

Weekly Report N°11 for

School year 2023-2024

RubbleScout,
"Navigating Chaos, Saving Lives"

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Objectives:

- Upgrade the mounting for electronic components from wood to PMMA (Polymethyl Methacrylate) plate for increased durability and reliability.
- Replace the malfunctioning LiDAR unit.
- Improve the wiring circuit with a more robust DC-DC converter to enhance system stability and prevent future failures.

Activities Undertaken:

1. Electronics Mounting Upgrade:

- Substituted the wood plank with a PMMA plate to mount the electronics, offering better support and resilience for the components.

2. LiDAR Replacement:

- Installed a new LiDAR unit to replace the one that previously failed, ensuring the core functionality of RubbleScout's navigation and mapping capabilities is maintained.

3. Circuitry Enhancement:

- Reconfigured the wiring layout and incorporated a sturdier DC-DC converter into the circuit. This change is aimed at providing a more reliable power supply and minimizing the risk of electrical issues.

Results and Observations:

- **Mounting Stability:** The transition to a PMMA plate for electronics mounting has significantly improved the structural integrity of the component setup, promising enhanced durability in various operational conditions.
- **LiDAR Operational Efficiency:** With the replacement of the LiDAR, initial tests show the unit is functioning well, reinstating the robot's ability to perform detailed environmental scans.
- **Power Supply Reliability:** The new DC-DC converter has fortified the power system, providing a more stable and reliable energy supply to all components, which should mitigate the risk of similar electrical mishaps in the future.

Next Steps:

- **System Integration Testing:** Conduct comprehensive tests to ensure all newly installed components and reconfigured systems work cohesively and without fault.
- **Performance Evaluation:** Assess the operational improvements brought about by the hardware upgrades, particularly focusing on the efficiency and reliability of the LiDAR scanning process.
- **Continual Monitoring:** Keep a close watch on the power system's performance during extended operation periods to verify the effectiveness of the new DC-DC converter and identify any areas for further improvement.

Reflections:

This session was pivotal in reinforcing RubbleScout's hardware foundation, setting a new standard for its build quality and operational reliability. Upgrading to a PMMA mounting plate, replacing the LiDAR, and enhancing the power circuitry are critical steps in ensuring the robot's durability and functionality. As we move forward, these improvements will be crucial in enabling RubbleScout to navigate and map environments more effectively, bringing us closer to our goal of creating a dependable robotic aid for search and rescue operations.