

UBC Engineering

Design Team

Handbook

2015-2016



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Applied Science

Table of Contents

Engineering Design Teams	5
Relationship with the Faculty of Applied Science	5
Team Structure and Operation	5
Privacy and Digital Security	5
Recruiting	7
Succession Planning	8
Starting an Engineering Design Team	8
Safety	10
Safety Training and General Space Access:	10
Safety Plans:	11
Hazardous Materials – Safety and Disposal	11
Incidents and First Aid	11
Incident Reports:	12
Student Team Safety Funding:	12
Contact Information	12
Team Finances	14
Setting Up a Team Account (PG)	14
Submitting expenses for Reimbursement	14
Receiving and Depositing Sponsorship Funds	15
UBC Funding Opportunities	15
Tips for Better Funding Applications	15
Sponsorships	16
Industry Sponsorship and External Funding	16
IMPORTANT – Sponsorship Agreements	17
Liability Insurance	20
News and Publicity Guide	21
Publicizing Your Team for New Members	21
News – UBC Public Affairs and Applied Science	22
Faculty Advisors	25

Responsibilities of the Faculty Advisor	25
Responsibilities of the Team	26
How to Approach a Faculty Member	26
Team Resources	27
Team Trailers	27
Welding Services	28
EDC 101A – Ledor Group Composites Room	28
EDC 211 – Workshop	29
EDC 213 – Electronics Workroom	29
Departmental Workshops	30
FAQ	31
Appendix A: Existing Teams	33
A1: Automotive Teams	33
A2: Chemical and Biological Engineering Teams	34
A3: Civil Engineering Teams	34
A4: Engineering Physics Teams	35
A5: Fluid Dynamics Teams	35
A6: Robotics Teams	35
A7: Computer Teams	36
Appendix B: Team Document Examples	37
B1: Supermileage Team Structure (2015/16)	37
B2: SailBots Team Organizational Documents (2014-2015)	48
B3: Supermileage Turnover (2014/15)	62
B4: Supermileage Communications Plan (2012/13)	64
Appendix C: Financial Document Examples	68
C1: Donation/Sponsorship Form	68
C2: Sponsorship Invoice Template	69
C3: Supermileage Sponsorship Package (2014/15)	70
C4: Baja 2014/15 PAF Application	79
C5: Supermileage 2014/15 PAF Application	86
C6: Lost Receipt Form	93
Appendix D: Safety Document Examples	94
D1: Safety Plan Template	94

D2: Safety Audit (Minimum Requirement)	95
D3: General Work Area Inspection Checklist	97
D4: Safe Work Procedure Form	99
D5: SailBots Safety Audit Example	101
D6: SailBots Safety Notes	103

Engineering Design Teams

A UBC Engineering Design Team, henceforth referred to as Team, is an extra-curricular group comprised of UBC students with a common goal of gaining relevant design, competition, team, and leadership experience. Teams generally design and manufacture a device or product (e.g. a robot or a vehicle). Teams often choose to enter a regional, national, or international competition with their device, to represent UBC Engineering and put their hard work to the test.

Relationship with the Faculty of Applied Science

Teams are an integral part of the Faculty of Applied Science and are provided access to space and resources within the Faculty. In order to qualify for some departmental funding, student teams may be required to declare a host department, where their university accounts reside. Each team is required to have a university bank account (“PG”) registered with the APSC Dean’s office or with their host department. Each team must have at least one Faculty Advisor whose interests are relevant to the team’s work.

The Faculty of Applied Science provides temporary and semi-permanent project space, access to machinery and manufacturing equipment, as well as funding opportunities under the Professional Activities Fund (PAF), EUS referendum funding and general faculty funds. The Faculty leads and develops Safety and Leadership Training throughout the year.

Team Structure and Operation

Teams’ internal functions are independently operated. Teams are required to nominate a Team Captain and a Safety Officer to oversee their operation. Teams may create additional executive positions to suit their individual needs. Teams may develop their own internal governance documents to serve the needs of their team and to ensure continued success. Examples of Team Governance Documents have been made available in Appendix B for reference.

Teams meet and work during the week as well as on weekends. Work hours are agreed upon internally, to conform to student schedules and resource availability.

Privacy and Digital Security

Teams often collect personal information as part of their recruitment and financial operation. It is important that teams abide by the relevant privacy standards as groups hosted within a public Canadian institution.

The following information has been sourced from the University Counsel’s Privacy Fact Sheet (<http://universitycounsel.ubc.ca/files/2014/01/Fact-Sheet-Disclosure-Outside-Canada.pdf>):

Public bodies in British Columbia, including UBC, are subject to restrictions on the storage or access to personal information from outside Canada. These restrictions, which are contained in the Freedom of Information and Protection of Privacy Act (FIPPA), require all personal information in UBC’s custody or control to be stored only in Canada and accessed only in Canada, with a few narrowly defined exceptions.

Many computing services are offered through the Internet, and may be hosted in the United States or other foreign jurisdictions. Using these services to collect, store, transmit or access personal information is a violation of the restrictions against storage or access outside Canada.

Here are some examples of commonly used cloud services, with Canadian-based alternatives:

Cloud Services	Canadian Based Alternatives
Dropbox	Workspace 2.0
Gmail, Hotmail	FASmail
Survey Monkey	Fluid Surveys
Google Docs	Microsoft Word and Excel

Student Teams that use non-Canadian services to host private information, including Student Emails and Student Numbers, are required to acquire student consent before doing so.

Consent

It is acceptable to store or access an individual's personal information outside Canada if you have the consent of the individual. This consent must be in writing and must specify:

- who may store or access the personal information;
- if practicable, the jurisdiction in which the personal information may be stored or from which the personal information may be accessed; and
- the purpose of the storage of or access to the personal information.

Since it may not be practical to secure written consent from every student, it is acceptable for [teams] to secure the consent as follows:

- in the [team documents], or in a written communication to the students, describe the cloud-based service and the information that it will be storing or accessing, and explain that if the students choose not to provide their consent to this storage or access, they must see the [team lead] to make alternate arrangements; and
- make alternate arrangements for students who refuse to provide their consent, such as allowing them to sign in to the service using a false name and non-identifying email address.

Teams should note that the restriction on storing personal information on outside servers also applies to sponsors. “Personal information” is defined as “recorded information about an identifiable individual.” A name and work contact information is not considered personal information. However, student teams should still consider this information “sensitive,” because it is not always publicly posted and it is important to consider whether or not the individual would want their information made public (i.e. through a Freedom of Information request). Financial information, including sponsorship amounts, should also be considered sensitive.

UBC IT is in the process of rolling out Workspace 2.0, its cloud-based file sharing system (very similar in nature to Drop Box and Google Drive). Currently, Workspace is only available for Faculty and Staff use, however in the future, it will become available for student team use. When this occurs, Teams will be expected to use this service, or a similar Canadian-based service, to store confidential and private information.

Recruiting

Teams rely on recruiting new members to ensure the long term success of their projects. Some teams choose to interview interested students to make sure candidates are committed to the team, however teams are not required to interview candidate students.

Events

The largest recruiting event is the annual Imagine Day Main Event where clubs and organizations from all walks of life set up booths along main mall and recruit new members. Instructions to register for an Imagine Day booth will be sent out annually, often during the summer. If you have not received an email, but you would like to sign up for a booth, contact the Student Teams Coordinator (team.engineering@ubc.ca) for information on how your team can sign up. The Faculty of Applied Science also hosts several events each year, such as the Engineering Open House, which often serve as excellent outreach opportunities for teams. The Student Teams Coordinator will send information about these events as they approach, so make sure your contact information is up to date.

Online Presence

Besides attending public outreach events, many teams are very active online. Social media sites can be a great way to show off your work, your team's culture, and your team's goals. Teams often also have blogs or websites with lists of current members, contact information, and project updates. If your team would like to create its own WordPress site, UBC Blogs (blogs.ubc.ca) is an excellent resource that provides students with an easy to set up webpage, 29 free themes to choose from, and free hosting!

Digital Signage

The Faculty of Applied Science has several locations, including the EDC atrium, Kaiser Atrium, Kaiser 2nd Floor Lounge, and Macleod Atrium, where Teams may utilize large screens for digital advertising. Students in the Faculty of Applied Science can display approved ads free of charge. If you would like to promote your team using the monitors throughout UBC and Engineering Buildings, follow these steps:

- Review templates and tips for creating digital signage on
 - UBC's Digital Signage site: <http://digitalsignage.ubc.ca/current-clients/content-guidelines/>, and
 - APSC's Digital Identity site: <http://apsc.ubc.ca/apsc/visual-identity>.
- To display your signage in Engineering buildings, please contact advertising@apsc.ubc.ca. If the ad gets the approval of the APSC Communication Department, please allow 2-4 business days to upload to the system.

More information on digital signage and public outreach can be found in the News and Publicity Section.

Succession Planning

Nearly every student here at UBC aspires to one day graduate. And while some students stick around longer than others, it should come as no surprise that the current executive members of a team will likely no longer be the executive members a few years down the line. While some teams change leadership more often than others, it is important to consider leadership succession to ensure that your team survives even once you are gone. This could include essential project information, team administrative information (e.g. email or blog accounts), contact information, detailed information on current and past sponsors (including sponsorship amounts), and experiential advice. The UBC Supermileage Team has provided the handbook with an example of their Turnover Document (in Appendix B3: Supermileage Turnover (2014/15)) used to help bring new executive members up to speed on their role.

Starting an Engineering Design Team

Teams were formed by an inspired and determined group of students to solve a compelling design challenge. In the event that none of the existing teams are able to satisfy your interests, you may consider starting one. The following are steps that should be taken if you intend to start a new student team:

Talk to Existing Teams

UBC Engineering currently recognizes 23 Design Teams that design and build submarines and satellites and nearly everything in between. Chances are that an existing team may want to pursue the same idea as you, and may already be on their way to developing a design for it, albeit not publicly communicating so.

Talk to members and executives of the team(s) most aligned with the project or design challenge you have in mind, to determine if there is a possibility to incorporate it into existing design challenges. There may well be an opportunity for multiple teams to collaborate on the new design project. A full list of current teams can be found at <http://teams.engineering.ubc.ca/the-teams/> and in Appendix A: Existing Teams

Develop a Proposal and Find a Faculty Advisor

Clearly articulate your objective in a professional Team Proposal - it is your best opportunity to convince the Faculty of the particular benefit of having a new team. Contact a Faculty member you are interested in working with, and ask them if they would like to support your team (consider their existing commitments).

Some criteria that should be considered in developing a plan are:

- What is the goal of the new team, and how is it not currently being met by existing student teams?
- What is the financial scope of the design challenge? Are there industry sponsorship opportunities?
- What is the timeline of the design solution? Will it be a recurring design cycle or a one-time challenge?
- Will you compete with other design teams outside of UBC?
- Will the Team require project space? If so, how much, and where?
- What is the Team structure going to look like?
- How will the Team stay accountable to itself and the Faculty?
- Do you need a succession plan?

The Engineering Design Teams Coordinator (team.engineering@ubc.ca) is available to consult and help with development of this plan.

Present Your Proposal

Time to make it official.

Set up a meeting with Dr. Van der Loos, Student Teams Faculty Head, and Emily Wyatt, Student Professional Development Officer, to discuss your proposal and the further steps that need to be taken. Your Faculty Advisor may or may not choose to attend this meeting.

Safety

Teams are required by the Faculty to extensively train their members to act in accordance with UBC Safety Policy 7. In addition, practicing safety is paramount to professional development. APEGBC, for example, puts holding paramount “the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace” as the number one policy in their Code of Ethics.

Each member must pass the safety training requirements for their workspace in order to obtain workspace access. Violation of Safety Requirements will result in the member’s FOB access being revoked and may result in the team being placed on probation. The Faculty reserves the right to restrict access to resources until safety guidelines are followed.

Safety Training and General Space Access:

Each Team’s Captain and Safety Officer are required to attend the annual Engineering Design Team Conference which will include training pertaining to leadership, bullying and harassment prevention, team management, and of course, safety.

The Applied Science Safety and Facilities Officer will coordinate with UBC Risk Management Services to host an in depth Safety Training course. The Training will consist of an online course and quiz which is to be completed independently, as well as a detailed in-person Safety Orientation. Upon the successful completion of both components of the Safety Training course, Team Captains and Safety Officers will have their workspace access renewed. Safety Officers will also be required to train the remaining members of their team.

Teams are required to maintain documentation of their members’ training. This documentation should be readily available upon request of the Safety and Facilities Officer, Student Team Coordinator, Student Development Coordinator, or Faculty Advisor.

For detailed safety information please visit: <https://www.hse2.ubc.ca/moodle/>.

All team members are also required to complete the following UBC RMS courses before they will be granted space access:

- RMS Workplace Hazardous Materials Information System (WHMIS) course
- RMS Bullying & Harassment Awareness course

Note that while the Bullying and Harassment Awareness course is only required to be completed once, the WHMIS and in person Safety Training courses must be completed annually to ensure that students are actively aware of updated safety procedures and precautions.

Once team members have completed their appropriate safety training, Safety Officers must contact the Student Teams Coordinator in order for members to obtain FOB access to their team space. For access requests, please attach an updated spreadsheet of Team Members containing their:

- Name
- Role (if any)
- Student Number
- Email Address
- Spaces where Access is Required
- Training Completed (e.g. General Safety, Respirator Fit, etc.)

Some students may also require access to additional spaces, such as the EDC 211 Workshop or the EDC 101 Composites Room. These spaces require additional training before access is granted. Further information is provided in the [Team Resources](#) section below.

Safety Plans:

Student Teams are expected to develop comprehensive safety plans, outlining the relevant actions that need to be taken to ensure safe operation in their space and while working on their project. Safety plans reduce the likelihood of accidents occurring by improving team awareness, and help improve how teams deal with emergencies by ensuring that things have been thought through ahead of time. A sample Safety Plan form is included below. Example Safety Documents and Templates are available in Appendix D.

Hazardous Materials – Safety and Disposal

Many teams require the use of hazardous materials, such as resins and combustibles, in their projects. Teams must take all necessary safety precautions when handling these materials. Teams should be aware of the appropriate PPE required, and should keep up to date Material Safety Data Sheets in their space. Hazardous materials cannot simply be flushed down a drain or thrown in a trash can. The APSC Safety and Facilities Officer has an account with UBC Waste Management and can help teams dispose of any hazardous materials. Contact Richard Colwell at Richard.colwell@ubc.ca for more information on the disposal process. More information can be found in the EDT Safety Training Course.

Incidents and First Aid

Teams often keep First Aid kits in their space in case of accidental injury. UBC Safety Policy requires that all First Aid kits are overseen by an Occupational First Aid Level 1 (OFA1) Certified First Aid Attendant. The Safety and Facilities Officer will be coordinating an OFA1 training course at the beginning of the year, free of charge. Each team should have at least one member with OFA1 certification. *Self-administration of First Aid is not allowed.*

In the event of an incident that requires First Aid, only an OFA1 Certified Attendant may administer First Aid. If there is no OFA1 Attendant present, students should call 911. The Mobile First Aid Unit will go to the patient's location and respond to any first aid issue, no matter how minor. The Vancouver Fire Department has been contracted to provide mobile First Aid for UBC Faculty, Staff and Paid Students (604-822-4444).

Incident Reports:

Team Members must inform their Safety Officer in the event of an incident or a near-incident. It required that your team's Safety Officer fill out an Online Incident Account form on the UBC Risk Management Services Website. This form provides UBC with the information it requires to identify potential lapses in safety and areas for improvement, as well as ensuring that the appropriate steps have been taken to remediate the incident. Teams may wish to have their own incident reporting system in addition to the Online Incident Account form made available by UBC RMS, however this extra step is not required.

The Online Incident Account form can be found below:

(https://www.hse2.ubc.ca/consdata/locked/incident_accident/register.php?no_account=1).

You will be required to login with your CWL credentials to access the form. If it is your first time submitting an incident report, you may be required to create an account with the incident/accident system as you submit the report.

Student Team Safety Funding:

In 2015, UBC Engineering alumnus Andre De Leebeck and his wife Barbara generously established the *Andre and Barbara De Leebeck Engineering Student Teams Safety Enhancement Fund*. Their goal is to support safety initiatives and training, and to enhance the overall safety of engineering student teams. A portion of this funding supports both fixed and one-time costs associated with enhancing safety equipment, training and environment for student teams. However, depending on resources, some funding may be available to individual teams in order to reimburse specific safety-related expenses that they incur. If your team incurs a cost that you believe is safety-related, contact Richard Colwell (below) to see if reimbursement is possible. The amount of reimbursement will vary year-by-year.

Contact Information

If you have any further questions or concerns after reading the previous section and taking the online safety course, please contact the APSC Safety and Facilities Officer.

Richard Colwell

Safety and Facilities Officer, Faculty of Applied Sciences
The University of British Columbia | Vancouver Campus
Wayne and William White Engineering Design Centre
Room 235, 2345 East Mall | Vancouver, BC V6T 1Z4
Phone: 604-822-2273 | Cell: 604-786-8008
richard.colwell@ubc.ca

Important Phone Numbers

- **Emergency:** 9-1-1
- **UBC Royal Canadian Mounted Police (RCMP):** 604-224-1322
- **RCMP Tip Line:** 778-290-5291 or 1-877-543-4822
- **UBC Campus Security:** 604-822-2222

- **AMS Safewalk:** 604-822-5355
- **Urgent Building Safety Problems, Broken Lights:** 604-822-2173

Support Services

- **AMS Sexual Assault Support Centre (SASC):** 604-827-5180
- **UBC Counselling Services:** 604-822-3811
- **UBC Student Health Services:** 604-822-7011
- **RCMP Victim Services:** 604-224-1322
- **Employee Family Assistance Plan (EFAP):** 1-800-663-1142

Team Finances

Teams are responsible for generating a professional budget, and financing their projects. They generally do so through industry sponsorships (monetary and in-kind), and by applying for UBC-based funding opportunities.

The following are resources meant to help current teams, their members, and the UBC student body at large. Please contact team.engineering@ubc.ca if you have any suggested changes or questions.

Account Set-Up (PG)

Teams can set-up an account at UBC through the APSC Dean's Office. Email finance@apsc.ubc.ca to set-up an appointment and for an application form.

Account Balance

Applicants of the team can request the account balance by sending an email to finance@apsc.ubc.ca.

Approval

PAF Claims –

The primary applicant must approve and sign on PAF claims.

Teams Expense Claims –

Two individuals are designated as signing authorities to approve and sign for all expense claims for members of the team. When a designated signing authority claims expenses, the other signing authority must co-sign. Designated signing authorities cannot authorize his/her own expense.

Expense Claims for Reimbursement – PAF and Teams

Claims must be supported by *original, itemized* receipts and *original* signatures from the claimant and the designated signing authority / primary applicant in order to be reimbursed. Fill out a Missing Receipt Form (see Appendix C – Financial Document) for any receipts (including itemized meal receipts) that are lost. A credit card statement is not acceptable as receipt, but may be submitted in conjunction with the Missing Receipt Form. Your credit card number should be blanked out.

Expenses in a foreign currency: identify the exchange rate used by attaching evidence such as a credit card statement or print out from <http://www.oanda.com> on the date the expense was incurred.

Expense claims may be dropped off at the front desk on the 5th floor of the Kaiser Building (office hours are M-F, 8:30am – 4:30pm) or mailed to the APSC Finance Dean's Office, 5000 – 2332 Main Mall Vancouver, BC V6T 1Z4.

Invoice for Payment – Teams

Obtain an invoice (quotes are not acceptable). Have at least one of the designated signing authority sign, date, and indicate the speedchart on the invoice. Forward the original to APSC Finance Dean's Office.

