Cambridge Autonomous Underwater Vehicle

Newsletter – Winter 2010/11

CAUV

WELCOME

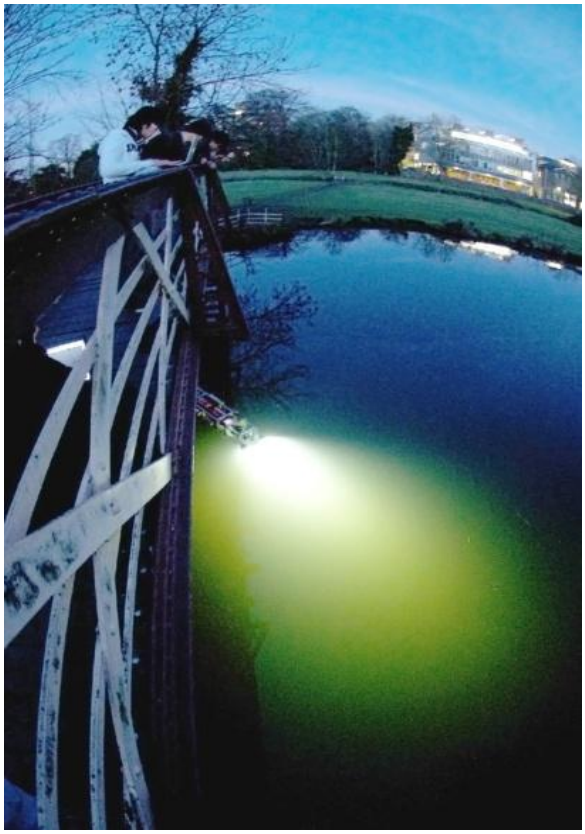
In the past few months the CAUV team has been working intensively on both our development vehicle (Red Herring), and the concept design for a new, highly integrated AUV which will bring us closer to our eventual goal: to operate under Arctic ice in one of the most inhospitable and unforgiving environments for any autonomous vehicle.

Recent developments have been fast and frequent with electronic parts reaching completion, exciting new software being developed and the whole lot brought to bear on some bracing wintery days testing the AUV in the river Cam.

The New Concept

Now that Red Herring is a completed platform for software development, hardware team attention turns to concept design of our next vehicle. With a longer design cycle than previous vehicles and strong support from industry, things are coming into place for CAUV to build its best AUV yet. Following some engrossed discussions in concept design, the team are resolved to build a miniaturised and modular vehicle. It will take a sleek, cylindrical form, particular attention paid to its ease of use to the end user. The mechanics team are already raring to get CADding and the next few weeks will see a first iteration detailed design taking shape.

"developments have been fast and frequent"



Red Herring lights the Cam as night falls

Electronics Update

Reliability and robustness have been the focus of recent electronics development: critical components that have failed in the past, such as bought-in thruster controllers, have been rebuilt to custom designs that fit our exact requirements. Though intended for our next vehicle, these components will get a thorough testing in Red Herring first.

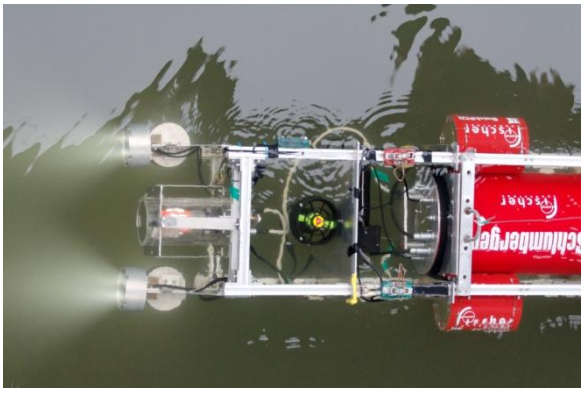
CAUV team up with Cambrand

With innovative ideas flying everywhere during the concept design of our new vehicle, the CAUV team could easily lose touch with our practical ability to produce what we design. Fortunately the team has been proud to receive support from Cambrand, a centre of excellence in Design for Manufacture:

As Malcolm and Jason from Cambrand took ten team members on a tour of the Cambridge Precision manufacturing facilities, our eyes popped out on stalks as we saw kinds of parts their factory was able to machine! We now go about our detailed hull design with renewed focus, aiming for hardware that not only performs excellently but which also can be made efficiently.

