



Clatsop Community College; 1651 Lexington Ave; Astoria, Oregon 97103, USA

ROV Name: *Lazarus*

Total Materials Cost: \$5885

(Including ROV Build Cost: \$3,417 & Research and Development: \$2,468)

Total Company Labor: 6538 hours

Safety Features:

- All power regulators include over-current, over-temperature, short-circuit, output over-voltage, and input under-voltage protection.
- Ergonomic handles allowing comfortable and safe transport of Lazarus
- 30 amp rated fuses
- Warning stickers placed on thruster housings
- All solder joints are sealed using ocean depth capable hot glue and 3:1 ratio adhesive lined heat shrink
- All electronics are housed in epoxy or a pressure-housing rated for ocean depths

Special Features:

- Lazarus features an innovative in-water electronics architecture that allows for a serviceable, depth-ready waterproofed electronics system, without requiring highly advanced or costly manufacturing techniques.
- Lazarus Industries' piloting software is based on the Unity3d game engine, which is notable for its excellent user interface and 3D mathematics capabilities.
- Rather than over-complicate or obfuscate matters with a proprietary control protocol, Lazarus utilizes a standard, easily interfaceable JSON TCP server with human-readable variable names. This makes it incredibly easy for prospective developers to create their own piloting software for Lazarus, and drastically serves to speed up developing time.
- All piloting algorithms employed by Lazarus are implemented surface-side, rather than on Lazarus' onboard computer. This allows piloting algorithms to be developed and tested through simulation without Lazarus being present. This is a drastic improvement over Lazarus' Predecessor, Maggie, which required being powered and plugged into a laptop to have its piloting algorithms adjusted.
- Lazarus is designed from the very beginning with transportability and ergonomics in mind. Two sets of built-in handles make carrying Lazarus safe and easy, so long as safety protocols are observed.
- All manipulator designs are centered on simplicity, with most manipulators bearing no moving parts.
- Perhaps Lazarus' most noticeable feature is its Wide Area Lighting & Status Indicator (WALSI). This impressive set of components serves more than one feature, not only offering wide area lighting to pilots, but serving as a status indicator for surface technicians, and drastically increasing Lazarus' aesthetics.

Georges Oates Larsen

- RETURNING Member to MATE
- Junior in College
- Mathematics/Physics Major
 - Chief of the Board of Directors; Head of Research and Development; Pilot
 - 2449 Hours



Haley Werst

- NEW Member to MATE
- Sophomore in College
- Film Major, Physics Minor
 - Chief Executive Officer; Head of Media; Co-pilot
 - 959 Hours



Jennifer Jordan

- NEW Member to MATE
- Junior in College
- Physics Major, Engineering Minor
 - Chief of Business Operations; Electrical Engineer; Chief of Safety; Mission Analyst
 - 1668 Hours



Sam Daire

- RETURNING Member to MATE
- Freshman in College
- AAOT Major
 - Chief of Manufacturing; Tether Technician; Intermittent ROV Technician
 - 1010 Hours



Sean Sullivan

- NEW Member to MATE
- Freshman in College
- AAOT Major
 - Manufacturing Technician; ROV Technician; Parts Management
 - 452 Hours



Pat Keefe & Iris Daire

- Team Mentors

Distance from Astoria, OR, USA to Long Beach, CA, USA: 1727 km