Receiving and Depositing Sponsorship Funds

For more information on this process, please see the section below entitled [APSC's Development Office and How They Can Help](#).

UBC Funding Opportunities

The following are UBC-supported funding opportunities, along with relevant details.

Applications may be point-based or otherwise. Point-based funding applications award points on the merit of the funding application's conciseness, accuracy, and reasoning, and generally have more stringent requirements that must be followed.

Name of Fund	Allocating body	Deadline	Website
PAF	PAF Committee	Mid-September	http://paf.engineering.ubc.ca/
EDTC Referendum Funding	EUS	Funding Awarded Bi-annually	N/A
Department Specific Funding	Applied Science Department	Mid-September	engineering.ubc.ca
AMS Sustainability Fund	UBC Alma Mater Society	Early January	http://amssustainability.ca/submit/
Walter Gage Fund	UBC Vice-Presidents Students Office	Ongoing	http://vpstudents.ubc.ca/funding-awards/walter-h-gage-memorial-fund/

Tips for Better Funding Applications

Minor factors in funding applications may end up critically impacting the funding provided to a team. A few tips may be of help in getting the funding you need:

- Ensure that the team and Principal Applicant meet the requirements listed on the specific fund's website.
- Develop an accurate and accountable budget with enough detail before applying.
- Read the application very carefully. Answer any questions concisely and logically.
- Pay attention to professionalism - grammar, required font, word count etc.
- Discuss the application with the Engineering Teams Coordinator and your faculty advisor at least a week prior to deadline - they may have helpful feedback for you.
- Submit the application before the deadline. Late applications are not accepted and may jeopardize the team's financial situation.

Examples of high scoring PAF applications from 2014 have been made available in Appendix B Industry Sponsorship and External Funding

Sponsorship & Industry Relations

Teams in the past have been successful in soliciting in-kind and financial sponsorships from companies in their respective industries.

Companies are motivated to sponsor teams and clubs for a variety of reasons, including:

- Public relations: sponsorship enables a company to display its brand in a specifically targeted manner – many companies consider this to be a form of advertisement. Companies also benefit from the perception, by both the public and other companies, that they support education, innovation and student initiatives.
- Human resources: to companies, student team members often represent very valuable and talented potential employees. By sponsoring teams, these companies both enhance their profile and presence among students and often get a chance to engage with them directly.
- Tax benefit: UBC is a charitable organization and as such can issue a tax receipt or business acknowledgement to an individual or a company, both of which have tax implications (for more information, see below).

UBC's business and charitable number is: **10816 1779 RR0001**

Tax Receipt vs. Business Acknowledgement

If you have any questions about tax documentation or receiving sponsorship funds or gifts-in-kind, please contact the Development Office – contact information below

Companies may ask you if they will receive a tax receipt for their sponsorship – they are often simply referring to business acknowledgements (the individual asking may not know the difference). Simply state that they can receive a business acknowledgement if they would like, and feel free to explain the difference:

- Charitable tax receipt: issued for philanthropic gifts (usually from individuals, not companies) with no strings attached. The individual receives no perceived economic benefit from their donation. They can apply the tax receipt directly against their income tax.
- Business acknowledgement: issued for sponsorships (always from companies), where the company is receiving economic benefit – i.e. their logo is displayed, which is considered a form of advertising. Companies can use the business acknowledgement to write off the sponsorship as an expense.
- A company **cannot** receive a tax receipt for a sponsorship, but they can receive a business acknowledgement.

NOTE: UBC can issue business acknowledgements for **both cash and in-kind** sponsorships. However, in-kind sponsorships require more steps and the special assistance of the Faculty's Development Office (see below for contact info).

Sponsorship Package

It is recommended for teams to develop a Sponsorship Package document to provide to external groups. The document should include points such as:

- Description of the Team, your objectives, and your goals for the new year
- A short explanation of what kind of funding you need, how much, and why
- A description of where the money/in-kind support will go
- The types of publicity that the team expects to receive, including expected community outreach that you will perform during the year – this implies opportunities for the sponsor's logo to be displayed publicly
- How the Team will reward the sponsorship; teams often have several levels of sponsorship depending on the amount of support given, and often incorporate logo display and opportunities to meet the team as the primary rewards; it is most effective to lay these levels out in a chart format.

TIP – industry professionals are busy, and they often receive many requests for sponsorship every year. They do not have the time to read long documents. Short and concise (i.e. 4 pages) sponsorship packages that get right to the point will be the most effective.

An example of a Sponsorship Package has been made available by the UBC Supermileage Team and can be seen in Appendix C3

The Faculty's Development Office (below) is also happy to assist your team in developing a sponsorship package.

IMPORTANT – Sponsorship Agreements

Some sponsors may request that your team sign a sponsorship agreement that they have drafted before they will give you the sponsorship cheque. Whatever you do, **DO NOT**, sign any agreements. Students do not have the authority to sign an agreement on behalf of UBC. In fact only a handful of people in the *entire* university have this authority.

If you are asked to sign an agreement, please indicate that you do not have the authority to sign it, and that you will have to provide it to UBC's legal counsel for review. Then, contact Jonathan Doan (below) immediately and he will liaise with legal counsel.

You may want to consider asking the sponsor if the agreement is really necessary. It can sometimes take months for legal counsel to approve and sign an agreement.

APSC's Development Office and How They Can Help

The Faculty of Applied Science's Development Office is the external relations arm of the Faculty. They manage the Faculty's relationships with industry and alumni, developing research partnerships and fundraising for the Faculty. The Development Office can assist student teams in the following ways:

- Sponsorship packages: can assist you in developing the content of a package and can even format it into a UBC-branded case, which has been proven effective with industry.

NOTE – turnaround time on these cases can be 3-4 weeks (sometimes less), so be sure to plan for lead time.

- Sponsorship strategies: can discuss who to approach (i.e. target audiences) and how, including cold-call and cold-email coaching.
- Invoices: sponsors will often request that you provide them with an invoice for the amount of their sponsorship before they will submit a cheque. The Development Office can provide you with an invoice template (**See Appendix C2 for Example**).
- Issuing business acknowledgements and “thank you” letters: as long as the Development Office is aware of a sponsorship, they can issue a business acknowledgement. Also, it is very important to thank your sponsors as much as possible – it may encourage them to sponsor the team again next year and beyond. Although your team should frequently thank your sponsors yourselves (see below), the Development Office can also thank the sponsors on behalf of senior Faculty executives such as the Dean or Assistant Dean.
 - **NOTE** – to issue both business acknowledgements and “thank you” letters, the Development Office must be made aware of the sponsorship, and requires the company’s name and the name/contact info of the individual at the company that you secured the sponsorship from.
- Depositing your sponsorship cheques: When you receive a sponsorship cheque, your options are as follows:
 1. *You provide the sponsorship cheque to the Dean’s Office finance dept. (suggested) or your Department for deposit*: you must fill out a donation form with the sponsor’s contact information (**See Appendix C1**), and provide the Development Office with a copy of the cash receipt, the cheque, and the donation form.
 2. *You provide the sponsorship cheque directly to the Development Office*: in this case, you must simply bring the cheque and completed donation form to the Development Office.
- “Donate Now” button: can arrange for this button to be placed on your team’s webpage, which will allow individuals (**not companies**) to make donations directly to your team’s PG account.

If you would like to work with the Faculty’s Development Office, please contact:

Jonathan Doan, jonathan.doan@ubc.ca
Suite 290, 2360 East Mall (CHBE Building)

Other Sponsorship Tips

- Begin by speaking with your team’s previous Team Captain and/or review their succession documentation. They have gone through the process of funding their project and should be able to inform you of previous companies who have sponsored your team before and who might sponsor you again.
- Develop a detailed budget before you approach sponsors so you know how much you need, and what your sponsorship levels should be. Have it available if sponsors ask for it, but avoid providing detailed budget information in your sponsorship package.

- Do not ask for more than you need, and ensure that you are able to justify the amount of money you are asking for.
- If other universities have similar teams to yours, check who sponsors those teams and approach those companies.
- If you are approaching a new company which has not sponsored your team before, try to contact either their Community Investment (best choice) or Human Resource (second best) offices – these offices are most likely to be in charge of sponsorship.
- Ensure that every sponsorship cheque is made out to “The University of British Columbia” and that its memo line states “Sponsorship of [your team].”
- Some companies may want to pay for their sponsorship via a **wire transfer**. Be sure to confirm with every company if they will be writing you a cheque or paying via wire transfer. Wire transfers are typically done through the Development Office, so please notify them of any impending wire transfers. Also instruct the company to include the invoice number when submitting their wire transfer. **NOTE** – whenever possible, encourage companies to write cheques. They are less labour-intensive to process.
- Track your team’s sponsorship activities with as much detail as possible – the best organized sponsorship drives are the most successful. **Remember**, this information must be kept on a secure server or at least an encrypted device. Track information like:
 - Company/individual contact’s name and contact info.
 - The date(s) that you contacted the company and how (email, phone, face-to-face).
 - Results of any conversations with a company, and next steps.
 - Company’s decision RE sponsorship (“yes” plus \$\$ amount; or “no” and reason).
 - Potential dates for follow-up (sometimes you might have to follow up once or twice before you even reach someone at the company, let alone get an answer).
 - Date that you receive sponsorship cheque, and actions taken with it (important because you may have to follow up with some companies to get the cheques that they have promised).

Ongoing External Support

The following external groups provide support to student teams on an ongoing basis. If you are aware of any additional groups that do so, please inform team.engineering@ubc.ca.

Company/Group	Requirements/ Exceptions	Type of support provided	Contact
Aurora Bearings	<ul style="list-style-type: none"> • Automotive teams. • Wire transfer prior to shipment 	Half the order Bearings and rods at lowest cost, the other half provided free .	customerservice@aurorabearing.com
Soller Composites	Composites	Discount	information@SollerComposites.com
Misumi USA	Registration with UBC student Email	Discount	http://us.misumi-ec.com/

Company/Group	Requirements/ Exceptions	Type of support provided	Contact
SolidWorks	UBC Student Team	Free SolidWorks Student, SolidWorks Electrical licenses for team members	christine.Morse@3ds.com

Sponsorship Follow Up

Should your team receive sponsorship funding, there are three very important follow up activities that need to be done.

1. Please send the sponsor a thank you letter from the team immediately.
2. Please be sure to follow through with the sponsorship awards that your team promised. It is **vital** that your team deliver on all promised benefits, or the sponsor will not support the team in future and may even ask for their money back.
3. At the end of the academic year, send each sponsor a short report on your activities for the year, along with the name of your new team captain or sponsorship representative.

Together, these activities will ensure that your sponsors are appropriately thanked, and that your team has the continuity they need to successfully secure sponsorships the next year.

Liability Insurance

Student teams are often required to carry Liability Insurance in order to compete in events or test their projects in certain facilities. UBC provides student teams with Liability Insurance. To request a certificate of insurance for your team, please email UBC Risk Management Services via Blossom Sobrinho (blossom.sobrinho@ubc.ca). Be sure to include the facility that is requesting the certificate of insurance, what specifically they require, and the dates which the facility will be used.

News and Publicity

Are you wondering how you can get the word out about the cool new inventions you and your team are working on, or how you can promote your upcoming competition or member recruitment event? Find out the various channels through which you can best communicate and market your news and events in this News and Publicity guide compiled by Applied Science Communications and UBC Public Affairs.

Publicizing Your Team for New Members

There are several different mediums through which you can advertise for your team through UBC Engineering and the Engineering Undergraduate Society (EUS).

e-nEUS

e-nEUS is a weekly email newsletter that goes out to all current UBC Engineering undergraduate students.

The e-nEUS goes out on Sunday evenings, from September to April, and on a monthly basis in the summer. Summer 2015 e-nEUS editions will be published on **June 7, July 12 (updated)**, and **August 2 and August 30**. Articles are accepted up to **5pm the Wednesday before** the e-nEUS comes out!

The e-nEUS is a great way to get word out about:

- EUS events
- Engineering Student Services/Co-op/Faculty notices
- Industry Announcements

Before filling out the submission form (<http://ubcengineers.ca/eneus/submission-form/>), please familiarize yourself with the submission guidelines (<http://ubcengineers.ca/eneus/submission-guidelines/>).

To contact the e-nEUS Editor, e-mail eneus@ubcengineers.ca.

Digital Signage

If you would like to promote your event using the TV monitors throughout UBC and Engineering buildings, please follow the instructions below:

1. For the template and tips on how to create the slides for the digital system, please go [UBC Digital Signage for design/content tips and sign templates](#).
2. Decide on your target audience:
 - For **campus-wide distribution**: please [contact the UBC Digital Signage team](#) – they require 2 weeks' notice
 - For **Engineering-building distribution**: please contact advertising@apsc.ubc.ca – please allow for 2-4 business days to upload to the system

3. **During events:** if you wish to have your slides show exclusively on a monitor during an event, please contact the individual manager for each building/monitor:

- Kaiser atrium, 2nd Floor Kaiser lounge & Macleod atrium: Colleen Brown (colleenb@ece.ubc.ca)
- Engineering Design Centre: Clara Soyris (clara.soyris@ubc.ca)
- Chemical & Biological Engineering building: Magnolia Flores (mflores@chbe.ubc.ca)

Social Media – Applied Science and Engineering

- For UBC Engineering Facebook page (primary audiences: current students, alumni, general public): contact Victoria Chang at victoria.chang@ubc.ca
- For Twitter, @ubcappscience and @ubcengineering (primary audiences: general public, industry, current students, alumni, media): contact Victoria Chang at victoria.chang@ubc.ca
- For UBC Engineering Facebook groups (primary audience: current students): contact Wendy McHardy at wendy.mchardy@ubc.ca

News – UBC Public Affairs and Applied Science

Applied Science Communications is the main channel of communications and marketing for the Faculty of Applied Science, and UBC Public Affairs is the university's conduit to the media. Both units support students and faculty by helping assess if a story has news value, identifying the best media outreach strategy, and writing and packaging stories.

Applied Science Communications promotes news through our APSC (www.apsc.ubc.ca) and Engineering (www.engineering.ubc.ca) websites, e-newsletters and social media (Twitter and Facebook).

UBC Public Affairs deliver news to the media through our UBC News website (www.news.ubc.ca) and several formats: media releases, Q and As, media advisories, expert advisories and social media (Twitter).

Student engineering teams work with UBC Public Affairs, Applied Science Communications and the news media when they are preparing for competition and planning a media event to showcase their work and innovation. UBC News may issue a media advisory to invite journalists to attend the event and provide some details on what they will see. Applied Science Communications amplifies Public Affairs efforts through our various channels.

Tips for working with UBC Public Affairs and the news media:

- Timing: Contact Public Affairs before you hit a major milestone or head to a competition. Journalists want to tell these stories when the news happens, not after. Make sure to give

us enough time to work on the event and advisory together. When you contact PA, please let us know what sort of timing we're working with.

- All stories are worthy – not every story is newsworthy. Identify what makes this story newsworthy and any news hooks. What's particularly interesting or quirky about what you're doing?
- Identify what the implications of your work/findings are. Ask yourself, why should readers of the Globe and Mail, or the Vancouver Sun care?
- Use language that you would use for speaking to the general public – try to avoid the use of technical jargon.
- Multimedia: Journalists are more likely to cover stories if we can provide good photos and videos. Try to document your building process so you can provide video and photos of the entire process to journalists.
- Spokespeople: Identify a few people in your group who will do interviews.
- Key messages: Develop three key messages that you want to share with media. These can address the question: what are you doing? Why are you doing it/what are the implications of your work? What comes next in this field? Make sure the spokespeople know the key messages and practice saying them out loud before they do interviews. Use these key messages in interviews to help reporters tell your story.

A final word: the media provide a great opportunity to convey your story widely. Once you have prepared yourself for interviews and sent out your story, you need to be available and responsive to media, and sensitive to their deadlines.

For your news needs, contact Victoria Chang at victoria.chang@ubc.ca.

Publicizing Your Event/Competition for Attendance

Social media—Applied Science and Engineering:

- For UBC Engineering Facebook page (primary audiences: current students, alumni, general public): contact Victoria Chang at victoria.chang@ubc.ca
- For Twitter, @ubcappscience and @ubcengineering (primary audiences: general public, industry, current students, alumni, media): contact Victoria Chang at victoria.chang@ubc.ca
- For UBC Engineering Facebook groups (primary audience: current students): contact Wendy McHardy at wendy.mchardy@ubc.ca

UBC Events—Applied Science calendar:

Applied Science has its own UBC Events calendar in which events that pertain to the entire UBC community are advertised. If you wish to promote an event that has a UBC-wide appeal on this calendar, please contact Victoria Chang at victoria.chang@ubc.ca.

Applied Science and Engineering events calendars:

APSC and Engineering event calendars are hosted on the APSC and Engineering websites: <http://apsc.ubc.ca/news-events/calendar> and <http://engineering.ubc.ca/news-events/calendar>. To request for an event to be posted, contact Victoria Chang at victoria.chang@ubc.ca.

APSC This Month

APSC This Month is Applied Science's monthly e-newsletter for APSC faculty and staff. The recurring submission deadline is typically the last Friday of each month for the following month's edition. To submit news items, fill out the following form:

<http://apsc.ubc.ca/webform/apsc-month-submission-form>. If you have any questions, contact Victoria Chang at victoria.chang@ubc.ca.

e-nEUS

e-nEUS is a weekly email newsletter that goes out to all current UBC Engineering undergraduate students.

The e-nEUS goes out on Sunday evenings, from September to April, and on a monthly basis in the summer. Summer 2015 e-nEUS editions will be published on **June 7, July 12 (updated)**, and **August 2 and August 30**. Articles are accepted up to **5pm the Wednesday before** the e-nEUS comes out!

The e-nEUS is a great way to get word out about:

- EUS events
- Engineering Student Services/Co-op/Faculty notices
- Industry Announcements

Before filling out the submission form (<http://ubcengineers.ca/eneus/submission-form/>), please familiarize yourself with the submission guidelines (<http://ubcengineers.ca/eneus/submission-guidelines/>).

To contact the e-nEUS Editor, e-mail eneus@ubcengineers.ca.

Faculty Advisors

All Engineering Design Teams are **required** to have *at least one* faculty advisor from within APSC. The advisor will be a faculty member of the team's Host Department. In the case of dual-hosting, there will be an advisor from each Host Department.

Responsibilities of the Faculty Advisor

- Communication: The advisor is expected to meet with the team's captains at least once per year. This would optimally be at the start of the academic year after new members have been determined. It is also recommended that the faculty advisor meet or communicate with the team once per term on the team's status.
- Access: The advisor is expected to be aware of space and resource issues and be available to relay requests to the department and/or APSC. This may relate to workspace, storage, transportation, fabrication, testing labs and external resources.
- Funding: If asked by the team, the Advisor is expected to advise the team on funding opportunities, such as PAF and TLEF, including reviewing proposals, and on sponsorship strategies. The Advisor is also to sign off on any team procurement requests made through APSC.
- Design mentorship: If the team requests design reviews related to the team's prototype, or to competition preparations, the Advisor is expected to meet on an ad-hoc basis at the request of the team captain.
- Contact: The Advisor is expected to advise the team directly (via email, for example) for any opportunities or other reasons that the Advisor may find compelling, e.g., lectures coming to campus, upcoming conferences, new vendors of relevant technologies, new labs on campus.

Responsibilities of the Team

The captain of the Team is expected to be the primary contact to the Advisor.

