

# Membership

## Membership Policies

1. Must be able to commit approx. 6 hours per week. This is to ensure continuity of project.
2. Team leadership selection is based on interest to devote more time and take on more responsibility than regular members. Team captain and sub team leads need to be able to lead a group of students effectively. Team captain and sub team leads will also be responsible for mentorship of other members.
3. There are three sub teams in UBC SailBot: Electrical, Mechanical, and Software. The minimum size for each subgroup is 5 members including sub team lead.
4. UBC SailBot will not tolerate inappropriate behaviour or harassment within the team.
5. The team captain(s) and sub-team leads will be in their specific position for no more than two years. This will ensure that new members will be able to take over, ensuring the team's survival over time, even after core members have graduated.
6. First year students are welcome, as long as they are willing to learn and contribute to the team. This is to ensure continuity as well.

## Recruitment Plan

This year we have seen a big increase in number of members once again. This is mainly due to five factors:

1. UBC Sailbot is in the middle of an exciting project to attempt to cross the Atlantic Ocean autonomously. This has raised interest in the student community. The challenges of this project now include power and power regeneration, which has brought in new members skilled in those areas.
2. In June 2014, UBC SailBot won the International Robotic Sailboat Championship for the third year in a row and with a perfect score for the second year in a row. This victory helped the team establish a stronger base at the university and as a result more students became aware of the team.
3. A strong representation at Imagine Day and strong presence throughout the UBC Engineering community (including recruiting letters sent directly to some engineering departments at UBC).
4. Social Media such as our blog and especially Facebook has brought in many new members who use sites such as those to follow the team.
  1. A strong group of returning members, which has shown interested students that there is strong leadership and community on the team.

We spread the word that we were looking for new members by word-of-mouth, social media, and presence at the MECH 2 BBQ, Jump Start for New International Students, Engineering BBQ and Imagine Day.

Throughout July to September, we did 30 minute interview-sessions for each and every interested person where we explained the project, how we work, and what it takes to be on the team. Based on these interviews, the team leads selected the appropriate team members for the different positions in the team. There were always two interviewers from SailBot and the team lead was required to be at every interview to ensure fairness in selection. By having interviews, we can better ensure that our team members are devoted to the team and also set the tone as a professional team.

Interview questions that we used for potential team members:

1. Why are you interested in joining the UBC Sailbot team?
2. What are some of your strengths that you can bring to this team? Hands-on experience?
3. Are you part of some other (related or unrelated to engineering) clubs? Have you been part of another engineering club?
4. What are some skills you'd like to work on?
5. Do you have any past work or project experience?
6. How much time do you expect to put into the team each week? How many courses are you taking?
7. What position(s) in the team would you be interested in?

We also supplied some technical questions to the potential team members to answer so we could get a better idea of their technical knowledge. However, generally we are looking for people who are genuinely interested in putting hours into the team rather than having initial direct technical knowledge.

At the start of the school term, we had a welcome orientation for new members, as well as for returning members. We introduced everyone to the team's history, recent success at our competition, updates from the various team leads, and future plans and timelines to grow their excitement. This allowed new members to become introduced to the team right away and feel like an integrated member.

## Diversity Plan

We are actively inclusive of all our team members, both socially and in the work that they want to be doing. UBC SailBot happily welcomes all interested students to the team, no matter what faculty or department they belong to. By having a diverse student body we intend to be more representative of real-world work environments.

The team will promote professionalism and create a welcoming, supportive, and inclusive environment for everyone who is in contact with us.

UBC Sailbot is a unique project that combines mechanical, electrical, and software aspects. This creates a team that is extremely diverse in skillsets.

Our new world record attempt has also brought in members from many different faculties who are interested in making history, including Science and Arts.

UBC SailBot will not tolerate inappropriate behaviour or harassment within the team. If this occurs, it will lead to an immediate cancellation of membership and reporting to university representatives.

### **Definition of harassment:**

Harassment is intentional behaviour that is found to be disturbing or threatening, and that may or may not include discrimination based on race, color, religion, sex, sexuality, national origin, age, disability or genetic information. Harassment becomes unlawful if 1) enduring the offensive conduct becomes a condition of continued membership, or 2) the conduct is severe or pervasive enough to create a work environment that a reasonable person would consider intimidating, hostile, or abusive.

Petty slights, annoyances, and isolated incidents (unless extremely serious) will not rise to the level of illegality. To be unlawful, the conduct must create a work environment that would be intimidating, hostile, or offensive to reasonable people.

Offensive conduct may include, but is not limited to, offensive jokes, slurs, epithets or name calling, physical assaults or threats, intimidation, ridicule or mockery, insults or put-downs, offensive objects or pictures, and interference with work performance. Harassment can occur in a variety of circumstances, including, but not limited to, the following:

- The harasser can be the victim's supervisor, a supervisor in another area, or a team member.
- The victim does not have to be the person harassed, but can be anyone affected by the offensive conduct.

