



SAN DIEGO STATE UNIVERSITY

Underwater Research Camera Housing, Shutter, and Wiper

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Project Overview

Design, build, and test an anti-fouling shutter/wiper for a glass window on an underwater pressure-resistant housing which will hold an autonomous (remotely controlled) camera.

Dr. Uwe Send and his team at the Scripps Institute of Oceanography has made leaps and bounds in the fields of ocean-climate interaction, and their fleet of research cameras are integral in CO2 uptake and acidification monitoring.

Design Specifications

- ❖ IPX8 Waterproof up to 30 atm
- ❖ Assembly will not crush up to 30 atm.
- ❖ Shutter and wiper system clears lens window of debris
- ❖ System is antibiofouling

Project Sponsor

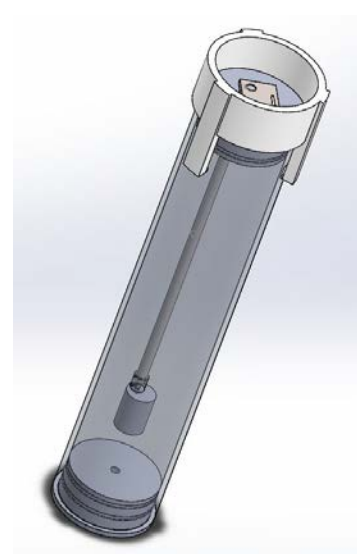


Current housing apparatus

Manufacturing

- ❖ 6061-T6 body and end caps machined at SDSU machine shop.
- ❖ 316 shutter, wiper, and lens window machined at SDSU machine shop.
- ❖ Polycarbonate edge guard outsourced to Incept3D.

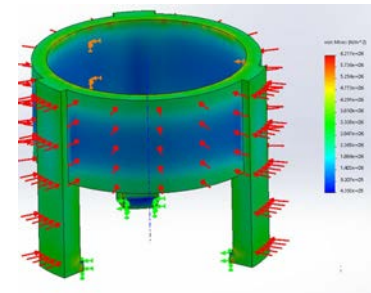
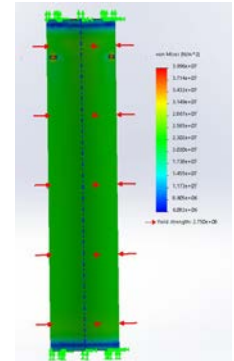
Final Design



CAD Mockup

Assembly

- ❖ O-rings seated into grooves on each cap, then lubricated. Rotary seal press fit into seat.
- ❖ Shutter coupled to motor, electronics connected from bulkhead.
- ❖ Copper tape for antibiofouling.



FEA Crush Analyses

Results

- ❖ Shutter protects window from debris.
- ❖ Wiper removes debris from window.
- ❖ Assembly does not crush at operating pressure.
- ❖ IPX7 satisfied.