

Portland State Remote Operated Vehicle

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ROV Team

2010 Team at regionals



2011 Team at a meeting



ROV 2009 and 2010

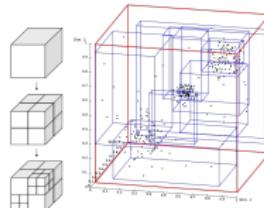
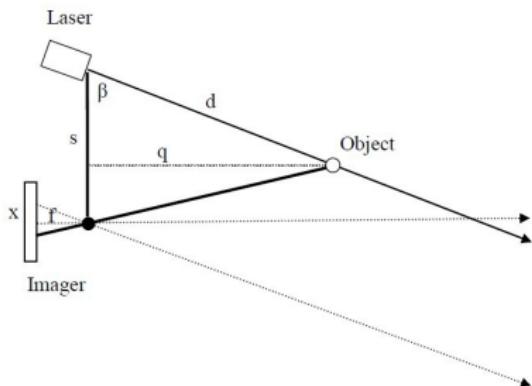
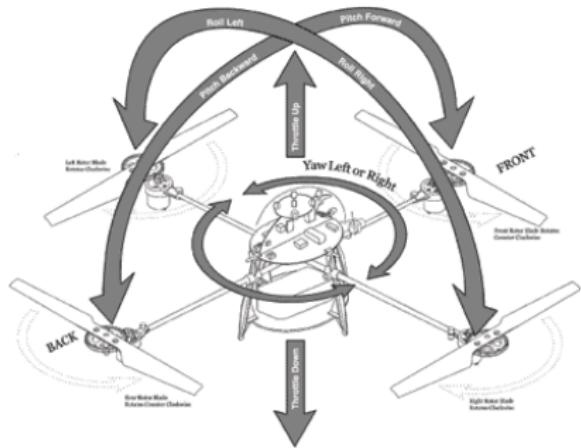
- ▶ 2009 and 2010
- ▶ Underwater Remote Operated Vehicle
- ▶ Marine Advancement for Technology Education (MATE) Center
- ▶ 2009 - Boston, Mass. - 28th
- ▶ 2010 - Hilo, Hawaii - 18th
- ▶ No members of the 2009 team remain, the torch has been passed
- ▶ Switched away from MATE in 2011, seeking new challenges

International Aerial Robotics Competition

- ▶ Mission
 - ▶ Covertly infiltrate a secret installation
 - ▶ Recover and replace USB stick without being detected
- ▶ Rules
 - ▶ 10 Minutes
 - ▶ Cannot Land
 - ▶ Completely Autonomous
- ▶ IARC
 - ▶ 6th IARC Misson in about 20 years
 - ▶ 1k entry fee(hopefully get waived), 20k grand prize
 - ▶ Mission went uncompleted last year
 - ▶ Designed so that “No currently existing craft can complete the mission”
 - ▶ AUVSI, Association for Unmanned Vehicle Systems International

The very basics of the plan

- ▶ Quadrotor
- ▶ Mapping and Octrees
- ▶ Perform SLAM
- ▶ AI



Using school and internet resources to increase efficiency

The collage includes the following screenshots:

- IARC Home Page:** A screenshot of the IARC website showing the "Meetings" section.
- Google Groups (PSU ROV):** A screenshot of the Google Groups interface for the PSU ROV group, showing discussions, members, and pages.
- github.com (PSU-ROV):** A screenshot of the GitHub repository for PSU-ROV, showing branches like "master" and "TweetyCentral".
- Google Groups (IARC):** A screenshot of the Google Groups interface for the IARC group, showing discussions, members, and pages.
- Google Sheets (PDX-ROV 2011 Budget):** A screenshot of a Google Sheets document titled "PDX-ROV 2011 Budget", showing a table of parts and their costs.
- Code Editor (Screenshot):** A screenshot of a code editor showing C++ code related to a "dead" file.
- IRC Chat Log (Screenshot):** A screenshot of an IRC log from #psu-rov on Freenode, dated 2011-05-25, showing a discussion about a "dead" file.

Close, but not there yet

- ▶ Quadrotor mechanical done
- ▶ Capable of brief flights
- ▶ Closed loop stabilization in 'tweaking' phase
- ▶ Craft takes off, hovers for a few seconds, 'lands'
- ▶ Need floating point unit
 - ▶ Complexity bump
- ▶ 3 PCBs are in the works
 - ▶ Sensor/control board has been prototyped and built once already
 - ▶ Power board has been prototyped
 - ▶ ESC board has been whiteboarded

Pieces have moved forward, much remains to be done

- ▶ Hokuyo conversation demonstrated
- ▶ Pandaboard/Beagleboard flashed, configured
- ▶ Messaging code(0mq) has been written, but needs to be fleshed out
- ▶ SLAM(Tinyslam) has been investigated, but needs to be worked on a lot
- ▶ AI(A*?) Hasn't been touched, needs a ton of work

Things that have tripped us up

- ▶ Noise
- ▶ Sensor drift
- ▶ The accelerometer conspiracy
- ▶ The super-tool problem
- ▶ The leaf problem
- ▶ Cosine function

Really cool things that happened

- ▶ Greg wrote an RTOS
- ▶ Bribed mechanical engineers
- ▶ Kept the number of 'black boxes' to an absolute minimum
- ▶ Set up foodbot

Flight Components:

<i>Carbon Fiber Frame</i>	\$100.00
<i>2 Motors</i>	\$89.98
<i>PCB ESCs</i>	\$100.00
<i>Battery Charger</i>	\$119.99
	\$410.97

Navigation Components:

<i>PandaBoard Minicomputer</i>	\$174.00
<i>Printed PCB and components (control)</i>	\$200.00
<i>Printed PCB and components (power)</i>	\$100.00
<i>Digital inertial measurement unit</i>	\$64.95
<i>Protoboard and components</i>	\$100.00
	\$638.95

Miscellaneous:

<i>Testing Equipment</i>	\$100.00
<i>Unplanned Expenditures(S&H)</i>	\$200.00
	\$300.00

Total: **\$1316.84**

Thank You very much

- ▶ Once again, we're the PSU Remote Operated Vehicle Team
- ▶ I, and my teammates as well, strongly support this pilot program because our experience last year with getting involved in student engineering was the highlight of my college experience to date.
- ▶ Thanks Again!

We want you

- ▶ Google Group - psu-rov@googlegroups.com
- ▶ Redmine - rov.cs.pdx.edu
- ▶ Weekly Meetings - FABC 86-04 - 1:00pm Saturdays
- ▶ IRC #rov, irc.cat.pdx.edu