

Abstract

UNH Aquacats is an interdisciplinary company devoted to designing, building, testing, and competing with an underwater ROV. UNH Aquacats currently consists of students studying mechanical engineering, computer engineering, and computer science. This project provides an opportunity for our company to directly apply our knowledge of engineering, including fluid dynamics, systems and controls, finite element analysis, machining, and computer science.

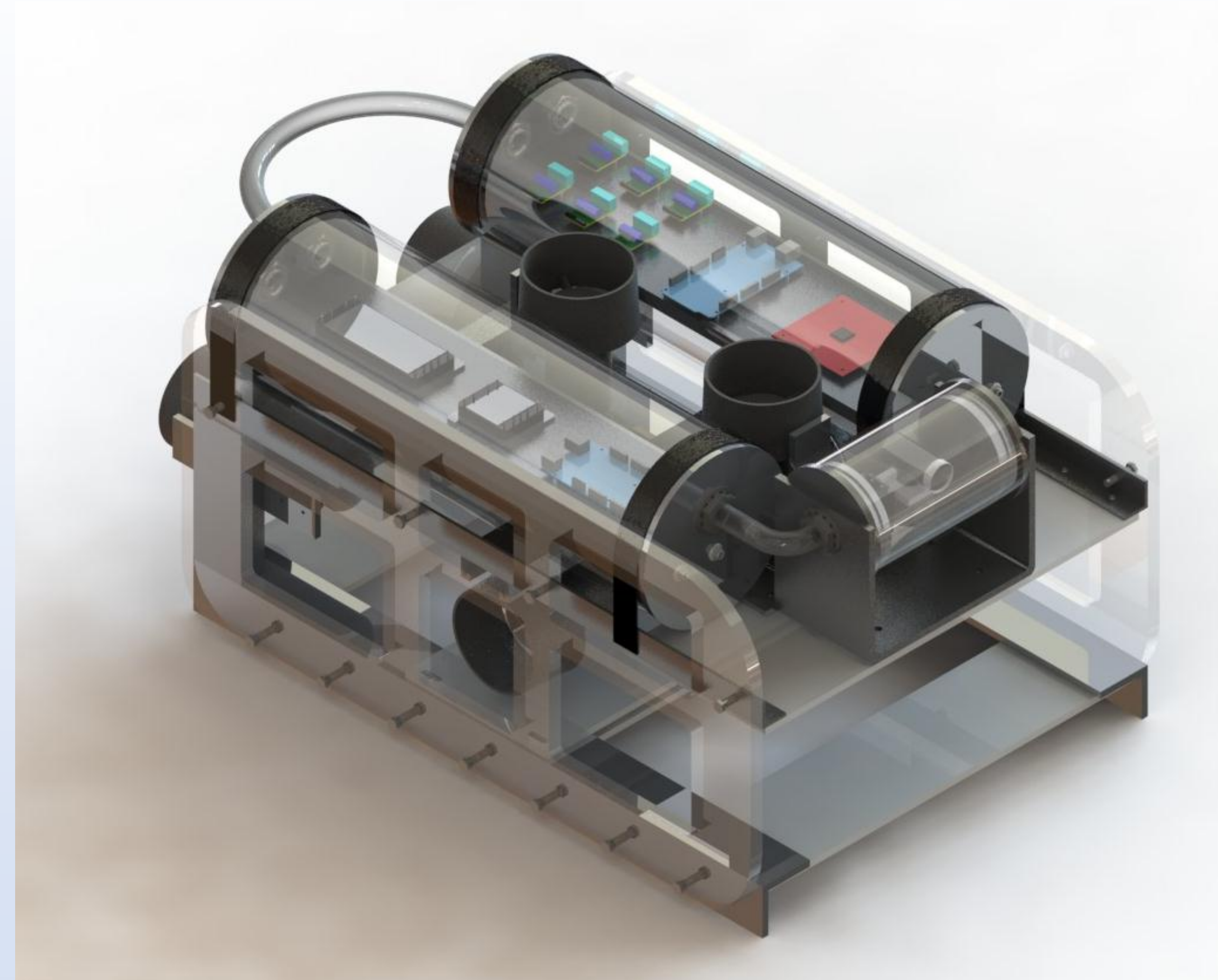


UNH Aquacats: 2013-14

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SolidWorks rendering of the Aquacat.

Mission Theme: Exploring the Great Lakes

The Thunder Bay National Marine Sanctuary, a rather rocky area on Lake Huron has been the site of hundreds of shipwrecks over the past two centuries, and has been aptly named "Shipwreck Alley." As a result, the area has great potential to be explored by ROV's for historic, scientific and conservational purposes. Examples of such are exploring well-preserved shipwrecks, studying sinkholes which are teeming with ancient microbial life, and cleaning up the area of waste so that it can be explored for years to come.

UNH Aquacats succeeded in designing, producing, and testing an ROV platform to be used for this year's MATE competition. The company mainly focused on organization as well as open communication. Over the course of the project, time management became our largest deficient area of our team. However, completing successful system tests both in and out of water has been the most rewarding aspect of the project. If presented with a chance to continue and improve on our design, a reduction of waterproof connections would be considered.

Design Rationale

Propulsion Design Goals

- Pitch and Yaw control
- 6 thrusters for 3 translational degrees of freedom
- Reversible thrusters to add power and ease of control
- Position around center of mass

Chassis Design Goals

- Minimize size in accordance with mission tasks
- Maintain slight positive buoyancy
- Space for PhD research equipment
- Symmetry to eliminate roll
- Waterproof housing of electronics and camera
- Safe mounting of tether on rear of ROV

Control Scheme

- Arduino Mega (2)
- Beagleboard XM
- IMU (inertial measurement unit)
- H-bridges (6)
- PS3 Controller
- Microsoft LifeCam

Company Evaluation