Michaelmas Blitz

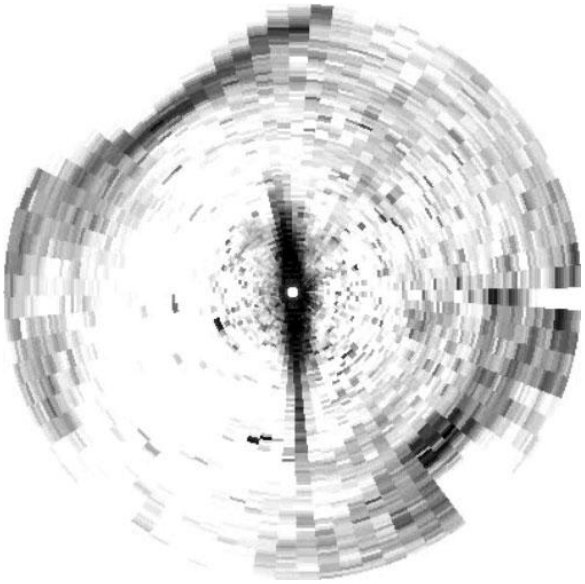
As the sun set on a frustratingly short (but exhaustingly long!) week of testing in December, the CAUV software team reflected on significant progress on image processing, improvements of our ability to "script" the control of the vehicle using simple high-level programs, and the development of a new control system that should yield more precise and faster control of movements.



Surfacing from the murky river waters

A key achievement during the week was the successful operation of new colour and brightness based object-avoidance, which operated successfully even in low visibility conditions, operating under Red Herring's own lights. Importantly, a significant amount of sonar and image data was also recorded: this is crucial for ongoing development.

The end of the week came too fast, the testing of some software postponed. With more new ideas implemented since, and plenty more yet to be realised the team is eagerly anticipating our next chance to test!



A snapshot of raw sonar data from the river.

A Look Ahead

CAUV once again looks forward to attending the annual SAUC-E competition in early summer, where students from across Europe bring their creations to compete in an underwater assault course.

"anticipate a step change in performance"

Though for the first time, we hope to follow this up with a summer devoted to all-out AUV building. With the team given the time to work on development and integration of hardware and software, we anticipate a step change in the performance of our next AUV: realisation of the highly integrated, highly modular vehicle we have always aspired to.

New Sponsor: Blue Water Ventures

This year we welcome Blue Water Ventures as a new sponsor. Specialising in finding, diving and exploring ancient ship-wrecks Blue Water Ventures shares a passion with the CAUV team for innovation in underwater technology. The sophisticated behaviour and staggering operating depths they require of their AUVs presents to CAUV a fascinating and exhilarating challenge!

MEET THE TEAM

James Rickenbach *3rd year Chemical Engineering*

Since the day he got here, James's involvement with CAUV and downright enthusiasm for the project have been infectious! Now in his penultimate year, it is James that leads the team. Bringing invaluable experience to the mechanical and practical aspects of building a waterproof vehicle, he never stops "getting stuff done" whilst encouraging others to do the same!

Ralph Barton *3rd year Electronic and Information Engineering*

An Autonomous Underwater Vehicle is a tremendous systems-engineering challenge, with a wide variety of disciplines working together successful integration is crucial: as Chief Technical Officer, Ralph makes sure this happens! With experience in Software and Computer Science, electronics, and as a member of the Mechanics team he is perfectly suited to the role.

James Buckley *2nd Year Engineering*

A recent addition to the team, James is already making enormous contributions to our AUV's hardware. Drawing on what can only be described as home-grown brilliance in integrated electronics, he's moving us towards a tidier, more efficient ARM based control system.

A big step in this direction is his creation of a new MCB – the electronics 'hub' that connects the algorithms in the computer to the vehicle's sensors and propulsion.

James Crosby *3rd Year Information Engineering*

As leader of the software team, it is James that puts the autonomous into AUV and brings our vehicle to life! Having worked on various commercial software projects, he will take on any challenge: from algorithms that let the AUV make sense of what its cameras 'see' to the scripts that allow the vehicle to decide what to do next.

James' hobby of photography means he also acts as CAUV's photographer, recording all our progress, excursions and successes.

The CAUV team would like to thank all our sponsors for their continued support.

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