- Communication: Requests to the Advisor should be given with ample lead time and be sensitive to the advisor's research and teaching schedules. Routine matters that can be handled at the administrative level should first be made through the EDTC or the APSC Faculty Coordinator.
- Initiative: For all the categories listed in "Responsibilities of the Faculty Advisor", the team is expected to initiate contact. Contact with the Advisor should be restricted to high-level matters.
- Invitations: The team shall invite the Advisor to periodic meetings, competitions, field trips, tests, etc., that may improve the connection and awareness with the advisor. Even though the Advisor may not always be able to attend, it is important to provide an awareness of ongoing team activities.

How to Approach a Faculty Member

It may be daunting to approach a faculty member and ask them to be an Advisor to your team. It is important to ensure that you have a faculty advisor belonging to each of your hosting departments.

- Relevance: Consider a faculty member's area of research. They will likely be able to provide more support to your team if their expertise aligns with your design challenge.
- Make a plan: Approach the faculty member with a clear plan of your Team's objective and deliverables. Set up an appointment via email.
- Make them aware of their role: the preceding pages in this document are a good guideline for the role of a faculty advisor.
- Consider their time commitments and be respectful of them. Clarify expectations regarding support, communication and technical involvement at the start.

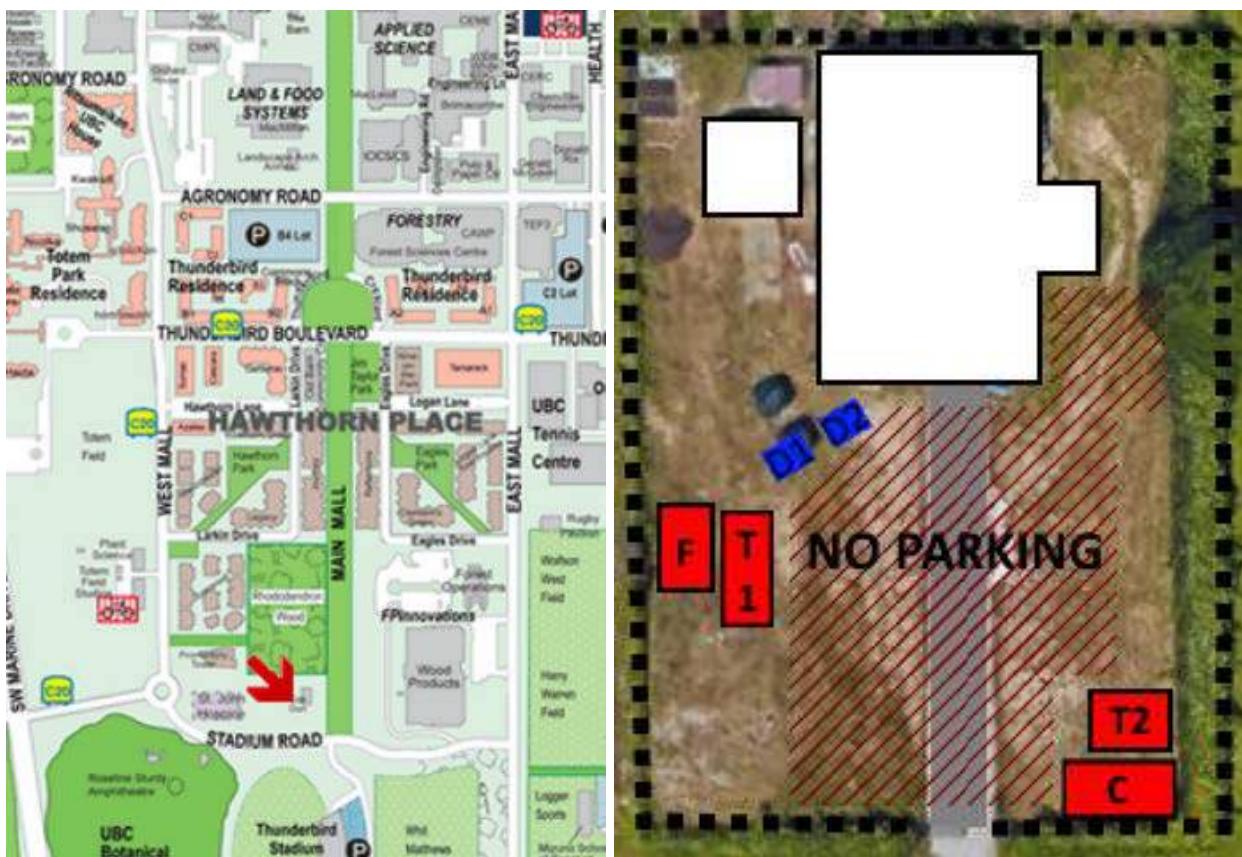
If you require additional help in contacting a faculty member to be your team's advisor, please contact the Engineering Teams Coordinator at team.engineering@ubc.ca.

Team Resources

Faculty support for Engineering Design Teams includes granting access to equipment, machinery, and workspaces. The following section outlines the procedure for gaining access to, and utilizing the various resources afforded to teams.

Team Trailers

The APSC Student Teams have access to two trailers to aid them in transporting projects. There is a Closed Box trailer and a Flat-Deck trailer. These trailers are housed in the UBC Gas Gun Enclosure across from Thunderbird Stadium. Access to the Enclosure is regulated by a combination lock on the gate. Trailer Keys will be stored in combination lock Key Safes on each trailer. Teams may access the space at any time to retrieve or return a trailer, provided they have first spoken with the Student Teams Coordinator to request the use of a trailer. The combinations to each lock may be changed on a semi-annual basis to improve security, however the Student Teams Coordinator will alert you to any changes before the date of your request.



UBC's Formula SAE Team has a smaller box trailer which was donated to their team and is also stored in the Gas Gun Enclosure. This trailer is also available for student team use, however bookings will go through Formula, to ensure that they have priority for its use.

Parking

Each trailer has a designated location in order to ease future access and to avoid disrupting the research in the Gas Gun Enclosure. Parking may not block the driveway and must leave a clear path to the dumpsters located on the left side of the building. In the figure above, the two dumpsters are marked D1 and D2. The Student Teams Storage Container is marked C. The Trailers are marked as follows:

T1 – open bed trailer

T2 – large box trailer

F – Formula UBC's box trailer

Please note: there is to be absolutely no food in the eaten or stored in the trailers. The Gas Gun Enclosure has had a history of rat problems, and the last thing we want is for rats to make a home in our trailers.

Welding Services

As welding is an extremely hazardous activity for anyone who is untrained, UBC forbids students who have not received the appropriate certifications from welding on campus. As many teams require welding in the fabrication of their projects, the Faculty of Applied Science has hired a certified student, Eli Nemtin (Captain of UBC Baja), to offer welding services to the teams. To request a welding job, email Eli at eli.nemtin@gmail.com detailing what your team needs done.

EDC 101A – Ledcor Group Composites Room

The EDC Team Space in room 101 is home to several student teams and the Ledcor Group Composites Room. The Composites Room is available for team use for activities including composites layup and sanding. The room maintains a negative pressure environment to prevent fumes from escaping to the Team Bays; appropriate PPE must still be worn when working in this space. Students are required to complete a Composites Room Safety Orientation and Respirator Fit Training before using this space.

The Ledcor Group Composites Room is also equipped with a flammables cabinet, for the storage of combustible and otherwise hazardous materials. Teams should use this cabinet to store hazardous fluids such as gasoline, resins, and paint thinners.

In order to determine the maintenance requirements of the room and create a system of accountability, Teams are required to create bookings to log their use of the composites room. Bookings can be created using the following form: <http://goo.gl/forms/AvxArdVpt>. Please check the room's availability before creating a booking. The booking calendar, can be found on the Teams Website (<http://teams.engineering.ubc.ca/student-resources/bookings/>).

Please note: The use of spray paints is prohibited in this room. Painting may be done in the Building Operations paint booth. Contact the APSC Safety and Facilities Officer to arrange bookings.

EDC 211 – Workshop

The EDC 211 Workshop is comprised of two areas: an Assembly Space and a Fabrication Space.

Assembly Space

The assembly space is available for student use on short-term design/assembly projects. Space access will only be granted after the student has completed a safety checklist for the space. The Assembly space includes workbenches, vices, and power outlets. Students using this space will also have access to a loaner tool box and e-toolbox.

Fabrication Space

The fabrication space is equipped with a pipe bender, sand blaster, pan and box brake, foot shear, and drill press. Students are permitted to use this equipment provided they have gained access to the assembly space and have completed training for the *same* equipment elsewhere. Training will not be provided for this equipment. The Fabrication Space also has a CNC Router available for wood, plastic, or foam cutting. You may only use the CNC Router if you have been trained by another current user.

EDC 213 – Electronics Workroom

The EDC Electronics Workroom houses electrical equipment for student project use. Available equipment includes oscilloscopes, soldering irons, multi-meters, a heat gun, a 3D Printer, and a 3D Scanner. FOB access is required for the use of this space and can be obtained after completing the Electronics Workroom Safety Orientation. Additional specific training is required before students may use the Makerbot Replicator 2X 3D Printer or the NextEngine 3D Scanner.

Makerbot Replicator 2X 3D Printer

The Makerbot Replicator 2X 3D printer is a dual extruder fused deposition modeling (FDM) device. Prints cost \$0.10 per gram (including supports and rafts). Prints can be weighed on the scale in the Electronics Workspace.

Only one nozzle is in service due to damage to one of the extruder heads.

Note: The Makerbot Replicator 2X 3D Printer is currently out of commission due to inappropriate use and improper maintenance. The Teams Coordinator is working to fix the printer, however the printer will not be available for student use until further notice is given. If your team urgently requires printing services, contact the Teams Coordinator to explore alternative options.

To use the printer:

- first use MakerBot's Free Desktop Application (<https://www.makerbot.com/desktop>) to determine how long your print will take
- check the booking calendar here: <http://teams.engineering.ubc.ca/student-resources/makerbot-3d-printer/>
- create a booking using the following form: <https://goo.gl/9ukhgU>
- log material use here: <http://goo.gl/forms/K1PI5LVax0>
- check your usage here: <https://goo.gl/2yJs5P>

More information can be found on the Teams Website: <http://teams.engineering.ubc.ca/student-resources/makerbot-3d-printer/>

NextEngine 3D Scanner

To access the NextEngine 3D Scanner, please contact the Student Teams Coordinator. More information on the 3D Scanner can be found here:
<http://www.nextengine.com/products/scanner/specs>

Departmental Workshops

Several different departments at UBC have Workshops available for student use. The departments with student shops include: Mechanical Engineering, Electrical and Computer Engineering, Physics and Astronomy, Integrated Engineering, and the School of Architecture and Landscape Architecture. The departments which offer support machining services include: Mechanical Engineering, Electrical and Computer Engineering, Civil Engineering, Physics and Astronomy, Chemical and Biological Engineering, Materials Engineering, and Chemistry.

Please visit the sites of these individual departments for more information on usage, access, and equipment.

FAQ

1. I want to start a team. What do I do?

Refer to Page 6 of this Handbook.

2. I have issues with my current team.

Depending on the nature of your concern, you may speak to your Team Captain, the Engineering Design Teams Coordinator (team.engineering@ubc.ca), the Student Professional Development Officer (Emily.Wyatt@ubc.ca), the Safety and Facilities Officer (richard.colwell@ubc.ca) your Faculty Advisor, or the Engineering Student Teams Faculty Head (vdl1@mail.ubc.ca).

3. I am a Team Captain and I'm not sure we'll meet our technical/financial goals this year. What should I do?

Set up an appointment as soon as possible with your Faculty Advisor first, and then the Engineering Student Teams Coordinator to discuss options.

Teams are foremost an opportunity for students to develop personally and professionally, and learn from any potential failures. There is support available at all times.

4. I am a team member and I see unsafe practices being conducted in or around my workspace. What should I do?

Contact your Safety Officer immediately. If you do not feel comfortable doing so, you may contact either of the following: the Engineering Design Teams Coordinator, the Student Professional Development Officer, your Faculty Advisor, the Safety and Facilities Manager, or the Engineering Student Teams Faculty Head.

5. My team did very well at a competition. Who should I tell?

Congratulations. Please let the Student Teams Coordinator (team.engineering@ubc.ca) know, as well as the Applied Science Communications Manager, ErinRose Handy (erinrose.handy@ubc.ca), and the Applied Science Development Officer, Jonathan Doan (jonathan.doan@ubc.ca). All three may be able to promote your team's success at different levels within UBC and externally.

6. My team is done with our project. What do we do with it now?

Many teams choose to hold on to their projects to show off at events. When this is less convenient (i.e. with larger projects), teams often salvage whatever parts and materials they can from the past projects, and dispose of the rest. Before destroying your project, please contact the Student Teams Coordinator to see if the Faculty of Applied Science would like to showcase your project.

7. Why should I keep a personal log/portfolio of my student team activities?

Employers love seeing examples of actual technical work that has been completed by students. Example work gives a more complete picture of a student's capabilities and experience. It is never too early to start documenting your project experience. Good things to

include in a student portfolio include 3D Models and Assemblies, Simulations, Computer Programs, Project Photos, and Project Results.

If you have any remaining questions which were not answered in this handbook, please contact the current Student Teams Coordinator at team.engineering@ubc.ca.

Appendix A: Existing Teams

A1: Automotive Teams

E-Racing modifies gas engine cars to run electric motors. Combining the amazing acceleration powers of electric motors with the superior design of a race car makes this car a thrill to watch.
Website: <http://https://sites.google.com/a/ubceracing.com/ubc-e-racing/>

Electric Car Club seeks to modify an existing gas guzzling car into a clean and highly efficient electric car. Their latest modification is a 1972 Volkswagen Beetle aptly named the E-Beetle. It is the first electric car to travel across all of Canada. Their main event is the Zero Emissions Race where they will travel across the globe in 80 days as the only team representing Canada.
Website: <http://www.ubcecc.com/>

Formula UBC designs and fabricates a Formula 1 style race car. Raw power and high speed are the objectives of this project. Their current 500lb. car can hit 0-60 miles in 2.5s and a top speed of 105mph. Their competition is in California and Michigan in the United States of America, where each team's car is put through rigorous safety inspections before hitting the track at full speed.

Website: <http://www.formulaubc.com/>

Supermileage is dedicated to the design and fabrication of a super fuel efficient vehicle. In the past, they came first for several years in the SAE Supermileage competition. Now, the team enters in the Shell Eco Marathon Americas under the Urban Concept Car division for a new and challenging experience.

Website: <http://www.supermileage.ca/>

UBC Baja designs and constructs a single-seat all-terrain vehicle. In addition to participating in the design and build process, students gain valuable experience promoting the vehicle, generating financial support through various methods and, above all, managing team responsibilities with academic and educational priorities.

Website: <http://ubcbaja.com/>

UBC Solar designs and builds a vehicle powered by the sun. With expensive technology, subjected efficiency and limited to only daylight usage, this team tackles these challenges, and more, at the World Solar Challenge. Technology engineered by the students on this team pave the foundation for tomorrow's mode of transportation.

Website: <http://ubcsolar.com/>

A2: Chemical and Biological Engineering Teams

BioMedical Student Team (BEST) is a multidisciplinary engineering student team dedicated to designing health technologies. Sharing a passion for biomedical engineering, undergraduate and graduate students from various engineering departments design and build a meaningful medical device. They will participate in NCIIA's BMEidea.

Website: <http://best.ece.ubc.ca/>

Chem-E-Car Reaction Car team designs a small, low-cost vehicle a specified distance within 2 minutes with a designated weight of water. The challenge is that digital timers, physical timers and visual sensing technology are not allowed on the vehicle and the stopping mechanism must be chemically initiated – whether by running out of fuel or cutting off a circuit.

Website: <https://ubccheme.wordpress.com/>

A3: Civil Engineering Teams

UBC Concrete Canoe team designs a concrete canoe each year to race in the ASCE Concrete Canoe Competition. The challenge is to build a durable canoe that is less dense than water, while still maintaining a high compressive strength of concrete. Competitions are hosted across America, and the UBC team is currently the first and only Canadian team competing in our region.

Website: <https://www.facebook.com/ubccconcretecanoe>

Concrete Toboggan team designs and constructs a toboggan where the running surface is made entirely out of concrete. Their competition is held at various institutions across Canada where competing teams will run their toboggan in down a snow covered hill in teams of 5. Their King of the Hill race pits two teams head to head where the winning team returns to the top of the hill to face the next challenger.

Website: <http://toboggan.sites.olt.ubc.ca/>

Steel Bridge designs a steel bridge structure. Their challenge is to build a strong and lightweight bridge. Competitions are hosted across the United States of America where teams race against the clock to assemble the bridge in the quickest time.

Website: <http://ubcsteelbridge.ca/>

UBC EERI competes annually in the Seismic Design Competition (SDC), a civil engineering competition hosted by EERI Student Leadership Council. SDC promotes the study of earthquake engineering among undergraduate students, while providing them with an opportunity to work on a unique design project and construct a cost-effective and architecturally pleasing building to resist seismic loading.

Website: <https://sites.google.com/site/ubceerichapter/about-us>

A4: Engineering Physics Teams

UBC Orbit pushes the limits of technology in an attempt to build a nano-satellite using “off the shelf” products. This nano-satellite will theoretically be launched into space carrying a scientific payload. The winning team of the Canadian Space Design Challenge will have their project blasted off into space to carry out their scientific experiment.

Website: <http://ubcorbit.com/>

UBC Rapid is designing rapid prototyping machines, also known as 3D printers. Their goal is to produce 3D printers that are fast, cheap, and with unprecedented precision.

Website: <http://ubc-rapid.com/blog/>

A5: Fluid Dynamics Teams

AeroDesign Team is a team dedicated to aerodynamic design. They construct airplanes that generate maximum lift and minimum drag in order to fly the heaviest mass possible over long distances at the SAE AeroDesign competition hosted in the United States of America.

Website: <http://ubcaerodesign.wix.com/ubcaerodesign>

Human Powered Vehicle Team builds a commuter vehicle that runs solely on human power and competes in an annual international competition, ASME HPVC. The team strives to establish a positive learning environment for students to implement innovative solutions for sustainable transportation. HPVT, established only in 2012, is one of the newest teams on campus and has grown immensely over the last year.

Website: <https://www.facebook.com/UbcHumanPoweredVehicleTeam>

SUBC, also known as UBC’s Human Powered Submarine, is exactly that. Students design and fabricate a “wet” submarine (which means that it’s flooded) that is powered entirely by a single person! But don’t worry, along with being in full scuba gear, the submarine pilot is also accompanied by a certified dive team. They compete in an international competition held in Maryland, USA.

Website: <http://blogs.ubc.ca/subc/>

UBC Sailbots design and fabricate robotic sailboats controlled by computer software without human intervention. Their fully autonomous, robotic boats navigate courses using various sensors and systems. Their competition is in Maryland, USA.

Website: <http://ubcsailbot.org/>

A6: Robotics Teams

Snowbots design and build model remote controlled cars. However, the one controlling the remote is a computer. They utilize computer software and various types of sensors allowing the vehicle to be completely autonomous. Robots will go head to head at the Robot Racing competition which is hosted across Canada.

Website: <http://snowbots.ca/about/>

Thunderbots FC is a football club of soccer playing robots. Designed and built to be autonomous, the robots, as a team, can carry out plays and strategies and recognize each other on the playing field. They play in the RoboCup Soccer Small Size League which is hosted all over the world.

Website: <http://thunderbirdrobotics.butteacm.org/>

Open Robotics is a new team of students dedicated to the development of an domestic assistive robot. Using artificial intelligence, they seek to design and build a humanoid robot that can care for the elderly, assist in daily activities and ultimately push the boundaries of AI. They aim to compete in Robocup @ Home in 2016.

