

Power-Up (Pilot, Co-pilot, and Deck Crew)

- [ ] Verify RPS is receiving 12V nominal
- [ ] Control computers up and running
- [ ] Ensure deck crew members are attentive
- [ ] The Co-Pilot calls out, "power on!"
- [ ] Power on RPS
- [ ] Co-Pilot calls out, "performing thruster test"
- [ ] Test thrusters and verify thrusters are working properly
- [ ] Verify video feeds from navigation and mission cameras
- [ ] Ensure Cameras are positioned correctly
- [ ] Test electrical and pneumatic components that require pilot input (See Pneumatic System Test Below)

Inspect and Test Pneumatic System (Pilot, Copilot)

- [ ] Verify all pneumatics lines on RPS and ROV are properly connected to the MATE air supply.
- [ ] Verify that the compressor is switched on
- [ ] Adjust pressure regulator to 40 PSI
- [ ] Activate pneumatics system and open main valve
- [ ] Verify there are no leaks and pneumatic lines are securely connected while under pressure
- [ ] Activate pneumatic tools and verify the pressure returns to 40 PSI after the tool is shut off.

ROV Launch (Pilot, Co-pilot, and Deck Crew)

- [ ] Deck crew members handling ROV call out, "hands on!"
- [ ] Carefully place ROV in the water
- [ ] Check for bubbles
- [ ] Visually inspect for water leaks
- [ ] If there are large bubbles, pull to surface immediately and proceed with Leak Detection Protocol
- [ ] If no issues are detected call out, "prepare to launch"
- [ ] Deck crew members handling ROV remove their hands from the vehicle and call out, "hands off!"
- [ ] Co-pilot calls out "thrusters engaged" and pilot begins mission

ROV Retrieval (Pilot, Co-pilot, and Deck Crew)

- [ ] The pilot calls out, "ROV surfacing"
- [ ] Deck crew calls out, "ROV on surface. Disable thrusters"
- [ ] Co-pilot calls out, "thrusters disabled"
- [ ] Deck Crew call out, "hands on," and remove ROV from water
- [ ] Co-Pilot calls out, "safe to remove ROV"
- [ ] After securing the ROV on deck, deck crew calls out, "ROV secured on deck"
- [ ] Co-Pilot powers down RPS
- [ ] Team begins demobilizing

Leak Detection (Pilot, Co-pilot, and Deck Crew)

- [ ] Immediately power down the ROV and RPS systems and remove the ROV from the water if a mission is occurring
- [ ] Visually inspect ROV to identify the source of the leak. Do not disassemble any part of the ROV until the source of the leak is detected
- [ ] Install pressure testing equipment and use soapy water to verify the source of the leak.
- [ ] Create a plan and repair the leak
- [ ] Check all systems for damage and verify proper operation
- [ ] Document the source and cause of the leak and detail the corrective actions and design changes made.

