Modular ROV for SubSea Operations

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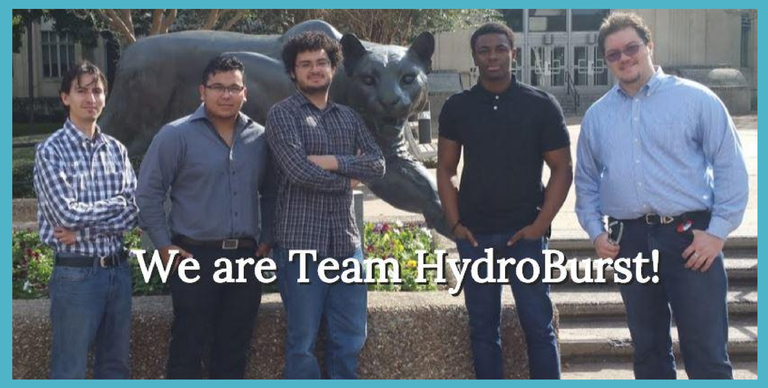

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What is a ROV?

An ROV is a Remotely Operated Vehicle which is an unmanned vehicle capable of reaching depths impossible for divers due to the high water pressure. Tasks preformed includes:

- Exploration
- Observation
- Maintenance and Repair
- Entertainment

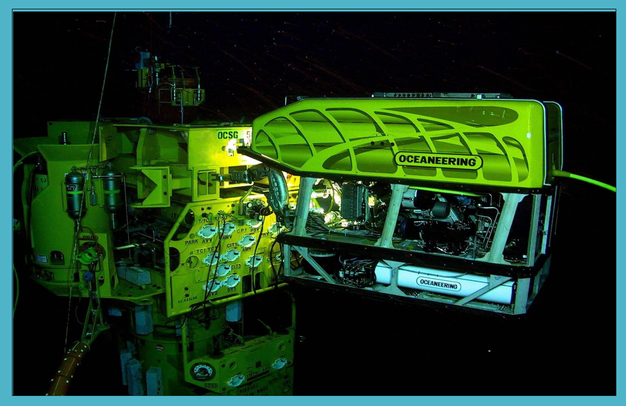

Figure 1. Show a work class ROV performing maintenance on a tree.

Methodology

The following list functions that a given ROV must have:

- Vision
- User Controls
- Propulsion System
- Manipulators
- Feedback

Objective

Team HydroBurst has researched and developed a design for a modular ROV to participate in the MATE ROV competition that simulates some of the challenges encountered in the subsea industry.

Results

The following figures show key components a ROV can implement in order to perform a given function.

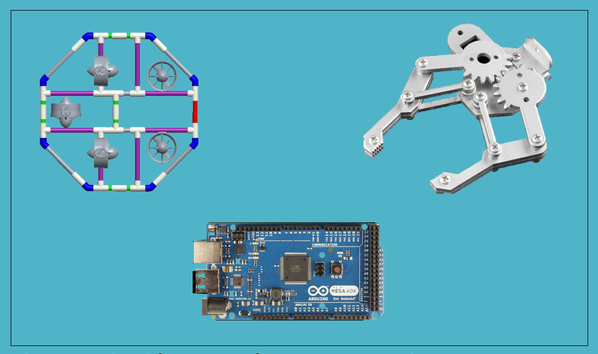

Figure 2. Shows the two main systems of an ROV. The drivetrain and the manipulators which are then controlled by a microcontroller (Arduino).

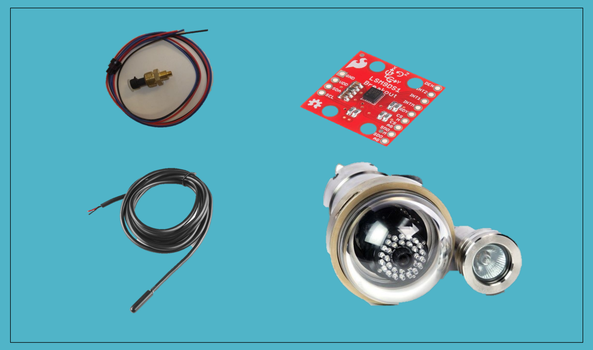

Figure 3. Displays some of the common sensors found on a ROV: pressure sensor, temperature sensor, gyro and a camera.

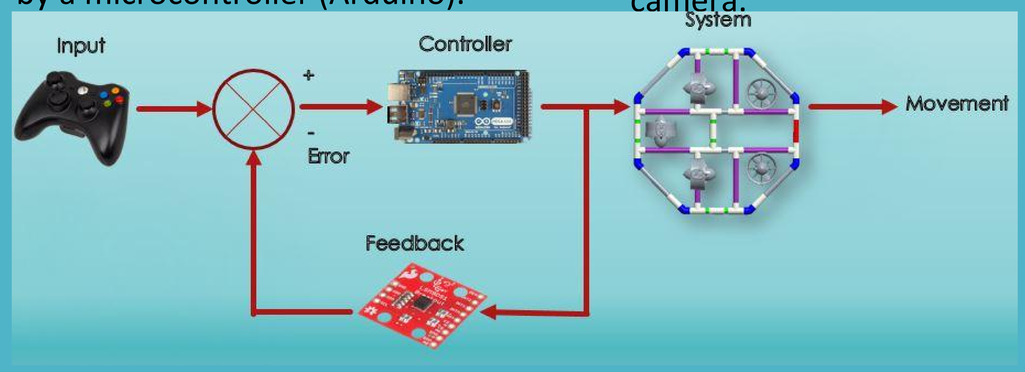

Figure 4. The following shows the simple closed loop system needed to achieve stable movement with the ROV with the use of a Gyro which helps compensates for errors in the

Discussion/Implications

2016 MATE Competition simulates real life subsea mission such as:

- Measure the depth of the ocean floor
- Temperature of thermal vents
- Retrieve equipment from sea floor
- Observing specimens in their environment
- Capping a wellhead

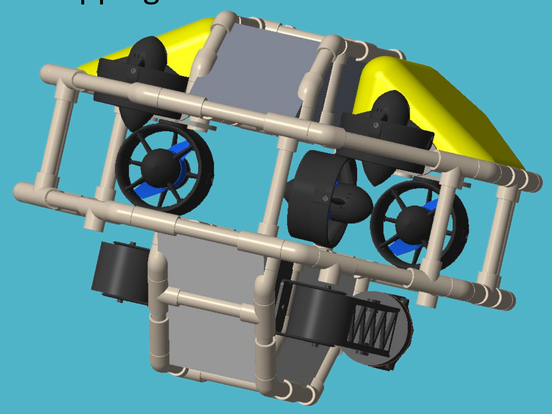

Figure 5. Shows team HydroBurst's current ROV design implementing a 5 thruster drivetrain with two manipulator arms.

Team HydroBurst's Goals

- Design and build a ROV for the 2016 MATE Competition in April.
- Fully implement the use of a Arduino to control the ROV.
- Implementation of two manipulator arms.
- Rated for depths up to 100ft.

Literature Cited

Moore, Steven. "Underwater Robotics" MATE. 2010. Book