Depth Sensors

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Overview

Depth sensors are a crucial means to receive feedback about more than just depth. By using four high-precision depth sensors, pitch and roll of the submarine can be calculated. Pitch and roll information can then be used to validate any information provided by an inertial measurement unit, and it is especially useful because depth sensors are not prone to the error induced by motors that a magnetometer is.

Timeline

1. Finish Schematic (October 7th)
2. Select Parts and Associate Footprints (October 15th)
3. Schematic and Component Review (October 17th)
4. PCB Routed (November 7th)
5. PCB Design Review (November 10th)
6. Order PCB (November 21st)
7. Get a single depth reading (December 1st)
8. Getting reading through I2C mux (December 3rd)
9. Sending formatted data through ROS (January 15th)

Theory

Think of three of the depth sensors defining a plane in 3D space. The final depth sensor acts as a fixed point above that plane that rotates as the plane rotates. If the fixed point is off-center of the plane, then when the plane rotates 180 degrees (staying flat at all times), then roll and pitch can be determined.

Resources

Resource	Description
ATMega1284P	Microcontroller to be used on the project.
Depth Sensor	Depth sensor in use on the submarine. Data Sheet
Arduino Tutorials	Code tutorials for programming Arduino devices.
ATMega1284P Arduino Core	Arduino Core for the ATMega1284P
RosSerial Documentation	RosSerial is the communication protocol that allows implementation of a ROS node on a microcontroller.
I2C MUX - 2	2-Channel I2C mux chip for multisensor configurations.
I2C MUX - 4	4-Channel I2C mux chip for multisensor configurations.