

# Cambridge Autonomous Underwater Vehicle

Newsletter - Winter 2009/10

**CAUV**

# WELCOME

Welcome to our winter 2009/10 newsletter. We have had lots of exciting developments since our last update in October. Here are some of the highlights:

## The team is growing...

Following our recruitment drive at the beginning of the academic year, we have seen the number of active team members swell to over 30! This has allowed us to make an unprecedented amount of progress on development of our new hull.

## ...and we have gained some exciting new sponsors

We are extremely grateful for the amount of new and continued support we have received from sponsors.

We are delighted that **Schlumberger** are continuing to support the team financially for the 2010 competition. As one of our lead sponsors their contribution is invaluable.

In addition, this term we have benefitted from generous donations in kind from companies including **Fischer Connectors**, who have given us a range of waterproof connectors, and **BatchPCB.com**, who will be providing us with the bespoke PCBs required for the new vehicle.

*"This has allowed us to make an unprecedented amount of progress..."*



The main hull tube with the frame in the background

## SAUC-E 2010

Details for the next running of the SAUC-E competition were released just before the festive period, and there are some pretty noteworthy changes over previous years.

The competition this year will be hosted at the NATO Underwater Research Centre (NURC) in La Spezia, Italy. The main change is the move to a saltwater testing area. More details on page 4.

## New website

Since Christmas, we have also launched our new website. Here you can see details of the current team; regular updates about the development of the new hull and all the latest photos.

It can be found at:

[www.cambridgeauv.co.uk](http://www.cambridgeauv.co.uk)



## MEMBER PROFILE: DAN WEATHERILL

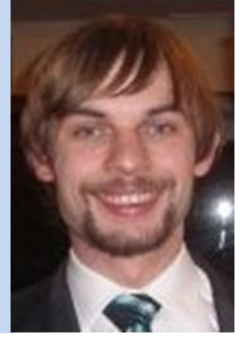
Dan is a second-year physicist who has been on the team since 2008. This year he takes on the role of Chief Technical Officer, responsible for overall supervision of the design and building of the new hull. His other passion is also on the water - rowing for the Clare College 1<sup>st</sup> VIII.



DEVELOPMENT VEHICLE

MEMBER PROFILE: LESZEK SWIRSKI

Leszek is a fourth year computer scientist from Fitzwilliam College. He is in control of the software team, which this year has seen one of the biggest increases in numbers. His team is now 10 strong and responsible for writing all of the code behind the submarine. In his spare time, Leszek enjoys reading and playing the guitar.



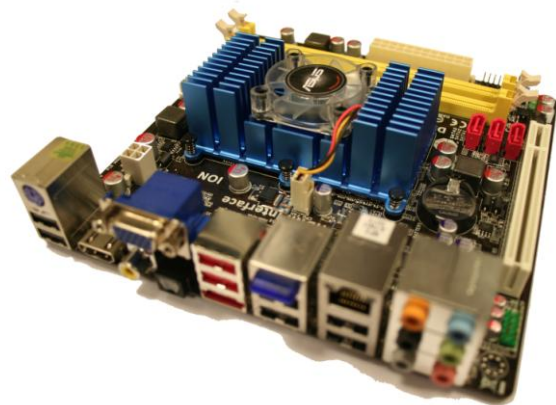
This year we are building a completely new vehicle to incorporate many of the lessons that we have learnt over the past three years. We haven't named the vehicle yet as its construction isn't complete and since its main purpose is to provide a platform for developing the electronics and software we are currently calling it our Development Vehicle.

The design of the vehicle began after the SAUC-E '09 competition following the problems that we have experienced with Blackghost. Our main problem was poor reliability, which has severely limited pool testing time over the past two years and due to this software development has been slow. Therefore we have decided to take a slight change of approach and to build a vehicle which is larger, simpler and more reliable than Blackghost. This approach means the vehicle won't be suitable for our Arctic goals but it will provide a test bed to develop the electronics and software which can be incorporated into future vehicles.

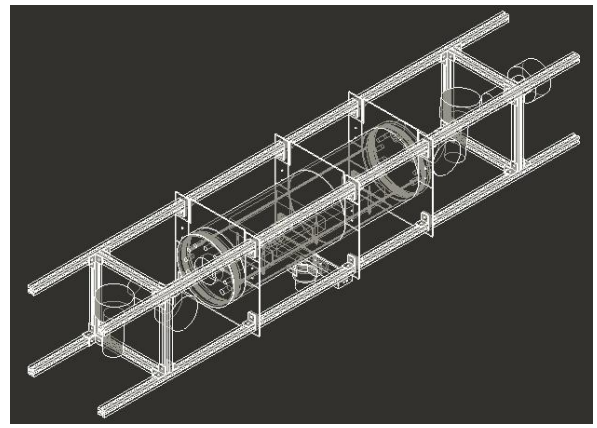
The vehicle has a main hull section that uses two simple plug endplates with o-ring seals to provide a reliable watertight seal. This is then mounted within an aluminium frame, which is made from t-bar section and is bolted together. This makes it is easy to change and reconfigure so different ideas can be easily tested. To manoeuvre the vehicle uses 5 commercial thrusters with two mounted vertically to control depth, two mounted horizontally to turn the vehicle and one mounted at the rear to drive the vehicle forwards.

Inside the hull we have also decided to increase the power of our computer to allow us to do a greater amount of visual processing. The new computer that we've decide to use is an ASUS AT3N7A-I which has a 1.6GHz Dual-core Intel® Atom™ processor 330 and a NVIDIA® ION™ graphics card.

For more information about the design as it progresses keep an eye on our website.



The ASUS AT3N7A that will provide the vehicles computing



The CAD model for the Development Vehicle showing the main hull, the frame and the thrusters

# SAUC-E 2010

This year the SAUC-E competition is being hosted at NURC (NATO underwater research centre) in La Spezia, Italy. It will run for seven days from the 28<sup>th</sup> June to the 4<sup>th</sup> July to allow the teams five full days of testing and preparation.

NURC is one of three research and technology organisations in NATO, conducting research in support of NATO's operational and transformation requirements. They focus on the undersea domain and developing solutions to maritime security problems.

The rules for this year's competition have been updated to make it more difficult. The biggest difference is the move to an outdoor competition arena with low visibility. This makes the conditions closer to those which most underwater vehicles experience, deep in the sea or in cloudy water. The change is expected to shift the emphasis on the tools which teams use to complete tasks. In previous years vehicles have been heavily dependent on vision but sonar systems are expected to play a key role this year.

The tasks involved in the challenge, listed below, have also undergone major changes.



The NURC waterfront where the competition will be held

The interesting changes are the addition of a cutting task and the use of an acoustic pinger to define tasks. The cutting task poses a fascinating challenge as a mechanism will have to be developed which can reliably cut a rope while causing no danger to the divers who will be in the water with the vehicles at all times. The use of a pinger to define a location to circle and the surfacing region also adds a new dimension but will be useful to aid the localisation attempts of the vehicle.

We are looking forward to adapting our new vehicle for the new challenges over the coming months and being able to once again compete against top universities from all over Europe in July.

## THE CHALLENGE

1. Submerge from the starting position and pass through a 3m by 2m validation gate.
2. Turn through 180° and follow a 0.5m diameter orange pipe to a second validation gate
3. Find a 0.3m diameter buoy and cut the cable holding it
4. Survey a 10m long wall which will not be straight
5. Circle an acoustic pinger which is located at the centre of the pool area
6. Surface directly above the acoustic pinger into a surfacing area

The CAUV team would thank all of their sponsors for their continued support