## Membership Management / Sustainability Strategy / Succession Plan

84 % of the 43 members last year stayed on the team this year, providing our team with a low turnover rate compared to similar sized engineering teams. We believe that team members stay on this project because it is fun, gives new challenges, and provides a unique opportunity to do something that has not been done before - and we are successful.

Since last year, we have made a greater emphasis on the social aspect of being a member of this team. We made several traditions for team spirit building purposes, including a UBC SailBot Day of the Longboat team, UBC Integrated Science Club Tournament Volleyball Team, a UBC Winter Futsal Classic Team, a UBC Storm the Wall team, a summer team potluck, a September icebreaker, and subteam picnic lunches after regular weekend worksessions, which have all been very memorable activities.

Every week, we have team lead meetings, full team meetings, subteam meetings, subteam worksessions and sub-subteam worksessions. In team lead meetings, we discuss updates from the past week, plans for the upcoming week, how well the team is functioning as a whole and any administrative tasks for the team. In full team meetings, one subteam gives an update presentation on their progress, similar to what happens in interdisciplinary projects in companies. Subteam meetings take place immediately following full team meetings so that the Mechanical, Electrical and Software subteams are already in the same room in case they need to ask questions from one another. Within each subteam, there are sub-subteams that have a design leader for their specific design components, who may become the future subteam leads. All members, including first year students, are involved in both design and build.

We keep detailed records of our organizational plan, the team space and tools. We put all of our work in a Google Drive accessible by all members. This includes information about the project including timelines, "how-to" tutorials, work session and testing documentation, pictures, videos and technical drawings. We strive to write all of our technical documents to be easily understood by a young team member or to a new team member joining in the middle of the project. We use the free Asana software to keep track of administrative tasks for team leads.

The team captain(s) and sub-team leads will be in their specific position for no more than two years. This will ensure that new members will be able to take over, ensuring the team's survival over time, even after core members have graduated. New and returning members will be given a chance to have a leadership positions within the team. New team leaders will be chosen by the rest of the team leads. Termination of leadership position before two year period is over must have approval from more than 50% of team leads. Team captain has veto in all termination cases, except his/her own.

## *Learning*

### Long-Term Learning Goals for the Group

UBC SailBot's main goal is to facilitate the practical learning needed to combine naval architecture and robotics. This year we are tackling a brand new and very challenging design problem. This will extend our knowledge of boats and sailing, and provide greater student involvement and professional development. Student development is a top priority and covers a broad range of areas such as research, teamwork, technical skills, and ultimately to prepare members of UBC SailBot for the engineering industry.

Furthermore, UBC SailBot is focussed on developing a tradition of challenging the level of engineering being accomplished at UBC. This has broad effects for the students as they have an opportunity to become leaders in the industry they pursue. UBC SailBot intends to continue striving to push boundaries for robotics capabilities. The hope is that UBC SailBot will continue to give students a once-in-a-lifetime opportunity to partake in an incredible challenge.

### Current Year Learning Goals for the Group

This year, the main goal of UBC SailBot is to enter the Microtransat Challenge and cross the Atlantic Ocean autonomously. Achieving this means building a large composite boat with a robust electronics package, and programming, which includes weather tracking and obstacle avoidance. Our other goal is to compete again in the International Robotic Sailing Regatta to defend our titles from 2012 to 2014.

This year, we plan to continue the design and build of a 5.5 meter carbon fibre boat for the transatlantic challenge using what we have learned from our previous experience. This will require the continued use of computer software such as Solidworks and Rhino. The boat is currently in the middle of construction and will give students the opportunity to learn how to use power tools and create composite structures. In addition, students will be developing naval architectural components such as keels, rudders, and sails using advanced technologies and materials.

The programming of the boat will be advanced, and will use modern computer systems, such as the Raspberry Pi. The software team has been developing complex programs capable of creating routes around weather systems and other boats. This will require incorporating live weather data, as well as tracking the position of boats using AIS (Automatic Identification System) technology. The team has also begun work on an obstacle avoidance system that will push the capabilities of our boat to new levels.

The electronics package will have to incorporate many robust sensors each with their own microcontroller, and ship-to-shore communication will be done through satellite communication equipment. The electronics team will be creating a mockup of the system for testing purposes. This system will then be incorporated into the boat. A power system will be developed that incorporates solar panels, a custom charge controller and a high density battery pack. They will also be developing redundancy systems so that there are backup systems in place in case of malfunctioning components. The team will also be working with the software team to provide the necessary sensor system for obstacle avoidance.

