

UBC Sails to Victory in the Sixth Annual International Robotic Sailing Competition

By Gaelen Krause



UBC's Thunderbird rolls over the Western Washington University entry in the fleet race

On June 14th 2012 the University of British Columbia and their two-meter long 'Thunderbird' dethroned the three-year reigning champions from the United States Naval Academy at the 6th Annual International Robotic Sailing competition in Vancouver, British Columbia. The University of British Columbia won the competition with a record-setting 47 points out of 50 in the Sailbot Class. Heralding from Chicago, Illinois, Olin College designed an impressively robust sailing algorithm and yacht, which carried them to second place with 43 points. This was a particularly impressive achievement, considering that the 32-member team only started their program in September. Also in the Sailbot division was Memorial University from St. Johns, Newfoundland. Despite persistent electronics issues, Memorial University's Volvo Open 70-inspired yacht garnered a hard won 23.4 points. Cal Poly Pomona won the Open Class with 27 points, beating out Aberystwyth University and Evan McCaw—the one-man team from the University of Iowa.

The event was held on English Bay outside of the breakwater walls at Royal Vancouver Yacht Club, who co-hosted the event with UBC. The turnout was terrific; there were eight teams from Canada, the United States, and Wales. **'We were really excited to see so many new teams at the event this year, and hope that the competition continues to catch the interest of more bright students around the world'** said Jon Mikkelsen, UBC's Team advisor. The competition is designed to be accessible to new teams. Students are allowed to make use of kit boats and electronics when necessary, and all the events except for the precision navigation can be completed in R/C mode for reduced points. As well, there has been significant international interest in the

Sailbot competition. There have been inquiries from as far away as Vietnam, and a competitive community of robotic sailors resides in Europe.



Olin College's Blackbody Radiation sported acrylic topdecks that made troubleshooting on the fly a breeze.

Notably, there were several major technological achievements among the various yachts in 2012. Olin College's 'Blackbody Radiation' sailed with a promising "fuzzy logic" algorithm. They developed "fuzzy logic" to continuously optimize the sailboat's direction and sail trim based on GPS-waypoints, no-sail zones, the sailboat's polar speeds, and any shifts in wind direction. All of this information was clearly portrayed on a user-friendly graphical user interface (GUI), which overlaid the yacht and her course over a chart of the local waters. The University of British Columbia navigated with only two sensors: a dual-antenna GPS unit from Hemisphere GPS and an ultra-lightweight wind sensor build around an optical encoder. The dual-antenna GPS has the significant advantage of giving a steady and reliable compass heading regardless of 'Thunderbird's' speed. The inability to determine heading at low speeds is a common issue for small boats that navigate only by conventional GPS, as they usually have a resolution of several meters. All of the boats this year were sloop-rigged monohulls, and the fastest were capable of upwards of 5 knots. The University of British Columbia's 'Thunderbird' and the United States Naval Academy's 'Gil the Boat' were the quickest in the fleet—they dealt comfortably with winds that peaked around 15 knots and waves



The 2012 Champions from UBC posed with their yacht and the author

that continuously washed over their decks in the upwind legs. The biggest challenge that these boats face is watertight integrity; every single team had electronics issues at some point in the competition that kept them out of the water. Whether it is a faulty radio connection, a short circuit from some unexpected water, or some emergency reprogramming, this competition almost always boils down to the programming, electronics, and the ability to troubleshoot on the fly. One thing consistently missing in these high performance boats is system redundancy. System redundancy may be the difference between being able to compete on the water and being cooped-up in the locker room rewiring.



Competitors prepare for the fleet race off Royal Vancouver Yacht Club in Vancouver

All in all, the 2012 Sailbot competition was a resounding success. All teams will certainly go home with areas of improvement in mind, and next year's boats will undoubtedly be as surprising and impressive as this year's fleet. We hope to build on the enthusiasm and talent that has been generated this year, and we expect the competition to see continuing growth into the future. Congratulations to the champions at the University of British Columbia and Cal Poly Pomona, as well as to all of the other schools that participated.

For more pictures and full results, visit the UBC Team website at www.ubcsailbots.wordpress.com