Website: <http://openrobotics.ca/>

UBC Unmanned Aircraft Systems compete in an annual competition and focus on the design and integration of unmanned aircraft systems and remote sensing technology. These systems are designed for use in emergency response and disaster relief scenarios in order to provide quick and accurate information to first responders.

Website: <http://ubcuas.com/>

A7: Computer Teams

UBC Launch Pad is a student team focused on annually developing a web or mobile application. Members can expect to gain real world software engineering experience through the full stack development of the app, in addition to the project's market research and deployment.

Website: <http://ubclaunchpad.com>

Appendix B: Team Document Examples

B1: Supermileage Team Structure (2015/16)

UBC Supermileage Team

2015-2016 Executive Role Descriptions

Purpose

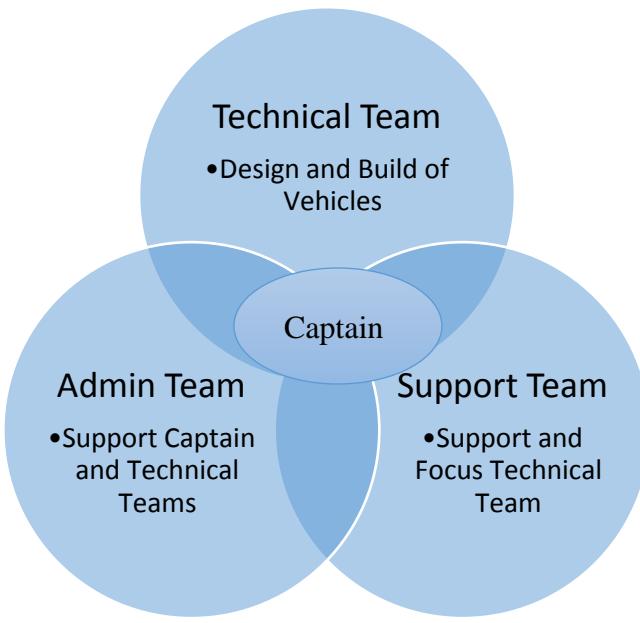
This purpose of this document is to define the executive positions on the UBC Supermileage team. This is a supporting document for the “2015-2016 UBCST Executive Role Applications” and exists to help you determine what role best suits you! It also helps clarify new team structures and outline the division of responsibilities for all current lead and administrative positions on the team.

Use this document as a tool to learn what you need, or clarify questions you have: there is no requirement to read its entirety!

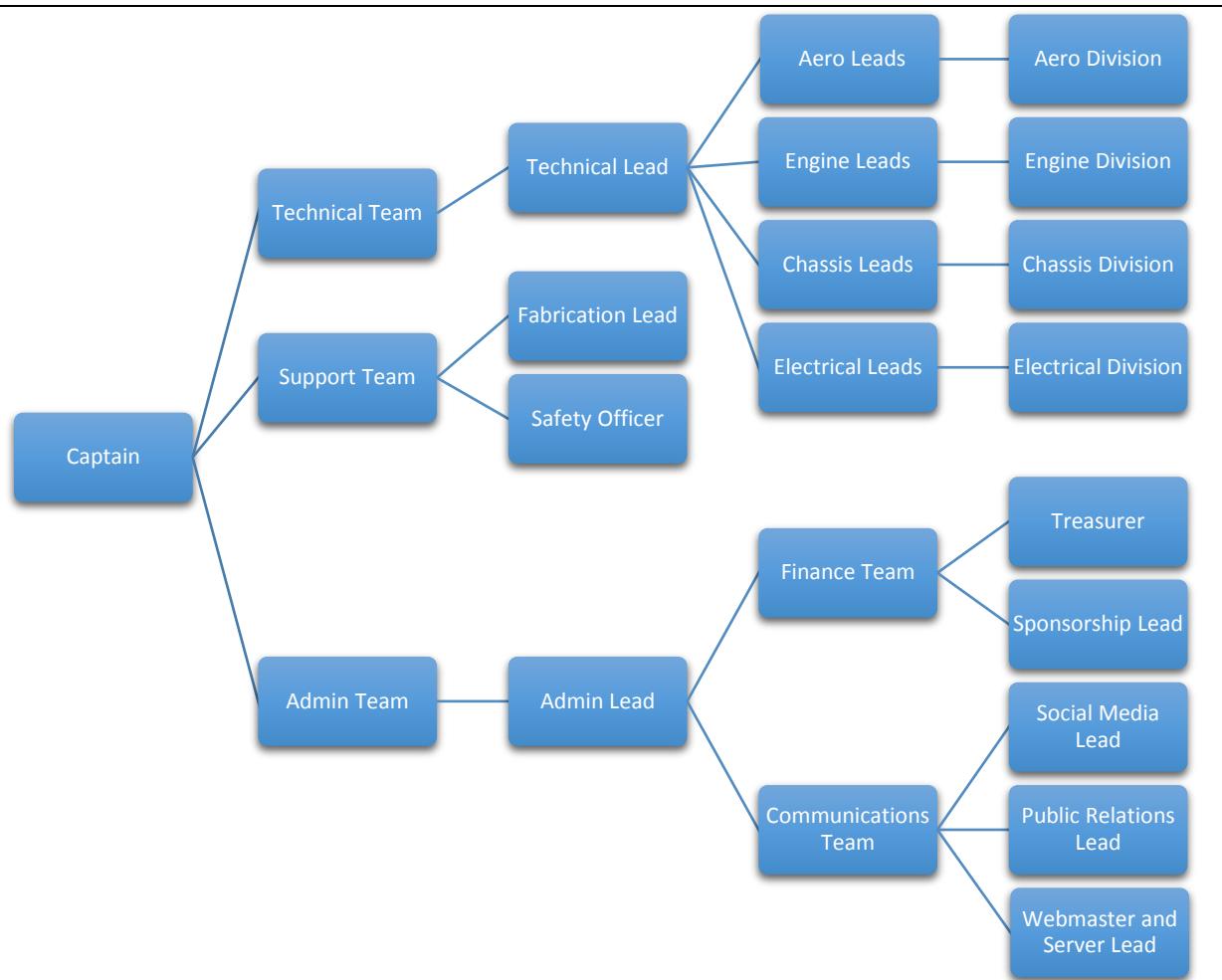
General Structure

The purpose of the UBC Supermileage team is to create super fuel efficient vehicles for international competitions, promote the education of future engineers, and raise awareness for sustainable transportation and energy usage in the community.

The current team structure involves a Captain and three main groups: Technical Team, Support Team, and Administrative Team.



The Technical Team is focused on the design and fabrication of the vehicles. The majority of the team is in this group within one of four divisions: Aero, Chassis, Engine and Electrical. The Technical Team operates with the guidance of the Technical lead who oversees the respective design and manufacturing projects within the divisions. The Support team is a group of leads without divisional members which provide higher capacity assistance where needed, including Safety and Fabrication. The Administrative Team oversees finances and communication for the team, including social media, external communications, events and sponsorship. The Captain directs all three groups towards the team vision, ensures cohesive design within the technical groups and completion of overall project. A diagram of this structure is shown below.



The team attends the Shell Eco-Marathon Americas competition in April, and is likely to attend the SAE Supermileage competition in June. Note that while the team generally follows a school year schedule (September to April), the summer is also used as a transition period and a new executive can expect responsibilities to begin as soon as appointed to their position. Planning and budgeting processes begin by June at the latest.

If structure changes are desired by members or leads throughout the year, they should be brought up at a leads meeting and voted on by the team. If positions aren't filled, the Captain will determine alternate distribution of roles or other plans as needed and vote on these at the next team meeting.

General Responsibilities

All executives have the following responsibilities:

- Determine year plan and budget by June 30, 2015
- Document activities throughout the year and save on team file sharing system
- Update schedule regularly
- Promptly respond to team related emails, calls or other communication
- Participate in all leads meetings and general meetings
- Maintain communication with captain and update them on division progress and issues

- Maintain communication with other divisions and ensure no conflicts between projects
- Fill out transition document at end of year
- Assist with deciding new executives and transition with them
- Respect other team members

General team member expectations:

- Participate in all general meetings
- Encouraged to attend all leads meetings
- Complete assigned projects or documents by date outlined by lead
- Maintain communication with lead throughout project
- Ask if you don't know something!
- Work in a safe manner, ensure you have appropriate training for your job
- Respect other teammates and users of Rusty Hut or work area: clean up!
- Assist in as many recruitment, outreach and media events as possible
- Assist with sponsorship applications as needed

Technical Team

The technical team is in charge of the design and manufacture of team vehicles and leads are the project managers of the technical team divisions. A lead position on the technical team requires a large commitment of time and energy, but also high reward and opportunities. The responsibilities are quite demanding but are generally shared amongst two or three co-leads. Leads are the head of their division and are responsible for the overall project design, logistics and completion. The role includes the following expectations for each division:

- Oversee the overall design, resources and completion of the division's portion of the vehicle
- Determine scope and financial needs
- Define all projects and understand their requirements
- Prepare and present a training module at the beginning of the year for new members
- Delegate projects and manage division members
- Provide guidance, mentorship and motivation to members
- Ensure all members have appropriate skills or training for their task
- Promote the development of new skills and innovations
- Ensure support and mentorship is available for all division members
- Regularly update division members on expectations and divisional progress
- Oversee and participate in design and fabrication work
- Order parts and submit receipts to treasurer (**ensure only leads order parts**)
- Ensure all projects complete in a timely manner and comply with rules

In summary: leads are in charge of planning projects, managing team members, and handling finances for their division. They work closely with other divisions to ensure cohesion and the highest mileage vehicles possible. This role is well suited for someone with a competitive nature, strong leadership skills, and a passion for innovative engineering.

Technical Lead

The Technical Lead is in charge of overseeing the work of the technical team. They push deadlines and keep the technical leads on track with the work schedule and ensure that proper documentation of design work is maintained. The technical lead must have a firm understanding of the competition regulations and work with the leads to ensure proper dimensioning and safe practices. They have an understanding of the big picture therefore promote cross communication between the divisions and offer support for integration of the systems. The technical lead will also work with leads in the beginning of the year to train new recruits on equipment handling, the technical details of the vehicle and direct appropriate resources to member with technical questions. In addition this lead position has been made to promote a focused program of multi-year projects to put UBCST on top at competition. They also exist to promote sound engineering and innovations and prevent the team from becoming stuck in a rut, or chasing currently winning designs.

Responsibilities

- Focus team on long term design
- Work with captain to arrange leads meetings and chair the technical discussion
- Ensure part orders are properly documented
- Consolidate separate division timelines into one team schedule
- Co-ordinate the two+ year design projects
- Ensure current projects work with future plans
- Assist leads with the training of new divisional members

Divisions

This section will outline the technical aspects each division works on and help clarify which division is responsible for crossover projects between divisions. As needed, project responsibilities are shifted between divisions after a clear discussion with the technical lead, the leads involved and the captain. Each division works on both cars. The Division Leads are the specialists in charge of each division that help develop the vehicle and run the “company”. The Division Members design and build the vehicle, and are in constant training to become Division Leads.

Aero

- Aerodynamic shell, windows, hatches, doors, latching mechanisms
- Shell mounting: responsible but works with Chassis team
- Research and Development of new monocoque body – Work with Chassis Team

Engine

- Engine, fuel injection, fuel system, sensors, ECU, drive train, engine tuning, dynamometer
- Engine mounting: responsible but works with Chassis team
- Drive shaft: responsible but may be transferred to Chassis
- Develop rolling Dyno/Test Stand for prototype – Can be made into Capstone project

Chassis

- All other mechanical components of car: chassis base, steering system, wheels and wheel mounting, braking systems, throttle activation, firewall, roll cage, driver ergonomics, safety systems, ballast
- Components such as horns, steering wheel, wiper, battery mounting: responsible for component mounting and electrical to do wiring

- Cable routing, throttle and brake lines: work with driver, electrical and engine

Electrical

- All electrical wiring, electrical panel and ECU mounting, wire routing, and external kill switch mounting, dynamometer wiring and programming
- Driver and competition communication equipment (radios etc)
- Lights mounting: responsible but work with Aero

Note that these are not exhaustive lists or hard boundaries: innovation and new projects are needed each year to remain competitive! The delegation and functional separation of work is driven by each team member's technical skills and interests.

Technical Support

The technical support team is new in 2014 and exists to streamline the team and reduce load on the technical leads. This team helps ensure cohesion and inter-divisional work, as well as a sense of support and guidance to all members. Technical team leads work with all divisions and delegate tasks as needed, but are not in charge of a set group of team members. This is a new team so the leads are encouraged to be creative and try new things! This is a sort of freelance team: they are not tied to a specific division or the captain and are able to take on tasks as needed throughout the team.

Fabrication Lead

The fabrication lead is a focal point to ensure the build portion of the cars comes together on schedule. This role is suited to someone experienced in general fabrication on all aspects of the vehicle, and who likes to get their hands dirty! Their main responsibility is to provide extra man power and assistance to push large jobs to completion. If a lead is working on a major project such as a shell mould and layup, the fabrication lead will assist that lead in the planning, scheduling and execution of the project. Leads are heavily focused on the completion of the technical project: the fabrication lead can help ensure setup and cleanup are accounted for as well. This includes a routine bi annual cleanup of the downdraft table.

This lead is a resource for members to talk to in the design stage to ensure a project is designed appropriately for manufacturing. The fabrication lead works to ensure proper housekeeping of the tools and machines and is in charge of ordering replacement parts if necessary. Pre-competition, the fabrication lead manages the construction of the shipping crate.

Responsibilities

- Major project assistance
- Support for leads
- Promote design for manufacture in all divisions
- Equipment housekeeping
- Train and assist new members with equipment handling

Safety Officer

The safety officer is in charge of team safety and the overall culture of safe work practices. This job is critical as it is a requirement of our workplace! This lead coordinates the safety orientations in September and ensures the team meets all safety requirements of working in Rusty Hut or other buildings. They are also in charge of promoting a clean, respectful environment, which is a safe

environment! This is a highly important position as it also promotes a culture of professionalism and quality which is reflected in our vehicles. This is not a highly time consuming position and is usually held with other roles, but it is one that must be filled. This year, to enforce cleanup practices by all members of the team, the safety officer is authorized to write up members for unsafe or dirty working areas.

Responsibilities:

- MSDS binder
- Rusty hut orientation and safety documents
- Safety equipment purchases
- Replenishing stock of disposable safety items (respirator cartridges, dust masks, latex gloves)
- Promoting shop cleanliness and housekeeping
- Proper disposal/pick up of chemicals/containers (aerosols, paint cans) Chemical Waste Inventory and Disposal
- Injury Tracking

Administrative

The function of the Administrative Team is to run the business side of the team and reduce load on the technical leads. This allows more time for high quality design from the technical team, and higher quality documents, finances and public image of the team.

Admin Lead

The Admin Lead is both co-ordinator and support for the admin team as well as support for the Captain. They pick up any other administrative pieces not covered by the Captain or members of the admin team. Much of this role has been under the Captain in the past, however as the team has grown and goals have grown, there are more balls for the captain to juggle. The Admin lead is needed effectively as a Vice-Captain, to take up jobs which otherwise distract the captain from overall team goals and prevent balls from being dropped. Their duties are generally ones with high consequences, requiring meticulous attention to detail, such as ensuring all members submit a department required document. This role is suited to someone with an extremely organized nature, patience and experience on the team.

Responsibilities

- Support and co-ordinate Administrative team
- Support Captain as needed, often as a Vice Captain role
- Secretary and meeting minutes taker (delegate as needed)
- Competition travel logistics
- Rusty Hut, EDC, and other access
- Help ensure divisions update schedule and submit receipts on time
- Update captain regularly on progress of admin team, inform of challenges and issues

Finance Team

Treasurer

The treasurer is in charge of the team's budget, incoming finances and expenses. All receipts are received by this person and documented in budget. You do not need a background in

finance to apply, but strong organizational skills are crucial. This role is one of the most critical ones on the team; you are in charge of keeping track of a very large sum of money and involved in crucial decisions in every area of the team.

Responsibilities

- Set up yearly budget with Captain: expected income and allowable expenses
- Maintain this budget throughout year
- Primary applicant for major UBC finance pools: PAF, Mech, Shell, Walter Gage funds, etc
- Keep track of all money coming in and out, document and report progress regularly
- Submit receipts for lead reimbursements (note: a lead is responsible for getting receipts to treasurer in a timely manner)
- Keep copies of all receipts for team use
- In charge of final report submissions to major UBC funding sources

Note that while in charge of all major UBC finance pools, as with any lead, delegation is allowed and often recommended. The treasurer is in charge of ensuring all documents are submitted on time and all team members are reimbursed appropriately but they don't have to do everything themselves!

Sponsorship Lead

This person is in charge of all sponsorship external to UBC and Shell funds. This is a role for someone looking to be involved in raising money for the team in a more creative way.

External sponsors are challenging to recruit and require time and focus to maintain. It can involve personal meetings, email, socials or any other event this lead comes up with. This role requires prompt and professional communication skills and availability in the summer, even if working from outside Vancouver. It is important that all connections made are maintained and turned over for future years. Fundraising events are also an option however these haven't been done in the past as there is a concern about the professional image of the team.

Responsibilities

- Sponsor package and template emails
- Sponsor tracking
- Distribution of application duties
- Negotiating agreements with sponsors
- Acquiring up to date sponsor logos
- Ensuring stickers and other sponsor commitments are followed
- Follow up with sponsors regularly: provide updates and maintain contact
- Thank you cards at end of year

Communications Team

Public Relations Lead

The public relations lead is in charge of overall publicity and ensuring the team's public image is positive and accurate. This role requires professionalism and strong interest in understanding all aspects of the team and goals for the year. The UBCST focuses heavily on connecting with the public to promote sustainable transportation and this role is the focal

point for promoting the team's sustainability goals. This person is in charge of planning, scheduling, co-ordinating volunteers and promoting all public relations events. In addition, they collect regular updates from the team, maintain marketing material such as PowerPoints, videos, posters and banners. It is an exciting and high profile role, working with major media such as Global, Metro, Discovery and more. This role is for someone who enjoys public speaking, has artistic interests and lots of creativity. The role can be as big as the lead makes it!

Responsibilities

- Public image of UBCST
- Collect regular updates from team
- Work with Social Media lead to display updates
- Write press releases and work with media teams
- Plan major events: Imagine Day, media events, outreach, Shell Challenge learning events, and more
- Manage team presentation materials
- Co-ordinate talent such as photographers, videographers etc.

Note: it is important this lead maintains the goals of the team and understands the schedule of the team: an event requiring a running car cannot be scheduled until there is a running car! Additionally, media and other events should not interfere with but work together with technical goals.

Social Media Lead

Ever find yourself bored in class and wishing you had something to tweet about, or a cool story to blog about? This is your time to shine! The social media lead is in charge of all online updates about the team. They work closely with the Public Relations Lead to get content from the team then turn it into a bizarre story that vaguely resembles what we do and usually requires reading with a British accent. Seriously, have you read our blog? The role requires endless creativity, but also professionalism and an understanding of appropriate tone for each medium.

Responsibilities:

- Weekly or Bi-Weekly updates of the following
 - Blog
 - Website
 - Facebook
 - Twitter
- Thank You posts to sponsors as appropriate

Note: the webmaster is in charge of 'static' website content: pages which give information about the team, sponsors, contact information etc. The Social Media lead is in charge of 'dynamic' content: regular updates on the main page.