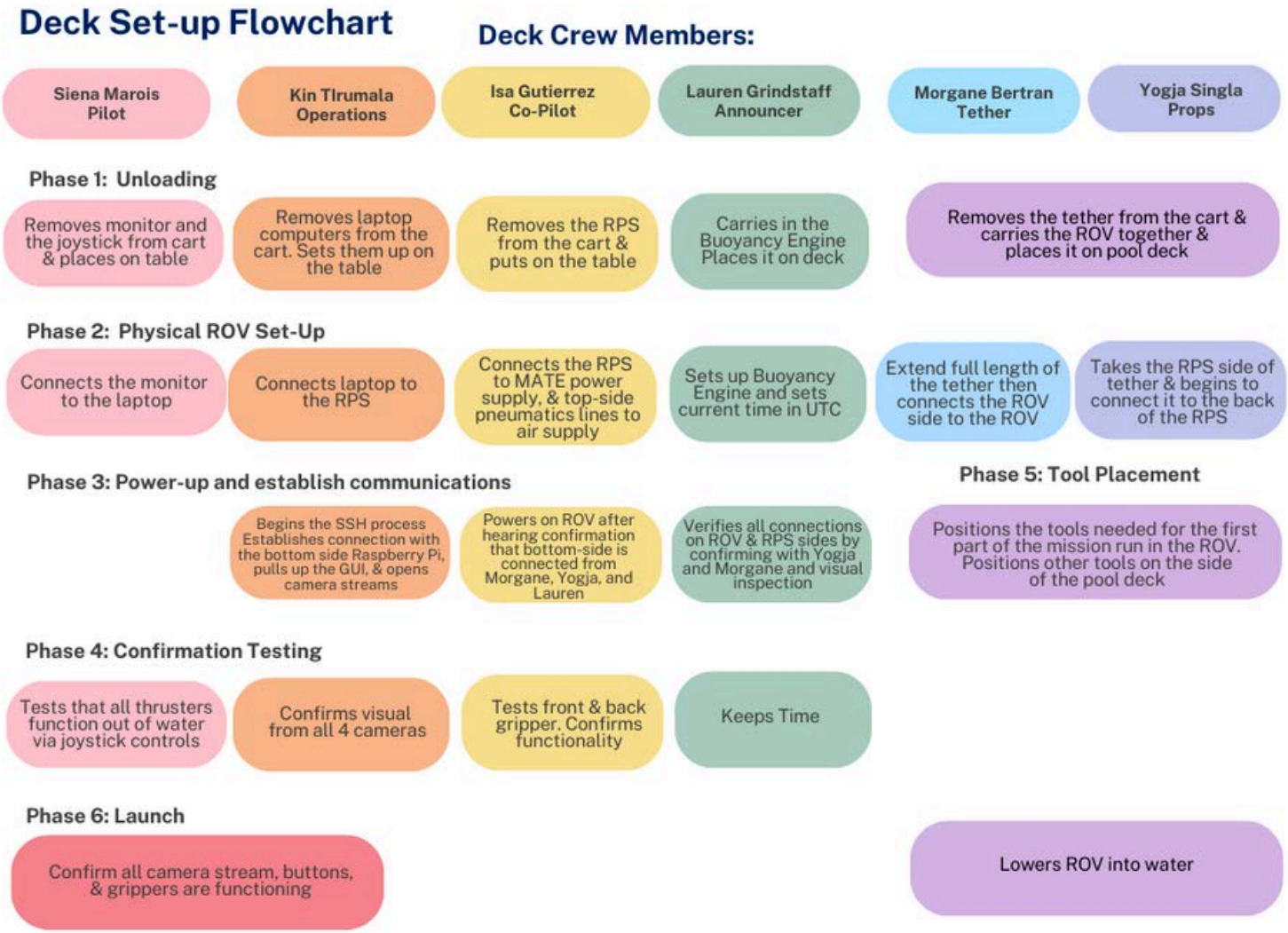
Loss of Communication (Pilot, Co-pilot, and Deck Crew)

- [ ] Cycle power on RPS to reboot ROV
- [ ] If no communication, power down ROV, retrieve via tether
- [ ] If communication restored, confirm there are no leaks, resume operations
- [ ] If communication has not been restored, begin troubleshooting procedures and isolate the issue. Determine if the issue is with hardware or software.
- [ ] Document the problem and detail the corrective actions made to solve the problem.

Pit Maintenance (All Team Members)

- [ ] Pit is well organized and free of debris
- [ ] All tools, cables, and equipment are safely stored in their designated spaces and there are no tripping hazards
- [ ] Check electrical cords and correct any electrical hazards
- [ ] Check supplies and organize a shopping list if anything is needed for repair or upkeep.
- [ ] Verify RPS, ROV and tether are clean, dry and stored.
- [ ] Protective caps for electrical connectors are in place
- [ ] ROV, RPS and tether have been readied for use on the next mission run

Appendix B: Deck Set-up Flowchart



C. *Geneseas* Training Tracking Log

Team Member and Position	Basic Safety Traning	Operations Safety Training
Lauren Grindstaff '24 - CEO / Announcer	☑	☑
Isa Gutierrez '24 - Electical Lead / Co-pilot	☑	☑
Siena Marois '24 - Electrical Lead / Pilot	☑	☑
Kinnera Tirumala '25 - Software Lead / Operations	☑	☑
Yogja Singla '26 - Mechanial Lead / Props	☑	☑
Morgane Bertran '27 - Tools / Tether	☑	☑
Alyssa Renomeron '25 - Software	☑	
Gabrielle Rosario '25 - Software	☑	
Angelyn Gonzales '27 - Software	☑	
Audrey Mayo '24 - Mechanical	☑	
Grace Chavez '25 - Mechanical	☑	
Isabella Ramos '25 - Mechanical	☑	
Hanna Wysoczynska '26 - Mechanical	☑	
Sonalika Prasad '26 - Software	☑	
Darlene Eugenio '25 - Electrical	☑	
Eliza Jane Yee '25 - Electrical	☑	
Katie Koo '27 - Electrical	☑	
Azul Kuppermann '25 - Tools Lead	☑	
Maddi Sundermier '24 - Tools	☑	
Catherine Hanly '26 - Tools	☑	
Katherine Hwang '27 - Tools	☑	
Laila Shamshad '26 - Cameras Lead	☑	
Mae Alvarez '24 - Cameras	☑	
Katherine Murillo '25 - Cameras	☑	
Minna Brindle '27 - Cameras	☑	