## Collaboration Plans

We will continue our strong collaboration with industry advisors, as we have over the past three years. Well-known yacht designer and two time olympic sailing coach Don Martin continues to provide invaluable design and construction advice. This year we have expanded our collaboration with naval architecture firms to include both SeaSpan and Robert Allan. Robert Allan will provide assistance with lofting our hull and foil designs in industry standard CAD software. They will also provide access to CFD and stability software packages that we could otherwise not afford. SeaSpan will provide engineering advice and assistance with technical issues as they arise.

This year we have already started working with the UBC Orbit Team to collaborate on a power system that incorporates solar panels, charge controllers and high energy density batteries. There are similarities in the needs of both team's systems, which has led to the sharing of knowledge between teams. The hope is that both teams will benefit from the knowledge and connections that each team brings, and a common design can be reached.

Our space in the Rusty Hut is in close proximity to both the Aero Design and Supermileage teams. We plan to share power saws and other large tools with nearby teams to save cost and space. The boat we are building this year is much larger and more challenging from a manufacturing standpoint than previous years. As such, we plan to have a larger and stronger presence in the Rusty Hut than ever before. We plan to take full advantage of the opportunities this will provide for greater sharing of both ideas and resources with our neighbours.

## New Group Member Training And Mentorship Plan

Our team grew from 42 members to 66 members this year. We sent 8 returning members to the Engineering Design Team Conference on September 20th, 2014 to foster future leaders within the team. We have some senior members in each subteam dedicated as technical advisors to younger members, and they also take the time to prepare training sessions for younger members to get a jumpstart on new skills they will need.

We have arranged affordable \$10 sailing lessons in collaboration with UBC Sailing Club so that members can truly experience sailing and better understand the design tasks.

We additionally hold tutorials to help the new members become acquainted with the Thunderbird competition boat. This will allow for them to be familiar with our sailing strategies and help them with developing the transatlantic boat.

Additionally, with a large group of returning members, we will be able to develop as a team and face some more challenging tasks.

### Senior Member Continuing Professional Development Plan

This year, the senior members of UBC SailBot will be challenged with a more advanced project, the creation of a more robust transatlantic autonomous sailboat; this boat will enter into the Microtransat Challenge. During the design of this boat members will be in contact with external engineers in order to aid in design and production of parts. This sailboat will contribute to further learnings in naval architecture by both returning and new members. An emphasis on low power and robust design will also challenge our senior members. We also sent 8 senior members who we see as potential future leaders to the Engineering Design Team Conference on September 20th, 2014.

Senior members will also be asked to take on more design tasks. This is meant to give them the confidence to take lead on a project when given the chance to in industry. This will also allow them to connect with industry to gather knowledge and advice. The senior members will then be relied upon to give mentorship to the younger members.

### Academic Success Plan

The student's on UBC SailBot are a great network and source of information. If one of our members is struggling in their classes we will immediately help them in any way possible. If necessary time away from the team can be taken to focus on class work, as success in classes is a top priority. Design work will also supplement class work and learning.

Honesty will also be stressed on the team, in the sense that if one is struggling to complete a task due to academic commitments they need not hide it from the team. The team understands and respects the academic commitments of our team members. If members are having difficulties, we urge them to approach a senior member without fear of repercussion. These senior members have also been known for their mentorship abilities, not only involving the project, but also academically. Senior members often assist other team members with their academic work.

## *Safety*

### Safety Training Plan

All members are required to complete the Department of Mechanical Engineering Lab Safety and Orientation Checklist, task-specific safety training, and pass the Introduction to Laboratory Safety Course before being allowed to work. The team safety officer is the only one allowed to train and sign off the safety orientations. Returning members also have to complete the Orientation Checklist and Safety Quiz annually.

## Safe Working Environment Plan

Inactive members will be removed from the list of people allowed to use the workspace, so that the workspace will not be used for unintended purpose.

Task-specific training takes place at the start of every work session, or when someone arrives mid-session. New members are reminded and encouraged to openly and repeatedly ask when they are unsure of how to do something.

We strive to have excellent housekeeping. Within work sessions, team leads are responsible to ensure that the workspace is clean and tidy throughout the duration of a work session. We also emphasize that there should be plenty of space between each team member.

Personal protective equipment (PPE) must be worn at all times when working and additional PPE must be worn according to the task. Work areas are to be kept clean and organized. Any tools or equipment are to be stored safely and securely in the proper location when not being used. If a piece of equipment is directly locked, there must be a note attached explaining why, who locked it and their contact information.

Copies of the safety incident reporting paper are on-site in our work space. Any incident/accident/near-miss, even minor ones, must be reported within one business day to the safety officer and MECH office.

MSDS is available in the work room's binder for any chemicals used. We went an extra mile, which took several hours, to put all of the relevant MSDS information including PPE, Precautions and First Aid Measures, onto a single spreadsheet and put it on the door to the chemicals cabinet so that team members are easily able to see relevant safety measures for all the chemicals. We put a second copy of the spreadsheet in our work space for convenient reference while using the chemicals.