Webmaster and Server Lead

A job for someone who is computer savvy! This is effectively the go-to person for all IT needs

of the team. The major need for this lead has arisen due to the lack of time and experience of current team members. There is a large team need for a functional document storage platform(s) with consistent access, sharing functionality and other needs to suit the team. A main part of this lead position is to determine or design a long term document storage method for the team and keep it maintained. Investigating new website designs and maintaining a reliable website is the other major component of the role. There is a lot of potential with a website that is first on the search list for Supermileage. This position is brand new and wide open to fresh ideas and innovations.

Responsibilities

- Server or document storage design and set up
- Maintain document storage
- Website design as needed
- Website maintenance
- Static website content
- Assist with email structure and maintenance
- Assist with IT related projects: wireless driver/car communications, simulation programming and more

Note: the webmaster is in charge of 'static' website content: pages which give information about the team, sponsors, contact information etc. The Social Media lead is in charge of 'dynamic' content: regular updates on the main page.

Captain

The Captain directs all three groups towards the team vision, ensures cohesive design within the technical groups and completion of overall project. They maintain the course of the ship and are in charge of the overall success of the team. The captain must make all decisions with support of the team unless in an emergency situation. All planning, scheduling and budgeting for each division and sub-team is completed by the Division Lead or Executive and overseen by the Team Captain. The captain is the face of the team for public events and competition.

Responsibilities

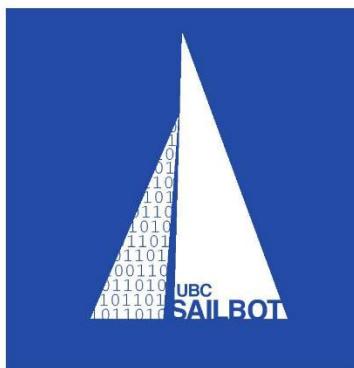
- Determine with team the overall goals and technical plans for the year
- Maintain team direction and image/brand
- Determine team structure and executives, ensure efficient use of team members
- Promote a healthy team culture, education, innovations and high quality vehicles
- Overall shop cleanliness, safety and functionality
- Lead high level planning, scheduling and budgeting with team
- Ensure transparency of budget and inclusion of team in all decisions
- Oversee all three groups, ensuring cohesion and adherence to plans and schedule
- Maintain communication and accountability
- Track milestones and determine when compromises or sacrifices must be made in project/budget, lead discussions with team
- Ensure completion of entire project on schedule
- Primary face of the team for media and sponsor relations

- Primary competition contact, in charge of registration, documentation and deciding attendees
- Ensure documentation throughout year and turnover at end of year

B2: SailBot Team Organizational Documents (2014-2015)



Mechanical Engineering Resource and Funding Request 2014-2015



Home Department:

Mechanical Engineering

Affiliated National / International Organizations:

Society of Naval Architects and Marine Engineers

Competition / Conference Name, Date, Location:

UBC SailBot MicroTransat ("Transat") robotic sailboat:

The MicroTransat Challenge, Summer 2015, Newfoundland to Ireland

UBC SailBot Thunderbird 2013 ("TB2013") robotic sailboat:

International Robotic Sailing Regatta, June 2015, Memorial University, Newfoundland

Primary Faculty Advisor:

Jon Mikkelsen

Mech Faculty Advisor:

Jon Mikkelsen

Community / Alumni / Other Faculty Advisors:

Donald Martin (yacht designer)

Robert Allan Ltd (naval architecture consulting)

Website:

ubcsailbot.org

Group generic email

captain@ubcsailbot.org

Roster Information

Team Executive Roster

Returning Members Roster

Total Returning Members (Executives Included): 36

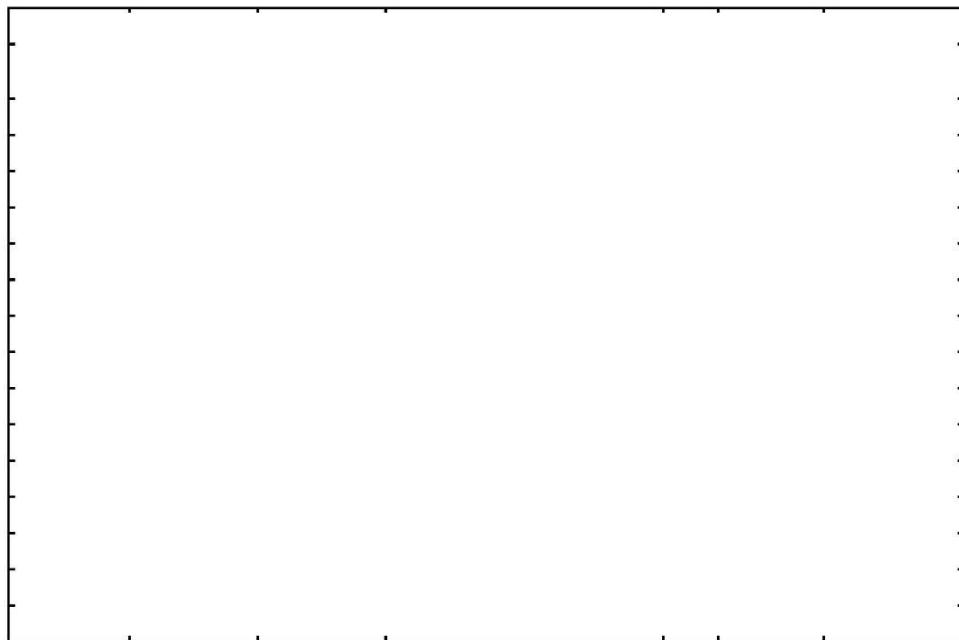
Total Returning MECH Members (Co-Leads Included): 11

First Name	Last Name	Student ID	Email	Year	Department	Phone Number

--

New Group Member Roster

First Name	Last Name	Student ID	Email	Year	Department	Phone Number



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:

Instructions:							MECH Worksession Signup											
1). Sign "Yes" in the sessions you will be attending, or "no" otherwise. 2). Read notes from the previous worksession before starting the next one. 3). Take photos at the session and put in 260 Pictures Folder (high quality for website) 4). Record what happened and put it in 255 Building Logs Folder (there is a template there) (include small size photos here)							Link to 255 Building Logs	Link to 260 Pictures	FYI Construction Tasks Ahead	Total Hours:	134							
Goal/Result(s) and Link to Building Log	Component	When	Time	Date	# People	# of hours	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs
							RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs	RSVP	Hrs
							14		8		5		5		11		8	
							Neil Doble		Dave Tlesken		Alex Krotzsch		Robert Gage		Kerim Seyitkrik		Madie Meier	
Take hull off of frame	Hull		10:00:00	Sept 13, 2014	8	26	Yes	4	Yes	4					Yes	3		
Build hull cradle	Hull	Vivian	11:00:00	Sept 20, 2014	8	33.5	(Prep)	2	No		No		Yes	4.5	Yes	4.5	No	
Install hull cradle	Hull	Alex v9	2:00:00	Sept 22, 2014	9	20.5	Yes	0.5	Yes (2.0)	4	Yes	1				Yes	1	
Install hull cradle group inside of hull	Hull	Cody	3:00:00	Wed Sept 24	6	14	Yes	3							Yes (4.0)	2	No	
Prep Inside of hull for cabin	Hull	Greg	9:00:00	Sat, Sept. 27	7	20					Yes	4		No		Yes	4	

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 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 whenever needed.

The biggest promotion plan UBC SailBot has is through its website, ubcsailbot.org, and through our Facebook page at 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
- Ubyssey
- 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.

B3: Supermileage Turnover (2014/15)

UBC Supermileage Team

2014-2015 Summary and Turnover Document

[Division/Position] Division

1) Year Overview

General overview of the year including highlights and struggles. Include information about the overall year in the shop, communications, team dynamics as well as competition.

1.1 Highlights and Achievements: List your most successful projects or processes including how they could be improved next year.

1.2 Failures and Issues: List of projects or processes that did not go well and what you learned from these experiences.

1.3 Ideas: What are some things you would change or would like to see the division/team do in the future?

2) Brief History

2.1 Summary of Current Design: basic overview of the past designs of note that did or didn't work.

3) Planning and Structure

3.1 Planning: How have you organized planning meetings, distributed work amongst leads and kept track of progress? What works/doesn't?

3.2 Communication: How do you communicate with members? Weekly email responsibilities, Facebook, other? How would you like to communicate with members or what could be better in the future?

3.3 Structure: Division structure: what worked/didn't? Used small teams led by experienced member, large group led by lead, etc.

4) Logistics

4.1 Early Year: Action items for the start of the year. What training is required for new members, what needs to be set up for September?

4.2 Other logistical details a lead should know?

4.3 Timeline/Calendar items – list of key dates and times to complete projects.

5) Key Contacts

Summary of important contacts for your division: professors, industry contacts, alumni or important businesses.

Name	Position/Title	Contact Info	Notes

8) Other

Any other information you would like to turnover. Past year's experiences, old wives tales, "this seems like it would work but trust me...". Further technical information can also go here.

B4: Supermileage Communications Plan (2012/13)

UBC Supermileage Team
Communications Plan 2012-2013

1. Introduction

The UBC Supermileage Team (UBCST) is an established student team operating out of the University of British Columbia (UBC) in Vancouver, BC. The team has been in existence since 2001 when it first competed in the SAE Supermileage competition. Since then the team has won numerous awards and has been internationally recognized by organizations such as Time magazine. The team has approximately 50 members from many disciplines of engineering.

2. Purpose

The UBC Supermileage Team relies on brand recognition to secure sponsorships, find new recruits, further its message, as well as advance nearly every aspect of its operations. Improved communications will create greater recognition primarily in Vancouver, with the rest of Canada and the United States being a secondary goal. This can be leveraged with industry to provide supplies, expertise, and financial aid. A higher profile will help attract skilled students interested in furthering their practical engineering abilities. Lastly, knowledge of energy efficiency initiatives such as UBC Supermileage will inspire people elsewhere to consciously think about energy consumption.

3. Target Audience

UBCST has identified the following groups as the target audience for its communications strategy in order of precedence:

1. University of British Columbia Faculty of Engineering staff and students
2. Local industry operating in fields related to the project (automotive, composites, green energy etc.)
3. Non-local (outside of Vancouver) industry operating in fields related to the project (automotive, composites, green energy etc.)
4. University of British Columbia students outside of the Faculty of Engineering
5. Local and non-local industry operating in fields unrelated to the project

4. Current Relationships

The Team has established relationships with the Target Audience to varying degrees.

1. UBCST enjoys strong support from UBC already, especially from the Department of Mechanical Engineering. The department is highly aware of the team and its activities, and lends support through use of facilities, administrative duties, faculty sponsorship, and financially. It is important, however, to maintain these relationships as it can be considered the backbone of the Team's support. Faculty of Engineering students are satisfactorily informed of the Team and its activities. The majority of incoming members every year are from the Faculty of Engineering, and UBCST attends many events, open houses, and information sessions put on by the faculty that students may attend.

2. UBCST currently enjoys sponsorship agreements with the following companies with offices in the Lower Mainland that operate in a related field to the project:

- a. _____
- b. _____
- c. _____
- d. _____

UBCST must work harder to generate a larger presence and awareness with companies in this category. These relationships can be useful to the team in the form of in-kind sponsorships and engineering experience in areas the Team is not so familiar with.

3. UBCST currently enjoys sponsorship agreements with the following companies with offices outside of the Lower Mainland that operate in a related field to the project:

- a. _____
- b. _____
- c. _____

UBCST must work harder to generate a larger presence and awareness with companies in this category. These relationships can be useful to the team in the form of in-kind sponsorships and engineering experience in areas the Team is not so familiar with. This category of company is typically more difficult to establish relationships with due to the inability to have face-to-face meetings or appeal to the “local” connection.

4. UBCST is less known but not unheard of by students outside of its home faculty. The Team currently attends events held by the University that expose it to students outside of the Faculty of Engineering such as Imagine Day and the UBC Alumni Fair. In addition, it attends more engineering-centric events such as E-Fest and UBC Welcomes You! that other students are also welcome to enjoy. Improved communications with this audience would greatly broaden the appeal of the Team and forge connections to new ideas, members, and industry support that would otherwise not be available.

5. UBCST currently enjoys sponsorship agreements with the following companies that operate in an unrelated field to the project:

- a. _____
- b. _____
- c. _____
- d. _____

The Team has done well to establish these relationships and must now work to

maintain them in coming years. It is expected that outreach efforts will include companies in this category in the future; however they are not a priority.

5. Goals

- a. Further expand recognition within the Faculty of Engineering among students and faculty members.
- b. Establish greater presence and recognition among the student population outside of the Faculty of Engineering
- c. Establish relationships with local parts suppliers and manufacturers
- d. Reach out to local industry for financial support

6. Intended Schedule

As in the past, the UBC Supermileage Team will constantly search for new ways and avenues to communicate with its target audiences. Conferences and events are held year round that UBCST strives to attend, examples of which can be found under the “Events” tab at Supermileage.ca. Recruitment attempts will begin with the UBC school year in September when it is easiest to approach students eager to expand their university experience. New sponsorship applications will begin in the summer following the 2013 Shell Eco-Marathon Americas and the start of UBCST’s fiscal year. These will continue throughout the year, however the largest concentrated push will occur approximately from May to October.

7. Method of Communication

Different methods of approach will be required for different groups of the target audience. With faculty and students centered around UBC, experience has shown that in-person presence is most effective for communicating our message and establishing new relationships. First point of contact may be team members running a booth or stand, a team member in class approaching a professor, or a specifically targeted e-mail or phone call to a member of staff. The targeted party can then be referred to the info@supermileage.ca e-mail which is the Team’s general-purpose e-mail for outside correspondence. This account is typically monitored by the team captain, currently ____.

First point of contact with outside companies will be established first and foremost by team members with existing contacts or relationships with the company, be they a former employer, frequent customer, or other. This team member will continue to be the liaison with the company for as long as the established relationship allows. Should the team member no longer be a part of the team, they will pass relations over to info@supermileage.ca and the person responsible for monitoring this address.

In the past each year UBCST has hosted some form of large event showcasing the team’s accomplishments and is typically more high-profile than other events at which the team is merely an attendee. Past events have included the 10th anniversary of UBCST, and media events in which local TV and print media are invited out to a demonstration of the vehicle. For the 2012-2013 year a learning event has been planned for February 28, 2013. This event will center around the Team’s message of energy efficiency and energy savings. It will demonstrate the science behind achieving extreme fuel efficiency, as well as showcase the vehicles and the team that creates them. It will also include a description and explanation of

the Shell Eco-Marathon and the experience members have taken away from past years.

8. Evaluation

Achievements in communication are typically very difficult to quantify. To this end, pass/fail criteria have been defined for each of the UBC Supermileage Team's Target Audiences to determine if the communication goals have been met.

1. UBCST must maintain 100% of the sponsorship, facility, and administrative assistance currently given by the Faculty of Engineering. It must also maintain a team size of at least 50 members, with at least 10 new members from the Faculty of Engineering being brought in at the start of the next recruitment phase (September 2013).
2. UBC Supermileage must retain at least 80% of the companies as team sponsors year over year. It must also bring in at least 1 new sponsor that fits into this category each year.
3. The Team will must retain all of its current sponsors that fall into this category.
4. UBCST must continue its outreach efforts to non-engineering students of UBC. The Team must attract and retain at least 1 student from outside the Faculty each year.
5. The Team must retain at least 60% of the current sponsors in this category year over year. It must also bring in at least 1 new sponsor that fits into this category each year.

Appendix C: Financial Document Examples

C1: Donation/Sponsorship Form

 <p>a place of mind THE UNIVERSITY OF BRITISH COLUMBIA Faculty of Applied Science</p>	DONATION / SPONSORSHIP FORM		
Date:	Prepared By:	Dept./School:	
Amount:	First Time Donor / Sponsor <input type="checkbox"/>		
<u>PLEASE NOTE</u> - the following contact information is mandatory .			
Donor's / Sponsor's Full Name and Address	<input type="checkbox"/> Individual <input type="checkbox"/> Corporation <input type="checkbox"/> Pledge <input type="checkbox"/> Gift <input type="checkbox"/> <input type="checkbox"/> Sponsorship		
*If donor / sponsor is a corporation or organization, provide:			
Contact's Full Name: _____			
Contact's Title: _____			
Email: _____			
Phone: _____			
Account Name: _____			
Speedchart: _____			
Account No.: _____			
Deposit Date: _____			
CC: Glynis Knowlden, Operations Manager Applied Science Development Office			
Notes:			

C2: Sponsorship Invoice Template



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Applied Science

UBC Solar Car Team

C/O Development and Alumni Relations Office
UBC Faculty of Applied Science
290-2360 East Mall
Vancouver, BC V6T 1Z3
Phone 604.822.8335 Fax 604.822.0688

INVOICE

DATE: August 11, 2015
INVOICE #
REF:

Bill To:
NAME
POSITION
COMPANY
MAILING ADDRESS 1
MAILING ADDRESS 2

DESCRIPTION	AMOUNT
Sponsorship of 2015/2016 UBC Solar Car Team	-
TOTAL	\$ -

Make all checks payable to **The University of British Columbia** and include "**Sponsorship for UBC Solar Car Team**" in the memo line.

If you have any questions concerning this invoice, contact (include student contact name, phone number, email here)

THANK YOU FOR YOUR CONTINUED SUPPORT!

C3: Supermileage Sponsorship Package (2014/15)



SPONSORSHIP PACKAGE

14



2014

Contact Us at SPONSOR@SUPERMILEAGE.CA
for any questions or additional information.

UBC SUPERMILEAGE TEAM



The UBC Supermileage Team is a group of 65 dedicated engineering students working to design and build fuel efficient, gasoline-powered vehicles for the Shell Eco-Marathon Americas and the Society of Automotive Engineers (SAE) Supermileage competitions. Our diverse team includes students from mechanical, geological, civil and materials engineering as well as engineering physics. Within this sponsorship package, you will be able to find the following:

- A Message from the Captain
- Competition Descriptions
- Past Achievements
- Overview of Vehicle Designs
- Our Goals for this Year
- How You Can Support Us



THE PURSUIT OF EFFICIENCY

Since 2001, our team has designed and built multiple super-mileage vehicles and has achieved fuel mileages of up to 3145 mpg (1337km/L). We are passionate about effecting positive change on the environment with our engineering education and have actively participated in community and professional events to raise awareness for sustainable transportation. With a proven track record of continuous success, we are looking to grow our industry relations and further improve on our competition performances!

WHY WE NEED YOU!

As a student design team, we rely heavily on the support and funding of local community and industry partners. Your support gives us the opportunity to practice engineering outside the classroom and grow as young professionals. Specifically, your contribution allows us to purchase material and equipment for the design and development of our vehicles.

CRATE INCIDENT, May 2014 - While returning from Houston, Texas this past May, the shipping truck containing our competition crate was involved in a highway accident. Both vehicles as well as many of our tools and valuable team resources were destroyed. In order to recover from the damages, the team will require extra support from the community and industry this year to achieve our goals and re-design and construct both competition vehicles

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca

MESSAGE FROM THE CAPTAIN



Thank you for your interest in the UBC Supermileage team! I am a fourth year Mechanical Engineering student in the Mechatronics option and have been a member of the team for the past three and a half years. As a competitive person and hands on learner who joined engineering to help society, I was quickly drawn to the Supermileage team. As one of the most successful student teams at UBC, with an impressive track record and over 60 members from diverse programs, the team offers students a space to apply classroom theory to a very real problem. Sustainable transportation is an important global issue and we are passionate about working towards the solution in our pursuit of efficiency. I'm always struck by the impact the team has on its members and the public. Our members are motivated, welcoming and inventive, pushing new boundaries each year and always eager to learn more.

