

# **CEP-UBC Mechanical Engineering Capstone Project**

## **Introduction**

For the engineering undergraduate students at UBC, their final graduating requirement is the completion of an 8 months long (September- April) Capstone Design Project. Using the knowledge and skills gained during their studies, students are tasked with challenging real world problems that require practical solutions.

Teams of 4 or 5 students take on a project to

- design and build a product
- develop a prototype model to study its feasibility
- design and develop a product for measurement and testing
- modification of an existing product

The most successful projects are proposed by industry clients, who would subsequently be presented with design models and a working prototype by the team. Students divide tasks amongst themselves and could contribute up to 300 hours of work per team member throughout the course of a project.

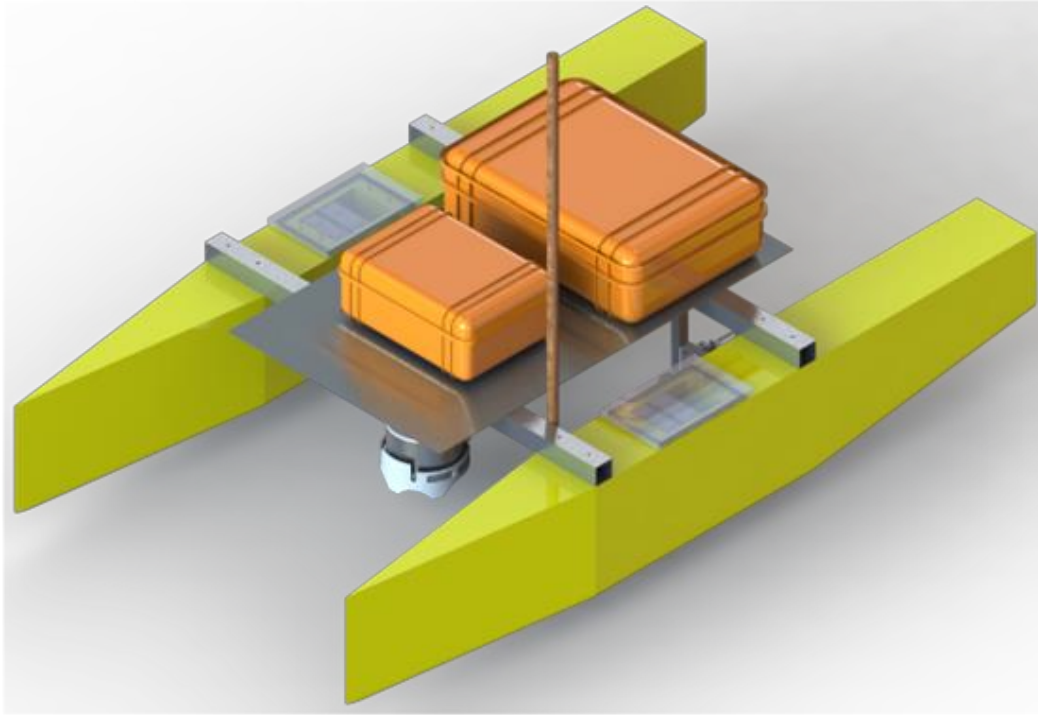
## **Project members and Scope**

For the 2015-16 academic year a joint Electro-Mechanical Capstone Project proposal was submitted to the UBC Department of Mechanical Engineering by Chartered Engineers Pacific Committee members Alan Wood (IET) and Kris Gadareh (IMechE).

This Mechatronics project proposal was among over 40 projects submitted to the UBC Mechanical Engineering Department by a variety of Canadian companies and governmental organizations. 116 final year students received presentations from sponsors at the start of their academic year and were instructed by the faculty to rank their top 5 choice of projects. Based on this ranking 8 faculty members and supervisors then assigned projects to 28 teams.

The CEP project proposal was chosen by a team of 4 Mechanical Engineering students to design, build and test a cost effective autonomous marine vessel or a robotic boat for bathymetry surveying on lakes within Canada.

The team designed and constructed a 2 meter long catamaran vessel with the top speed of 8 km/hr, capable of holding equipments and weighing just over 45 kg. The vessel has two rudders and two thrusters placed between its polystyrene and fibreglass hulls. Five LFP rechargeable batteries are used inside the hulls to power the electronics. The payload which is a multi-beam echosounder is powered by two 4-cell LiPo batteries. The boat is controlled with a Pixhawk Autopilot by setting GPS waypoints.



This project provided a good opportunity to strengthen the link between UBC faculty and CEP committee members. It also brought awareness of our activities specifically among students and future young members.