In the Engineering Design Team Conference, Jon Mikkelsen mentioned the importance of building a culture that "safety is smart". To address this, we have started implementing "Building Logs" where everyone on the Mechanical Team, including the first years, will take turns writing up an explanation of what we did during a work session, encompassing "What we did, how, why, and sample of safety measures taken." We have already done this for the past four worksessions since the Engineering Design Team Conference.

## Supervision Rules

One of the Mechanical Co-Leads or the Graduate student in Naval Architecture and Marine Engineering, Robert Gage, will be present to oversee any work being done. A minimum of two team members must be present at all times when work is being carried out, one of which being a Mechanical Co-Lead or the Graduate student.

We put a limit on the number of people attending each work session (as appropriate for the given task), both to make it reasonable to manage for the person(s) supervising and to allow for appropriate physical space. Work is scheduled before being carried out.

Here is a sample from our current *Google Drive* MECH Worksession Signup:

## PPE Rules

The required PPE must be worn at all times to be able to work in the lab. UBC SailBot has purchased all PPE necessary to perform the tasks we are facing. Task specific PPE is available on our team shelves and must also be worn at all times while completing work. Face masks must be properly fitted for an individual before use.

## *Outreach and Promotion*

### Outreach Plan

The UBC SailBot outreach plan includes being present at as many club days, industry nights, community events as possible. This will ensure both that our team gets more publicity and that UBC gets more publicity, as our members and the team are directly associated with the university. The team captain is responsible for attending as many events as possible representing the team. In the past we have been part of events such as:

- ESTC Industry Night
- APEGBC Student Team showcase
- SNAME Showcase Event
- UBC NAME Program Launch Event
- UBC Donor Night
- UBC Engineering Open House
- Canadian Power and Sail Squadron Showcase
- UBC GEERingUp!
- APEGBC Richmond Technical Presentation

We are a strong supporter of GEERing Up! We dedicated every week of their 2014 summer camps to having SailBot Kids' Activities where we helped the kids make and race their own little boats - team members from all subteams were involved in this. In our presentation, we had a conversation with the kids about what it's like to be on an engineering design team and emphasized the importance of teamwork. We



continued by mentoring the opening day of Geer Gals, a new after-school kids' program to give girls Grades 4-7 a fun and encouraging environment with female mentors in Science and Engineering.



The [ubcsailbot.org](http://ubcsailbot.org) website is the best resource the team has for outreach to people outside the university. Throughout the year we see a massive increase of number of people visiting our blog, and we intend to continue developing this.

We have also developed a newsletter that the community and sponsors are invited to sign up for. The monthly newsletter details the progress over the last month, links to blog posts, and highlights sponsors and members.

### Promotion Plan

The UBC SailBot team promotes itself in as many ways it can. Club days, industry nights, community events, and professional association events (SNAME and others) are some of the places the team does promotion.

By having a good collaboration with the MECH department and the EECE department we have ensured that the team has team advertisement on CEME, EDC, and McLeod display screens.

Furthermore, we plan to both contribute to the CEME lobby display case and having web-ready article(s) and photos for [www.mech.ubc.ca](http://www.mech.ubc.ca) whenever needed.

The biggest promotion plan UBC SailBot has is through it's website, [ubcsailbot.org](http://ubcsailbot.org), and through our Facebook page at [facebook.com/ubcsailbot](https://facebook.com/ubcsailbot). By updating blog and Facebook page weekly we can ensure that the world outside UBC has a very accessible place to learn all about the UBC SailBot team. We will continue posting pictures/videos and text with weekly updates. A biweekly or monthly newsletter to our sponsors are also being made and sent out.

Exactly as mentioned in the Engineering Design Team Conference, we have a visually appealing and thorough sponsorship package encompassing What We Do, Why We Do It, Why We Need Your Help and Sponsor Benefits and Recognition.

UBC SailBot is also part of a new international recruitment campaign for UBC. The team has recently been filmed sailing the autonomous Thunderbird 2013 as part of this campaign. UBC Studios, UBC's own filmmaking program, is our partner in making this video. UBC Studios has also approached the team about an opportunity to document the team's transatlantic pursuits in a longer feature.

UBC SailBot has been featured in the following media channels:

- Vancouver Sun
- CBC Radio
- CBC Television
- Global TV
- Wired Magazine
- Pacific Yachting Magazine
- Sailing World Magazine
- Western Mariner
- Ubysey
- Epoch Times
- Sing Tao
- Reddit
- SNAME Website Home Page
- Herald Times
- California Broadcast Station
- The Journal of Ocean Technology
- UBC Studios
- Tesla Motors Student Webpage
- BC Shipping News
- Digital Ocean Webpage

We intend to keep pushing for more media coverage to help promote UBC SailBot and UBC Mechanical Engineering throughout Canada and internationally.