As captain, I want to maintain our reputation as one of the top teams at competition while promoting sustainability and student development. Our goals this year are to continue the last two years of podium finishes with the Urban Concept, hold and attend as many public events as possible, and maintain our welcoming and learning focused team culture. We aim to rebuild both vehicles this year for the Shell Eco-Marathon, with a two year development focus on the prototype vehicle, allowing expansion into the SAE competition next year and new engineering challenges for our team. However, with the loss of our crate this summer, there is a heavy strain on our budget. We welcome any contributions or partnerships and are greatly appreciative of our sponsors. Your partnership supports students who want to go above and beyond the classroom learning experience and create lasting change.



Thank you,

2014-2015 UBC Supermileage Team Captain

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca

ubcast
UBC SUPERMILEAGE TEAM

3

THE COMPETITIONS

The UBC Supermileage Team has competed internationally at the Shell Eco-Marathon Americas and the Society of Automotive Engineers Supermileage competition. Both competitions challenge teams to design, construct, and test cutting-edge, energy efficient vehicles.

COMPETITION JOURNEY

Starting in 2001, the team competed in the SAE Supermileage Competition with the "Mark" series of Prototype class vehicles. From 2003 to 2006, the team dominated the podium with first place finishes and then set its sights on the more comprehensive Shell Eco-Marathon Americas (SEMA) Urban Concept challenge. In 2010, the team debuted in the Urban Concept class and, despite not completing a full run, the vehicle achieved an impressive fuel mileage. Since then, the team has iteratively improved the Urban Concept design to achieve consistent podium finishes. In 2013, the team decided to revive the development of prototype vehicles as well as continue development of the team's Urban Concept vehicle to allow more learning opportunities for team members. Upon competing in both vehicles classes in the SEMA competition, the team finished in 2nd and 5th place. Last year, the team continued to compete in both vehicle classes. Due to technical challenges faced at competition, the team was not able to acquire a valid score for Mark XI but finished 3rd with Odysseus.

	Date	Result	Mileage
URBAN CONCEPT	2014	3rd Place	0.722L/100km (326 mpg)
PROTOTYPE	2013	2nd Place	0.408L/100km (577 mpg)
URBAN CONCEPT	2012	3rd Place	0.817L/100km (288 mpg)
PROTOTYPE	2011	4th Place	1.099L/100km (214 mpg)
URBAN CONCEPT	2010	DQ	1.438L/100km (163.5 mpg)
PROTOTYPE	2014	DNF	-
PROTOTYPE	2013	5th Place	0.170L/100km (1383 mpg)
PROTOTYPE	2008	4th Place	0.126L/100km (1865 mpg)
PROTOTYPE	2006	1st Place	0.075L/100km (3145 mpg)
PROTOTYPE	2005	1st Place	0.147L/100km (1608 mpg)
PROTOTYPE	2004	1st Place	0.135L/100km (1747 mpg)
PROTOTYPE	2003	1st Place	0.254L/100km (927 mpg)
PROTOTYPE	2002	4th Place	0.263L/100km (895 mpg)
PROTOTYPE	2001	9th Place	0.797L/100km (295 mpg)



SHELL ECO-MARATHON AMERICAS COMPETITION is open to student teams from across North and South America. It comprises both Prototype and Urban Concept class vehicles and multiple energy sources.



SAE SUPERMILEAGE COMPETITION is open to student teams from across North America with gasoline powered Prototype class vehicles.

URBAN CONCEPT class vehicles challenge students to create cars that more closely resemble real-life automobiles in appearance and functionality.

PROTOTYPE class vehicles encourage students to create a futuristic vehicle that maximizes fuel mileage with minimal design constraints.

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca

OUR GOALS

Since the crate incident this last May, the team has been more determined than ever to design and rebuild our competition vehicles. The team is focused on the following goals this year.



PURSUIT OF EFFICIENCY

DESIGN AND BUILD TWO COMPETITIVE VEHICLES FROM GROUND UP – The UBC Supermileage Team has innovative vehicle designs and construction techniques that have made the team highly competitive. This year, even though the team will be starting from scratch, we are aiming to produce highly competitive vehicles with the ultimate goal of podium finishes in both vehicle classes.

The team is also preparing for a second competition, SAE Supermileage 2016, by developing a new engine and prototype shell this year. Postponing attendance of the additional event until 2016, due to current financial constraints, allows a full year of development to better implement past research and competition experience.

EDUCATION

CREATE MORE WELL ROUNDED ENGINEERS – The UBC Supermileage Team provides an inclusive environment for learning outside of the classroom. Junior members are trained and mentored by senior member in different areas of vehicle design and development. The team's growing internal training sessions include CAD modeling tutorials, carbon fiber layup demonstration, and wind tunnel tests. Team members are not only exposed to learning in the technical areas, but also in teamwork, project management and professional development.



RAISE AWARENESS

Sustainability is an increasingly pressing issue in today's society. The UBC Supermileage Team is passionate about creating sustainable transportation and wants to contribute by raising awareness about energy conservation. The team intends to organize and attend as many campus and community events throughout the year as possible to promote project and environmental issues.



SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca



URBAN CONCEPT CLASS: ODYSSEUS

The diagram illustrates the Odysseus car's internal structure. The body is shown in grey, the engine in green, the chassis in blue, and the steering system in red. Arrows point from each component to its respective description box.

Drawn by	UBC Supermileage Team	Page 1 of 1	
Title	Urban Concept Class: Odysseus	Rev	1.0
File Name	Sponsorship Package	Date	July 18, 2014

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca



PROTOTYPE CLASS: MARK IX

The diagram illustrates the internal components and external features of the Prototype Class: Mark IX. It shows a longitudinal cross-section of the vehicle's body, which is made of carbon fiber. The engine is a 50cc Honda model located at the rear. The chassis is constructed from Nomex honeycomb. The steering system is a water jet aluminum and plastic assembly. The vehicle has two green wheels with spoked hubs. Arrows point from the text boxes to specific parts of the vehicle diagram.

Drawn by	UBC Supermileage Team	Page 1 of 1	
Title	Prototype Class: Mark IX	Rev	1.0
File Name	Sponsorship Package	Date	July 18, 2014

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca

ubcst
UBC SUPERMILEAGE TEAM

7

WHY GET INVOLVED?

We are hoping to develop relationships with industry organizations interested in offering their support. Partnering with us provides several benefits.

CAREER RECRUITMENT

The UBC Supermileage team consists of engineering students who demonstrate a passion for engineering design by taking initiative outside the classroom. Sponsoring and meeting the team is a good opportunity to recruit engineering students who have already demonstrated commitment, professionalism and willingness to learn.

MEDIA COVERAGE

Every year UBC Supermileage partakes in media events that allow the team to be featured on newspapers and broadcasts. Last year, the team was covered in three episodes of a Global TV Series show in addition to being featured in local newspapers. Below are some highlights of the team's past media coverage.



“...you don't really need funky alternative fuels or an electric motor to trim your energy consumption on the road. Sometimes all it takes is a little ingenuity.” – Time Magazine's Greatest Invention of 2006



“What do you get when you challenge a bunch of engineering student to build a green car. At the University of British Columbia you get ... [a] three wheeler that can travel 3145 miles on a single gallon of gas.” – Daily Planet



“...a group of University of B.C. engineering students has designed a vehicle that will run from Vancouver to Halifax on \$5 worth of gas and fumes.” – The Vancouver Sun

SPONSORSHIP PACKAGE 2014 | sponsor@supermileage.ca



SPONSORSHIP LEVELS

UBC Supermileage Team enjoys partnerships with many companies every year. With the support of sponsors such as you, we are confident that we can achieve our goals this year and remain a highly competitive and impactful team.

Both monetary and non-monetary sponsorships, including technical support, are recognized annually and are greatly appreciated by the team. Each sponsor, regardless of status, will receive monthly email updates from the team and will have the opportunity to meet with team members and tour the team's workshop. Sponsorship status is detailed below but we are happy to discuss other partnership arrangements. For more information please contact us at sponsor@supermileage.ca

GOLD (\$5000 OR MORE)

Gold sponsors will have a large logo displayed in a dominant position on both competition vehicles. Also, the logo of your business will be featured on the team's web page and promotional materials.

SILVER (\$1000-\$4999)

Silver sponsors will have a medium-sized logo displayed with preferential placement on both competition vehicles. Also, the logo of your business will be featured on the team's web page and promotional materials

BRONZE (LESS THAN \$1000)

Bronze sponsors will have logo displayed on one competition vehicle, or both if space allows, team's web page and promotional materials

IN-KIND (NON-MONETARY SUPPORT/DONATION)

In-kind sponsors will be given a gold, silver, or bronze status based on contribution. The team values non-monetary support such as technical expertise, facility rentals, material donations and equipment donations. Other sponsorship arrangements can be discussed. Details of each sponsorship will be discussed on an individual basis.

C4: Baja 2014/15 PAF Application

Student Team: UBC Baja SAE

Type of Application: Team

Principle Applicant's Name:

Department/Program/Year: APSC / Integrated Engineering / 4th

Email: Secondary Email:

Phone:

List of Co-applicants

Name/Group	Department/Program	Year	Email
	APSC / MECH	3rd	
	APSC / ENPH	3rd	

Previously funded projects via PAF:

Did you collect awarded funds? Yes

Did you submit your Final Report? Yes

List of Previously Funded PAF Applications

Name/Group	Department/Program	Year	Email
	APSC / MECH	2013	
	APSC / MECH	2012	
	APSC / MECH	2011	

Student Team Background:

UBC Baja met several objectives this year, creating a new vehicle and competing in the Kansas Baja SAE 2014 competition.

At competition, UBC Baja achieved first place in a dynamic event – a feat that impressed judges and peers due to the short existence of the team. UBC Baja also achieved high design and marketing scores, showcasing the organization, ambition and ability of this group.

The team also improved team infrastructure, sustainability, member learning and team composition – achieving 24% female representation – to strengthen the group and better reflect the student body.

Budget requested from 2014/2015 PAF: \$ 9,000

Amount expected from other sources: \$ 6,150

Project Summary:

The team is buoyed by its achievements and will work this upcoming year to address broken or deficient systems, meet regulations as well as improve the vehicle.

The current vehicle is competitive, but UBC Baja plans to improve essentially every vehicle subsystem this year as well as commence longer-term design-build projects.

The large projects are:

- Suspension lightening (design and build new suspension components)
- Drivetrain efficiency (design and build a transmission tuning rig and dynamometer)
- Design data acquisition (design and implement a variety of data acquisition systems)
- Brakes improvement (new rear brake system)
- Chassis lightening and modifications to meet regulations
- Drivetrain lightening (new guarding, drive cassette and tires)
- Suspension and drivetrain two-year projects (custom gearbox and suspension parts)

The team must invest in tools and will need to cover registration and vehicle transportation costs to the Oregon Baja SAE competition.

Student team's role in the Faculty:

UBC Baja's primary purpose is to achieve the highest results possible in Baja SAE competitions through innovation, engineering excellence and team organization.

Baja SAE competitions are large spectator events run by the Society of Automotive Engineers (SAE) that play out over three days. The top engineering universities from around the world are pitted against each other. Static, dynamic and endurance events push the vehicles to their limits, and test the engineering behind their design. Top teams achieve a fine balance between weight, efficiency, ruggedness and control. Points are won for innovation, economy and manufacturability as well as race results.

As a corollary, UBC Baja provides students the opportunity to get the most of their education through applied learning and teamwork. The team fosters a positive and energetic environment where members are challenged, given responsibility and held accountable. Members develop relations with industry and sponsors while balancing design, fabrication and competition schedules with academic responsibilities.

In the greater community, the team participates in several events and organizations aimed at recruiting new students to the Faculty, drawing positive attention to the Faculty within the UBC community and attracting donors to the Faculty. A member of the team is SAE student representative for UBC Engineering.

The team also sponsors student design projects as part of their academic programs. Last year the team sponsored the design and fabrication of a transaxle gearbox as part of a MECH capstone project. This year the team is sponsoring the design and fabrication of a transmission tuning and dynamometer rig, as well as a real time data acquisition system as part of an IGEN capstone project.

UBC Baja is a relatively young team with only two full active years and two competitions of experience. However in that short amount of time the team has many achievements including:

- A 1st place finish in the Tractor Pull dynamic even at Kansas Baja SAE, 2014
- An 18th place finish in its first endurance race at Washington Baja SAE, 2013
- The construction of two entirely new vehicles in two years
- Vast improvements in design and marketing scores between 2013 and 2014

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

- Sponsorship of innovative projects such as the design and fabrication of a custom transaxle gearbox as part of a MECH Capstone Project
- Achievement of 24% female membership that strengthens the team and reflects the student body
- Leadership in safety among student teams (Captain Eli Nemtin has been leading safety initiatives for student teams and student team spaces and is a key liaison between the Faculty and student teams on safety issues)
- Development of several private sector sponsor relationships and leadership in sponsor relations (UBC Baja has created a sponsorship package that is used by the UBC Applied Science Development Office as a model for other teams)

In the short-term, the team is focussed on improving the performance of the existing vehicle in time for the Oregon Baja SAE competition in May 2015. Planned improvements to suspension, drivetrain, chassis, brakes, and ergonomics are described in the Project Summary above.

In the longer-term UBC Baja is working on creating and maintaining relationships with sponsors to improve the financial sustainability and technical support network of the team. We hosted a Sponsor Appreciation day in September 2014 where sponsors were able to drive the vehicle around a course. And we hope to continue to provide value to our sponsors through similar events, continued competitive success and publishing stories on our website and social media.

To sustain the existence and momentum of the team, UBC Baja has also prioritised the purchase of tools and equipment to replace the tools it currently use that belong to a team member that will be graduating in 2017.

Impact of the project on UBC student learning:

UBC Baja members acquire knowledge and experience from participating in this project in the following areas:

- **Leadership and Teamwork:** UBC Baja is structured such that all students work within a vehicle design subsection under a subsection lead, and all subsections are expected to coordinate their efforts in order to create a cohesive final design. In this way, team structure mimics many industry project team structures and creates an environment where team members improve upon their communication, project management.
- **The Design Process:** Members hone their understanding of the design process by actively participating in research and development, feasibility studies, prototyping, and optimization. These skills are applicable to every area of engineering.
- **Fabrication and Assembly:** All members participate in the manufacture and/or assembly of the vehicle in some way. This allows them to develop hands-on skills and a greater understanding of the complexities of manufacturing.
- **Time and Resource Management:** Students learn to work with the responsibility of deadlines and accountability to a group of colleagues, just as in industry.
- **Networking:** Attending Baja SAE competitions and related industry events allow members to meet students from other schools as well as industry professionals, creating connections for potential team sponsorship and future career opportunities.

UBC Baja currently has a roster of 46 students who directly benefit from their involvement with the team.

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

List of Students Benefiting From the Project:

UBC Baja has 46 full members registered for the 2014-15 season. Please see Appendix 1 for detailed team member list.

Influence of the project on UBC Engineering's reputation on a local, national or international level:

Local

- UBC Baja team members interact with current and potential local industry sponsors and suppliers. These companies witness the strengths of UBC Engineering students and their dedication to this project, creating positive exposure for the Faculty.
- UBC Baja participates in many local events (led by APEGBC, SAE, UBC APSC, UBC EDTC) that showcase the team and vehicle and therefore reflects positively upon UBC Engineering. For the 2014-2015 season such events include auto shows, UBC APSC and Development events, local SAE events and APEGBC events.

National

- Many of the teams that compete in North American Baja SAE competitions are Canadian universities. Students, faculty and community members from across the country witness the accomplishments of UBC Baja in the short time since it's founding in 2011. This success is reflective of the exceptional continued support UBC Baja has received from UBC Engineering as well as the caliber of students within the faculty.
- Future opportunities may exist for UBC to host a Baja SAE competition and UBC Baja to compete with other Canadian universities.

International

- UBC Baja has attracted the attention of international industry members including Tesla Motors and Cummins. Tesla Motors has toured our facilities and also meets specifically with the UBC Baja team for co-op placements and internships. Currently, two team alumni are employed full time at Tesla. Cummins representatives approached UBC Baja at competition to potentially use pictures of the vehicle for Baja SAE promotional purposes.
- *The Discovery Channel* approached UBC Baja in 2014 in regards to doing a short interest piece on the team. They are periodically in contact and the team hopes to bring this plan to fruition as this is an exceptional opportunity to showcase UBC Engineering and the team.

UBC Baja's 2014-15 Budgets:

Potential and Expected Income

Potential Sources of Income	Amount	Funds: Received (R), or Applied for (A), Future Application (F)
PAF Fund	\$9,000	A
MECH Fund*	\$3,150	A
Walter Gage	\$1,500	A
SHELL Fund	\$1,500	F
External Sponsors	\$1,000	F
Total Potential Income	\$16,150	
Total Expected Income	\$14,000	(UBC Baja is accounting for some uncertainty in funding sources and possible penalties on funding applications such as this one)
*cash value requested		

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

UBC Baja 2014-15 Projected Expenses - SUMMARY

Amount	Category	Comment:
\$3,650.00	Comp. Costs	Registration, transport, fuel
\$250.00	Engine/Trans.	New engine required per SAE Baja regulations
\$3,425.00	Frame	Required modifications, improvements, equipment
\$600.00	Brakes	Required to meet safety standards for competition
\$250.00	Safety	Required safety gear replacements
\$650.00	Suspension, Steering and Wheels	Required equipment, new parts, maintenance
\$1,700.00	Drivetrain	Commissioning and rework of new gearbox, repair, maintenance, new parts, transmission tuning rig and dynamometer
\$1,175.00	Miscellaneous	Website, paint and primer, fasteners, water-jet time, equipment, admin supplies, fuel
\$500.00	Tools & Team Equipment	Please see note below*
\$1,500.00	Contingency	Approximately 10% of estimated costs
\$13,700.00	Total Expenses	

*The majority of UBC Baja's tools are lent to the team for use by team member, Eli Nemtin

Please find detailed projected expenses in Appendix 2.

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

APPENDIX 1 – Detailed Team Roster

	Name/Group	Department/ Program	Year	Direct	Indirect	Email
1		IGEN	4	yes		
2		MECH	3	yes		
3		ENPH	3	yes		
4		EECE	4	yes		
5		MECH	3	yes		
6		MECH	3	yes		
7		MECH	3	yes		
8		MECH	3	yes		
9		EECE	3	yes		
10		IGEN	4	yes		
11		MECH	3	yes		
12		MECH	3	yes		
13		IGEN	4	yes		
14		MECH	2	yes		
15		MECH	3	yes		
16		MECH	3	yes		
17		MECH	3	yes		
18		MECH	3	yes		
19		EECE	3	yes		
20		MECH	3	yes		
21		MECH	3	yes		
22		MECH	3	yes		
23		MECH	3	yes		
24		Cpsc	1	yes		
25		MECH	3	yes		
26		MECH	4	yes		
27		APSC 1	1	yes		
28		APSC 1	1	yes		
29		APSC 1	2	yes		
30		ENPH	3	yes		
31		MECH	2	yes		
32		APSC 1	1	yes		
33		IGEN	3	yes		
34		APSC 1	1	yes		
35		MECH	2	yes		
36		ENPH	3	yes		
37		IGEN	3	yes		
38		IGEN	4	yes		
39		IGEN	4	yes		
40		IGEN	4	yes		
41		IGEN	2	yes		
42		BCOM	3	yes		
43		BCOM	3	yes		
44		EECE	3	yes		
45		MECH	3	yes		
46		APSC 1	1	yes		

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

APPENDIX 2 – UBC BAJA 2014-15 PROJECTED EXPENSES - DETAILED
UBC Baja 2014-15 Projected Expenses

Amount	Description:	Category	Comment:
\$1,150.00	Baja SAE Oregon Competition	Comp. Costs	Mandatory registration fees for 2014 SAE Baja competitions
\$1,500.00	Truck rental	Comp. Costs	Approximate cost to rent a pick-up truck to tow a trailer and transport tools, equipment to competition
\$1,000.00	Fuel	Comp. Costs	Approximate cost for fuel to drive pick-up truck and trailer to competition
\$0.00	Trailer cost	Comp. Costs	UBC Baja plans to use the ESTC trailer to transport our vehicle, tools and equipment to competition
\$0.00	Hotel Costs	Comp. Costs	Team members will be expected to pay for their own transportation and accommodation costs to competition
\$250.00	New Engine	Engine/Trans.	New engine required
\$200.00	Plating, Body Panelling & Guarding	Frame	Required for firewall, belly plating, sidewalls, guards
\$200.00	Shielding Gas and Rods for Welding	Frame	Required for manufacturing of frame
\$25.00	Electrodes for Welding	Frame	Required for manufacturing of frame
\$50.00	Hole Saws For Tube Notcher	Frame	Required to notch tubing
\$350.00	Bulk tube	Frame	Necessary material to manufacture frame
\$600.00	Front and Rear Brake Assemblies	Brakes	Required to meet safety standards for competition
\$100.00	Goggle tear-away	Safety	Mandatory safety gear for competition
\$150.00	New 5 Point Harness	Safety	Required safety equipment. Current harness is out of date
\$150.00	Front spindles	Steering	Required for new steering system
\$200.00	Rod ends & Mounting tabs	Suspension	General wear and tear wears out these components
\$1,000.00	Transaxle & CV Joints	Drive Train	Student designed and built gearbox needs to be mounted in car
\$500.00	Two Half-shafts	Drive Train	Required to accommodate new gearbox
\$200.00	Uprights & Rear Hubs	Drive Train	Required for new drive train assembly
\$300.00	Rear Tires and Hubs	Wheels & Hubs	New set of rear wheels plus one spare required; front tires and hubs from previous vehicle are being reused
\$150.00	Website renewal fees	Miscellaneous	Cost for 1-year renewal of website
\$25.00	Administrative supplies	Miscellaneous	Paper and office supplies required to make funding claims, complete bookkeeping
\$250.00	Fasteners	Miscellaneous	All sub systems and assemblies require fasteners
\$100.00	Outdoor work tent	Miscellaneous	Useful for any necessary manufacturing during competition
\$150.00	Primer & Paint	Miscellaneous	The Baja car need to look good to represent UBC
\$250.00	Fuel	Miscellaneous	Required for testing of the car before competition, running the car during competition
\$250.00	Water-jetting time	Miscellaneous	Complex components that must be water jet for ease of manufacturing
\$600.00	MIG Welder	Frame	Potentially share cost with HPVT
\$2,000.00	TIG Welder	Frame	Potentially share cost with HPVT
\$500.00	Tool cabinet	Tools & Team Equipment	Please see note below*
\$1,500.00	Contingency Funds	Contingency	Approximately 10% of estimated costs
\$13,700.00	Totals		

*Note: The majority of our tools are lent to the team for use by team member Eli Nemtin.

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

C5: Supermileage 2014/15 PAF Application

Page 2 of 8

Student Team: UBC Supermileage Team

Type of Application: Team X Field trip _____ Project _____ Other _____

Principle Applicant's Name:

Department/Program/Year: Engineering/ Engineering Physics/ 4th

Email: Secondary Email:

Phone:

All correspondence regarding this application will be addressed to the Principle Applicant.

List of Co-applicants

Name/Group	Department/Program	Year	Email
	Engineering/Mechanical	4	
	Engineering/Mechanical	4	

Previously funded projects via PAF:

List all projects funded, all years, all applicants in table that follows

Did you collect awarded funds? Yes No

If Yes, did you submit your Final Report? Yes No

If No, why not? _____

List of Previously Funded PAF Applications

Name/Group	Department/Program	Year	Email
	Engineering/ Mechanical	2013	
	Engineering/ Mechanical	2012	
	Engineering/ Mechanical	2011	
	Engineering/ Mechanical	2010	
	Engineering/ Mechanical	07-09	

Student Team Background:

Last year, our objectives were to (1) place in the top two and three teams at the Shell Eco-Marathon Americas in the Urban Concept and Prototype classes respectively, (2) contribute to the development of well-rounded engineering students and (3) increase awareness of sustainability and efficient energy usage. The team succeeded in a third place Urban Concept finish with 326 mpg. This nearly met our goal of second place and was our second ever podium finish in this competition class. Due to engine and battery issues, the Prototype DNF but we learned many lessons which are now incorporated in our new designs. Through many community events and significant media coverage, we achieved our goal of promoting sustainable practices. Additionally, the team grew in size and all members gained valuable skills and practical experience over the year.

Budget requested from 2014/2015 PAF: \$12,000.00

Amount expected from other sources: \$48,216.00

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

Project Summary:

Provide the rationale to support your student team request in 150 words maximum.

UBCST works to design, develop and construct two single-person, fuel-efficient gasoline powered vehicles for the annual Shell Eco-marathon Americas competitions. The team welcomes engineering students from all disciplines and has members from nearly all engineering departments as well as other faculties at UBC. As future engineers, it is important to acknowledge and address issues such as climate change. By producing high-mileage concept vehicles, we strive to inspire, educate and promote public energy awareness and sustainable transportation. The UBCST represents a vision of awareness, innovation and implementation of sustainability, an idea shared by the Shell Eco-marathon and UBC Engineering.

In May 2014, on return from the Shell Eco-marathon Americas, the team's shipping crate was on a truck involved in a severe highway accident. Both competition vehicles and many valuable team resources were destroyed. Goals this year focus on recovering from the crate accident, ensuring longevity of the team, and maintaining UBC's reputation as a top team at the Shell Eco-marathon Americas.

Student team's role in the Faculty:

Provide a clear, concise statement of the student team's role in the faculty, including purpose, history, achievements to date, & short and long term goals.

UBCST was founded in 2001 by UBC Mechanical Engineering students. Since then, countless students have been involved with the team in different aspects. UBCST provides a means through which students are able to apply classroom knowledge in practical, hands-on situations.

Engineers and students are responsible for educating the public on environmental related issues that arise from technology. UBCST believes that through our project work we can promote awareness and reach out to educate the public on energy conservation. The team wants to continue to grow and innovate, and share its successes with the community. To reach these goals, UBCST works to meet with the public at as many events as possible. Recent events include SAE's Student Night, ACEC Transportation Conference and the Shell Innovation Summit.

Projected Goals:

- Rebuild two highly competitive vehicles for Shell Eco-Marathon 2015 competition: podium finish for Urban Concept and top 10 for Prototype
- Increase student and public awareness of sustainability and energy use
- Contribute to the development of well-rounded engineering students
- Ensure longevity of the team with improved team structures, turnover and project management documentation

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

Results:

- 2003-2006: 1st in Prototype Class with top mileage of 3,145 mpg in 2006.
- 2008: 4th in Prototype Class.
- 2010: 163.5 mpg in Urban Concept Class, DNF, equivalent score to 3rd Place.
- 2011: 4th in Urban Concept Class, 214 mpg.
- 2012: 3rd in Urban Concept Class, 288 mpg.
- 2013: 2nd in Urban Concept Class, 577 mpg; 5th in Prototype Class, 1383 mpg.
- 2014: 3rd in Urban Concept Class, 326 mpg. DNF in Prototype Class.

Impact of the project on UBC student learning:

- What are the expected outcomes? Explain how this project will contribute to the development of professional skills of UBC engineering students.
- What are the direct, short-term benefits, & what are the sustainable benefits?
- How many students are involved?

UBCST's work impacts the UBC Engineering student community by providing an opportunity for students to develop project management, teamwork, leadership and problem solving skills in a realistic engineering environment. The club gives students the freedom to innovate and be creative while practicing both hands on and soft skills, contributing to the development of well-rounded and successful engineers. Team members are exposed to a variety of industries; gaining important industry experience and contacts. Students gain a valuable educational experience which cannot be achieved in a classroom setting.

By showcasing the UBC Supermileage project at community and public events, we hope to raise student and public awareness of environmental issues faced today and thus influence their future decisions for sustainability and energy conservation. Last year we held a learning event where we featured our vehicles to the UBC community. This event allowed us to engage students and the general public on our vehicle design, technology and ideas of sustainable practice. As part of a mini-competition between all Canadian teams participating in the Shell Eco-marathon, this event received significant media and social media attention.

Much of the team's strength comes from its diversity of individuals; currently the team includes members from not only Mechanical Engineering but also Electrical and Computer, Engineering Physics, Geological, Integrated, Materials, Chemical and First Year Engineering, as well as Science, Computer Science and Commerce. Currently, there are 65 team members.

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

List of Students Benefiting From the Project

Please identify project beneficiaries.

If unknown, identify approximate number of students served both directly and indirectly.

Name/Group	Department/Program	Year	Directly	Email
	Mechanical	4	X	
	Mechanical	4	X	
	Geological	4	X	
	Eng. Physics	4	X	
	Eng. Physics	4	X	
	Mechanical	4	X	
	Electrical	4	X	
	Mechanical	3	X	
	Mechanical	3	X	
	Integrated	4	X	
	Mechanical	4	X	
	Mechanical	4	X	
	Commerce	1	X	
	Computer Science	3	X	
	Mechanical	4	X	
	Mechanical	4	X	
	Mechanical	4	X	
	Integrated	2	X	
	Commerce	4	X	

Note: This is only a list of EXECUTIVE AND LEAD members. The team has 65 members total, from all year levels of undergrad and one PhD. A list of names will be provided upon request.

Influence of the project on UBC Engineering's reputation on a local, national or international level:

As the Shell Eco-marathon is an internationally recognized competition, participants have garnered attention from media outlets, industry representatives and more. UBCST has been featured by prominent media such as Time Magazine, The Province, The Vancouver Sun, Shaw TV, City TV, Discovery Channel, Global TV, National Geographic as well as National Geographic for kids and US Department of Energy. The team has attended several events since last year's competition, all of which are listed on our website: <http://supermileage.ca>. In 2006, the team competed at the Japanese Fuel economy competition. As a result of our past successes, UBC Supermileage is recognized across North America and many teams from around the world contact us for advice and suggestions. The team has gained media attention for its high fuel mileage, as well as the environmental message associated with the project. In 2013-2014, UBCST was featured in several mini-series produced by Global TV National News and entered in international contests with National Geographic and NASA.

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

Thoroughness, Clarity & Transparency of Budget:

Create one budget using the table below (add more rows as need be). If needed, applicants may include their budget as an Appendix (limited to two pages).

Sources of Income	Amount	Received (R), or Applied for (A)
Shell Eco-M Travel Stipend	\$ 3,000.00	R
Shell Grant	\$ 10,000.00	R
Shell Extra Grant	\$ 5,000.00	R
UBC Mech Department	\$ 3,000.00	R
UBC Mech Department	\$ 1,000.00	A
Carry Forward	\$ 3,936.50	R
PAF Sponsorship	\$ 12,000.00	A
Shell Engineering Student Fund	\$ 8,000.00	A
Walter Gage Fund	\$ 1,000.00	A
Raffle	\$ 1,500.00	A
Soller Composites*	\$ 300.00	R
Fibertek*	\$ 800.00	R
Avcorp*	\$ 500.00	R
CRN*	\$ 250.00	R
EDTC*	\$ 350.00	R
APEGBC	\$ 2,000.00	A
Translink	\$ 1,000.00	A
Intergulf Developments	\$ 1,000.00	A
Electro-Meters*	\$ 700.00	A
Battery World*	\$ 400.00	A
Barrettes Small Engines*	\$ 700.00	A
Additional Sponsorship	\$ 3,779.50	A
TOTAL Income	\$ 60,216.00	*in-kind sponsorship

Note: Carry forward is large this year since expenses were frozen after the crate accident: previously anticipated purchases were held off and plans were modified until the team could determine its goals and financial capacity for this challenging year. Finances received from the Mech Department were held and purchases not reimbursed until the start of the team's internal fiscal year in September to ensure clear budgets.

Expenses	Amount	Justification
Aero	\$ 14,300.00	One fiberglass mould and two new carbon fibre aero shells
Chassis	\$ 11,665.00	Entirely rebuilding both chassis from scratch
Electrical	\$ 1,450.00	Circuit components for engine wiring and lights
Engine	\$ 6,645.00	Engines, power transfer, sensors, fuel/air systems
Admin	\$ 20,230.00	Safety, shipping vehicles and travel for 16 people to Detroit
Tool	\$ 2,520.00	Replacing lost safety supplies, tools and equipment
Contingency	\$ 3,406.00	10% of technical sections: industry standard to cover unknown expenses (shipping, taxes, customs, USD)
TOTAL	\$ 60,216.00	

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

APPENDIX A – DETAILED EXPENSES

Expenses	Amount	Justification
AERO		
Aero Proto		
Foam Machining	\$5,000.00	Base of the male plug requires high density polyurethane foam
Fibreglass mould	\$1,360.00	Fiberglass, resin, chopped mat, plywood ribbing, release agents
Carbon Fibre Shell	\$2,650.00	Carbon fibre, resin, vacuum bagging materials and layup supplies
Windows and Structure	\$800.00	Window materials and forming, divinycell for shell ribbing
Aero Urban		
Mould Release and Prep	\$340.00	Existing mould needs to be fixed up and surface prepped
Carbon Fibre Shell	\$2,750.00	Carbon fibre, resin, vacuum bagging materials and layup supplies
Windows and Structure	\$900.00	Window materials and forming, divinycell for shell ribbing
Aero General		
Tent	\$300.00	Composites lay-up not allowed Rusty Hut, required for outside.
Paint	\$200.00	Sponsorship in progress for paint jobs, if not need to purchase paint
Aero Total	\$14,300.00	
CHASSIS		
Chassis Urban:		
Firewall and roll bar	\$400.00	Fireproof and structural material to protect the driver
Steering System	\$225.00	Rod ends, bearing, stock metal, steering wheel
Wheel Support Systems	\$500.00	Bearings, axles, kingpins, wheel mounts and wheel covers
Drive Shaft	\$600.00	Included as a part of Capstone budget of \$1000
Chassis Base and Shell Mounting	\$3,250.00	Composites, nomex and divinycell cores, jigs and plugs, protective paint
Wheels	\$2,200.00	Custom hubs, tyres, rims and brake rotors
Chassis Proto:		
Chassis Base	\$1,100.00	Composites and aluminum core, jigs and plugs to mount parts
Wheel mounts and wheel covers	\$400.00	Aluminum uprights to mount wheels, carbon covers to protect driver
Steering Linkage and Handlebars	\$400.00	All costs excluding machining time. Metal rods, tubes, rod ends, plastic
Roll Cage & firewall	\$300.00	Bar to protect driver in rollover. Metal wall to separate from engine
Chassis Shared:		
Specialized Fasteners	\$300.00	Rivets; left-handed nuts and bolts; locknuts, metric fasteners
Fire Extinguishers	\$100.00	Needed in each car for regulations
Rolling Dyno	\$100.00	Dyno bearings and stock metal for chassis tuning
Spokes, Tubes and patches	\$500.00	Spokes to connect the rims to the hubs, tubes inside tyres
Harnesses	\$290.00	Two 5-point racing harnesses to protect driver and meet rules
Tile Cutter	\$100.00	Tool needed to cut the chassis bases to the proper shape
Layup supplies, mounts, chain guards and misc	\$900.00	Spatulas, mould releases, mixing supplies, foam moulds, vacuum bagging supplies. Mounts for harness, fire extinguishers, brakes, chains.
Chassis Total	\$11,665.00	
ELECTRICAL		
Oscilloscope	\$500.00	Troubleshooting circuits, especially at competition
Components and LEDs	\$150.00	Circuit making parts: resistors, caps, transistors. LED for headlights
Raspberry Pi/Other	\$100.00	For GPS driving line tracking and car info system
Hysteresis dyno brakes	\$700.00	To develop a new dyno - full sponsorship in progress
Electrical Total	\$1,450.00	
ENGINE		
Honda - Both Vehicles		

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

New engine	\$650.00	One tuning engine remains from crash, second required for competition
Engine sensors and equipment	\$750.00	Fuel injectors, VR sensors, timing pulley
Jackshaft and drive train	\$400.00	Included as a part of Capstone budget of \$1000
Throttle body	\$600.00	Air intake and throttle control including engine block modifications
Engine Mount	\$120.00	Waterjet aluminum plate with vibration isolation mounts
Starter motor and components	\$525.00	Electric starter motor, high reliability, and chain with guard
Exhausts	\$120.00	Metal tubing
Air System	\$225.00	Hose and pressure vessel to pressurize fuel lines
Fuel bottles and hose	\$340.00	Shell Eco Marathon specific, hose to connect fuel bottle to injector
Batteries and charger	\$400.00	3 to power all electronics on vehicle
Megasquirt ECU	\$720.00	Recently discovered one engine computer doesn't work after crash
Briggs Engine Development		
Engine and Clutch	\$760.00	Full engine sponsorship in progress, \$60 clutch separate
Engine sensors and equipment	\$290.00	Fuel injectors, TPS, timing pulley system
Throttle body materials	\$50.00	Air intake and throttle control, no modification to engine
Starter motor	\$170.00	Electric starter motor for testing only and chain guards for safety
Air system	\$75.00	Hose and pressure vessel to pressurize fuel lines
Exhaust hardware	\$100.00	Metal Tubing
Dyno		
Exhaust parts	\$100.00	Metal tubing
Fuel metering parts	\$50.00	Regulators and other components
Improvements	\$200.00	Mechanical upgrades or repairs from crate damage
Engine Total	\$6,645.00	
ADMIN		
Travel		
Flights (\$600/person x 16)	\$9,600.00	Vancouver to Detroit (Apr 9 - Apr 12)
Luggage	\$90.00	Pack engine in suitcase to allow tuning once cars shipped
Hotels	\$2,000.00	\$250/room x 2 rooms x 4 nights. Based on actual cost incurred last year
Shuttle (2 shuttles)	\$500.00	Airport to competition. Estimated from actual cost incurred last year
Crate shipping to Detroit	\$6,500.00	Based on cost incurred last year, same company, similar distance
Crate material	\$1,000.00	10'x5'x8' wooden crate. Requires full rebuild due to crash
Driver Equipment		
Motorsport Helmet	\$100.00	Crack recently discovered in one drivers helmet after crash (can't reuse)
Fire Suit and dry cleaning	\$190.00	One fire suit did not return from crash, other required dry cleaning
PR		
Posters and trifolds	\$100.00	Promotional posters and booth materials
Event Travel	\$150.00	Travel with a shell or material to conferences
Admin Total	\$20,230.00	
TOOLS		
Safety Equipment	\$350.00	Replacement tools due to crate accident
Replacement Tools	\$2,170.00	Benchtop drill press, belt sander, circular saw, measurement and hand tools, drill bits, hand drills, clamps, toolboxes
Tool Total	\$2,520	
Contingency	\$3,406.00	10% contingency on all technical sections (Aero, Chassis, Electrical and Engine). Unexpected customs, taxes, shipping, USD, etc. \$800.00 in V1
Total Expenses	\$60,216.00	

For Use by PAF Reviewer Only:

PAF Student Teams Application for Funding, 2012/2013

Overall Score: _____

Recommend funding? Yes No

\$ Amount: _____

C6: Lost Receipt Form



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Applied Science
Office of the Dean
5000 - 2332 Main Mall
Vancouver, BC Canada V6T 1Z4

Phone 604 822 6413
Fax 604 822 7006
www.rptc.vic.ca

MISSING RECEIPT FORM

TO: APSC Finance Dean's Office FROM:

RE: Missing/Lost Original Receipt(s) DATE:

I hereby certify that the following original receipt(s) have been lost or misplaced and billable to Project Grant listed below:

# (Correspond to Claim Form)	Date	Description	Amount	Speedchart/PG

These expenses have not and will not be claimed from any other source.

PAYEE / CLAIMANT SIGNATURE **PRINT NAME** **DATE**

SUPERVISOR SIGNATURE (one admin level higher than payee)	PRINT NAME	DATE
---	------------	------

GRANT HOLDER SIGNATURE _____ **PRINT NAME** _____ **DATE** _____
(if different from supervisor)

Notes

- 1) For Research Grants, please specify if there were any purchased alcohol included in the meals expense.
2) The missing receipt form must be printed on "UBC" letterhead.**

LAST UPDATED JUNE 12, 2015

Appendix D: Safety Document Examples

D1: Safety Plan Template

UBC Engineering Design Teams Safety Plan			
Event/Task Description:			
Date:		Location (to/from):	
Team Leadership and Safety Present			
Name	Role / Qualification	Cell Phone	Email
Detailed Description of the Event/Task (expand as needed)			
Hazard Assessment and Prevention (expand as needed)			
Potential Hazard and/or Safety Concern	Solution		
	•		
	•		
	•		
	•		

D2: Safety Audit (Minimum Requirement)

Example of Safety Audit Minimum Standard

Submitted by: (Name)

(Team)

Date: (Date)

Information

General Information

- Project Title:
- Workspace Location:
- Sponsoring Faculty Member and Contract:
- Website

Team Leader Information

- Names, contact information, student number, etc.
- All leaders if multiple exist, or leader and secondary contact if only one leader

Team Safety Officer Information

- Name, contact information, student number, etc.

General Safety Practices

- Include bullets or paragraphs describing the general approach to safety, general safety procedures, general guidelines that are followed
- Describe how incidents are documented, investigated, and how resulting recommendations will be implemented

Safety Training Standards

- Describe the minimum safety training standards members of the team must meet, how the training is conducted, and how you track who has done what / who is able to be in your space
- If multiple tiers of responsibility and corresponding safety training are present, describe each
- If specific tasks or equipment can only be done by members with certain training, describe the additional training and indicate how you track who can do what

Supervision

- Describe the supervision requirements for your space
- Describe how supervision requirements are enforced

Hazard Assessment

- Determine what hazards are present in your workspace. Describe the methodology used for identifying each hazard.
- For each hazard, clearly describe the following:
 - Job Location
 - Analyst
 - Date
 - Task Description
 - Hazard Description
 - Hazard Control
 - Hazard Monitoring
- Identify as many hazards as exist

Incomplete reports may be rejected, with a requirement to re-write the report within two weeks.

Reports rejected a second time may lead to temporary loss of space.

D3: General Work Area Inspection Checklist



a place of mind

Inspection Checklist

Date of Issue: 11.12.16

Area(s) Inspected: _____ Date of Inspection: _____

Inspected by: _____

Instructions:

1. Complete inspection on a regular basis. Edit this checklist to suit your specific location.
2. Inspect each item on the checklist and mark as satisfactory (✓) or unsatisfactory (✗).
3. For unsatisfactory items, describe the deficiency and location in the space provided, and complete the details on the Hazard Record (page 2).
4. Take all necessary actions or make necessary recommendations to correct/control the deficiencies.
5. Forward copies to the local Safety Committee and/or management.

	Item	✓ or ✗	Deficiency and Location
1	Aisles, hallways, doorways and exits: Unobstructed, free of slip/trip/fall hazards.		
2	Floors and carpets: Free of tripping hazards (holes, curled edges) and excessive wear.		
3	Housekeeping: Area is clean and tidy. Falling hazards removed (eg earthquake)		
4	Lighting, Temperature and Ventilation: Adequate.		
5	Emergency Exits: Unobstructed, illuminated signs.		
6	Emergency Lighting: Present and in working order.		
7	First Aid and Emergency Procedures: FA kit adequately stocked, logbook present, current information clearly posted, workers are aware of procedures.		
8	Fire Extinguishers: Accessible, signage present, in good condition, charged and inspected within last year.		
9	Equipment and Tools: Functioning, in good condition, safeguards in place.		
10	Work Processes: Materials-handling and ergonomic factors taken into consideration, written work procedures exist and are followed.		
11	Observing Workers: Following safe work procedures and wearing PPE. Worker concerns?		
12	Office Ergonomics: Consider chair, keyboard, mouse, screen and body posture.		
13	Other:		



a place of mind

Inspection Checklist

Date of Issue:

11.12.16

HAZARD RECORD

Item #	Corrective Action(s)	Responsible Person(s)	Date for Completion	Follow-up

D4: Safe Work Procedure Form



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

SAFE WORK PROCEDURE	Insert Reference Code: e.g. UBC-RMS- OHS-SWP14-001
Insert Name of Department, Faculty and or Building	Effective date: Date created Review date: Date reviewed Supersedes: Previous version

[Title]

1. SCOPE

Brief description of WHO the document applies to, WHAT it applies to, and WHEN it applies

2. PURPOSE

Brief description of WHY the document is necessary

3. BACKGROUND

Provide relevant background history or other information that impacts the above two sections

4. RESPONSIBILITY

Provide and brief description of WHAT the specific responsibilities are for all the different people involved in the procedure. E.g. Supervisor, student, technician, safety representative.

5. REFERENCES AND DEFINITIONS

Provide any references or definitions that will help clarify the subsequent sections. List of acronyms may also be included here.

6. TRAINING REQUIRED

List all documented training necessary to perform this procedure

7. MATERIALS/EQUIPMENT

List any equipment and materials that are necessary to carry out the task

8. HAZARDS

Hazardous equipment, conditions or materials are listed here



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

- | | | |
|---|---|---|
| • | • | • |
|---|---|---|

9. CONTROLS (for above listed hazards)

Provide a list engineering controls and personal protective equipment (PPE) necessary to ensure the procedure is done safely

- | | |
|---|---|
| • | • |
| • | • |

10. PRE PROCEDURE SET-UP

Describe what preparation is needed for this procedure to take place

11. PROCEDURE

Methodology is detailed in a clear step by step process

12. POST PROCEDURE/TAKE DOWN

Procedure is complete, method of disposal and expectation of general housekeeping is detailed

13. EMERGENCY PROCEDURES

Reference First-aid and emergency procedure documents (e.g. Building Emergency Response Plan)

14. OTHER IMPORTANT INFORMATION

Provide any other information necessary that will help to protect staff against injury and/or damage of property.

15. REVIEW AND RETENTION

This SOP is reviewed annually or whenever deemed necessary by the responsible departmental representative in Risk Management Services.

16. DOCUMENT APPROVAL SIGNATURES**Initial Creation Date:****History:****Revised By:**

	Creator	Management	Unit Head
Name	[name]	[name]	[name]
Date			
Name			
Date			

D5: SailBots Safety Audit Example

Specific Hazard Assessment

Job Location: Rusty Hut	Analyst:	Date: 09/28/2014
Task Description:	Working within the Rusty Hut	
Hazard Description:	Researchers are working on projects. The wind tunnel may be in operation. Other student teams may have hazards in their workspace. There are tripping hazards, large unstable objects, and a number of old projects hanging from the ceiling that could be hazardous.	
Hazard Control:	Members must notify the supervisor when entering the Rusty Hut. Proper PPE must be worn. The Safety Checklist, Safety Orientation, and Safety Quiz must be completed before working in the Rusty Hut.	

Job Location: Rusty Hut	Analyst:	Date: 09/28/2014
Task Description:	Laying out carbon/fiberglass and using chemicals in order to bond material.	
Hazard Description:	Catalysts, resins, epoxies, cleaners and other chemicals are being used and fumes or excess have the potential of coming into contact with individuals.	
Hazard Control:	Work is signed-off. Task-specific training must be completed, required PPE must be worn and surrounding group members are to be notified and use PPE if in close vicinity. Chemicals are to be handled and disposed of as per MSDS guidelines.	

Job Location: Rusty Hut	Analyst:	Date: 09/28/2014
Task Description:	Sanding	
Hazard Description:	Fiberglass/carbon/wood is being sanded and aerated particles and can come in contact with individuals	
Hazard Control:	Work is signed-off. Task-specific training must be completed, required PPE must be worn and surrounding group members are to be notified and use PPE if in close vicinity. Note that the face mask must be properly fitted and sanitized.	

Job Location: Rusty Hut	Analyst:	Date: 09/28/2014
-------------------------	----------	------------------

Job Location: Rusty Hut	Analyst:	Date: 09/28/2014
Task Description:	Cutting tools	
Hazard Description:	<p>Many types and sizes of cutters are used for cutting selected metal products made from iron, steel, or softer, non-ferrous materials (e.g., copper, brass, aluminum). Cutters are designed to cut materials of different kinds of products such as wires, cables (electrical, coax, multi-strand), wire ropes, fencing, bolts, rods, pre-stressed concrete wires, and strapping. There is a possibility for hand, eye, ear, and extremity injury while working with cutting tools as they or material being worked on could move suddenly or debris could come into contact with individuals.</p>	

Hazard Control:	<ul style="list-style-type: none"> ■ Wear safety glasses or goggles, or a faceshield and protective gloves when using cutters. ■ Choose the proper cutter for the job. Cutters are designed for a specific type, hardness, and size of material. ■ Cut materials straight across - keep the material being cut at right angles to the cutting edges of jaws. ■ Prevent injury from flying metal by wrapping a burlap bag, cloth or rag around the cutting jaws. Metal can fly when cut. The harder the metal, the farther it will fly. ■ Warn those in the area to take precautionary measures to avoid possible injury from flying metal pieces. ■ Keep cutting tools in good repair. ■ Adjust and lubricate cutter and moving parts daily if heavily used. ■ Sharpen jaws according to manufacturers' instructions. 
	<p>What should I avoid doing?</p> <ul style="list-style-type: none"> ■ Do not use a cutting tool until you are trained in its proper and safe use. ■ Do not use cushion grip handles for jobs requiring insulated handles. Cushion grip handles can conduct electricity and do not insulate.

D6: SailBots Safety Notes

Enclosed:

General Information
General Safety Practices
Incident Report Form
Specific Hazard Assessment

General Information

Workspace Location

Civil and Mechanical Engineering Laboratories (Rusty Hut)
2275 East Mall
Vancouver, B.C., Canada
V6T 1Z4

Kaiser 1180
Fred Kaiser Building
2332 Main Mall
Vancouver, B.C., Canada
V6T 1Z4

· **Safety Officer and Contact**

· **Emergency Contacts**

· **Sponsoring Faculty Member and Contact**

Jon Mikkelsen
mikk@mech.ubc.ca
604-822-2709

General Safety Practices

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 a sample of safety measures taken." We have already done this for the past four worksessions since the Engineering Design Team Conference.

One of our first year students wrote on September 24, 2014:

- Dave gave a safety and training lesson on the proper usage of the circular saw.
- Members who weren't trained or didn't feel comfortable didn't utilise power tools.
- Tool training by Dave for new members.
- Kept adequate space between each group of people doing something.
- Used glasses with side shields in preference to glasses without them.
- Ear plugs were worn around the circular saw.

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.

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 can always see the safety measures for chemicals before obtaining them. We put a second copy of the spreadsheet in our work space for convenient reference while using the chemicals.

Incident report forms are also in the team MSDS binder which is on the same shelf with all the PPE. Any incident/accident/near-miss, even minor ones such as a paper cut, must be reported within one business day to the safety officer and MECH office.

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.

The incident report form is included in the following two pages.

Safety Training Standards

All members are required to complete the Department of Mechanical Engineering Lab Safety and Orientation Checklist and pass the Introduction to Laboratory Safety Course ("General Training") before being allowed to come to worksessions. We keep track of general safety training completion of all team members in our team organizational chart spreadsheet on Google Drive. Team members sign up for worksessions on our Google Drive, and cannot sign up for worksessions until they have completed the general safety training. The team safety officer is the only one allowed to train other team members in the general safety training.

The health and safety officer is fully trained and certified in Standard and Emergency First Aid and CPR-C.

Additionally, task-specific training takes place at the start of every work session, or when someone arrives mid-session with prior notice that they will arrive at this designated time. Task-specific training is conducted by one of the Mechanical Co-Leads or the Graduate student in Naval Architecture and Marine Engineering. We keep track of who has completed task-specific training by a printed spreadsheet with everyone's names on the door to the team cabinet containing the task-specific tools, which can only be signed by one of the Mechanical Co-Leads or the Graduate student.

New members are reminded and encouraged to openly and repeatedly ask when they are unsure of how to do something.

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.

The Mechanical Co-Leads, the Graduate student, and the Safety Officer are the only mechanical team members who know the key code to access the team tools, so it is not possible for individuals to use the team space without them. The only others who know the key code are the Co-Captains, the Electrical Lead, and the Software Lead.

GENERAL SAFETY POINTS

- If in doubt, DON'T DO IT, ask for help.
- If you think pieces of equipment or tools are not safe, do not use them. Contact the Safety Officer.
- If a piece of equipment or tool needs repair, inform the Safety Officer and leave a note on the tool.
- Do not use dull or poorly sharpened drills. Inform the Safety Officer and it will be serviced.
- Remove rings and watches when using power tools.
- Remove sharp edges with a file as soon as possible.
- Always securely clamp your work piece when drilling, whether using a press or not.
- Tie back long hair and loose clothing when using power tools.
- Always wear safety glasses when you are in the work area, even if someone else is using the

tools.

- Know where the first aid kits are located.
- Know where to get first aid treatment. If someone needs assistance, campus phone 2-4444 or 911
- Report ALL accidents. You will not get in trouble.
- Report even minor incidents. WorkSafe BC implores that individuals should not self-assess, diagnose, and treat themselves.
- Report near-misses. This allows procedures to be improved before a potential incident may occur.
- Sweep up cuttings and do not blow them off with an air hose.
- Keep your workspace clean including benches and floors.
- No open toed shoes allowed in labs.
- No food allowed in labs.

Some basic tips when using hand tools

What should I know about using hand tools?

- Select the right tool for the job. Substitutes increase the chance of having an accident.
- Use tools designed to allow wrist to stay straight. Avoid using hand tools with your wrist bent.
- Ensure that team members are properly trained in the safe use of hand tools.
- Use good quality tools.
- Keep tools in good condition at all times.
- Inspect tools for defects before use. Replace or repair defective tools.
- Keep cutting tools sharp and cover sharp edges with suitable covering to protect the tool and to prevent injuries from unintended contact.
- Replace cracked, splintered, or broken handles on files, hammers, screwdrivers, or sledges.
- Ensure that the handles of tools like hammers fit tightly into the head of the tool.
- Replace worn jaws on wrenches, pipe tools and pliers.
- Redress burred or mushroomed heads of striking tools.
- Pull on a wrench or pliers. Never push unless you hold the tool with your palm open.
- Point sharp tools (e.g., saws, chisels, knives) laying on benches away from aisles and handles should not extend over the edge of the bench top.
- Maintain tools carefully. Keep them clean and dry, and store them properly after each use.
- Carry tools in a sturdy toolbox to and from the worksite.
- Wear safety glasses or goggles and well-fitting gloves appropriate for the hazards to which you may be exposed when doing various tasks.
- Keep the work environment clean and tidy to avoid clutter, which may cause accidents.
- Use a heavy belt or apron and hang tools at your sides, not behind your back.

What should I avoid when using hand tools?

- Do not use tools for jobs they are not intended to do. For example, do not use a slot screwdriver as a chisel, pry bar, wedge or punch, nor wrenches as hammers.
- Do not apply excessive force or pressure on tools
- Do not cut towards yourself when using cutting tools.
- Do not hold the stock in the palm of your hand when using a cutting tool or a screwdriver.
- Do not wear bulky gloves to operate hand tools.
- Do not throw tools. Hand them, handle first, directly to other workers.

- Do not carry tools in a way that interferes with using both hands on a ladder. If working on a ladder or scaffold, tools should be raised and lowered using a bucket and hand line.
- Do not carry a sharp tool in your pocket.

Some basic tips when using powered hand tools

When and how should you inspect powered hand tools?

- Inspect tools for any damage prior to each use.
- Check the handle and body casing of the tool for cracks or other damage.
- If the tool has auxiliary or double handles, check to see that they installed securely.
- Inspect cords for defects: check the power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
- Check for damaged switches and ones with faulty trigger locks.
- Inspect the plug for cracks and for missing, loose or faulty prongs.

What should you do if you find a tool defective?

- If a tool is defective, remove it from service, and tag it clearly "Out of service for repair".
- Replace damaged equipment immediately - do not use defective tools "temporarily".
- Have tools repaired by a qualified person - do not attempt field repairs.

What should you do before using powered hand tools?

- Ensure that you have been properly trained to use the tool safely. Read the operator's manual before using the tool and operate the tool according to the manufacturer's instructions. Use only tested and approved tools.
- Ensure that the power tool has the correct guard, shield or other attachment that the manufacturer recommends.
- Prevent shocks. Ensure that the tools are properly grounded using a three-prong plug, are double-insulated (and are labelled as such), or are powered by a low-voltage isolation transformer: this will protect users from an electrical shock.
- Check electric tools to ensure that a tool with a 3-prong plug has an approved 3-wire cord and is grounded. The three-prong plug should be plugged in a properly grounded 3-pole outlet. If an adapter must be used to accommodate a two-hole receptacle, the adapter wire must be attached to a known, functioning ground. NEVER remove the third, grounding prong from a plug.



- Replace open front plugs with dead front plugs. Dead front plugs are sealed and present less danger of shock or short circuit.



- Have a qualified electrician install a polarized outlet if the polarized, two-prong plug of a double-insulated tool does not fit in a two-hole receptacle. Double insulated tools use plugs having one prong that is visibly wider than the other.

- Test all tools for effective grounding with a continuity tester or a ground fault circuit interrupter (GFCI) before use.
- Use only the kind of battery that the tool manufacturer specifies for the battery-powered tool that you are using.
- Recharge a battery-powered tool only with a charger that is specifically intended for the battery in that tool.
- Remove the battery from the tool or ensure that the tool is switched off or locked off before changing accessories, making adjustments, or storing the tool.
- Store a battery pack safely so that no metal parts, nails, screws, wrenches and so on can come in contact with the battery terminals; this could result in shorting the battery and possibly cause sparks, fires or burns.

What should you do while using powered hand tools?

- Wear or use personal protective equipment (PPE) or clothing that is appropriate for the work you are doing; this may include items such as safety glasses or goggles, hearing protection, dust mask, gloves, safety boots or shoes, or rubber boots.
- Switch off the tools before connecting them to a power supply.
- If a power cord feels more than comfortably warm or if a tool is sparking, have it checked by an electrician or other qualified person.
- Disconnect the power supply before making adjustments or changing accessories.
- Remove any wrenches and adjusting tools before turning on a tool.
- Inspect the cord for fraying or damage before each use. Tag defective tools clearly with an "Out of service" tag and replace immediately with a tool in good running order.
- During use, keep power cords clear of tools and the path that the tool will take.
- Use clamps, a vice or other devices to hold and support the piece being worked on, when practical to do so. This will allow you to use both hands for better control of the tool and will help prevent injuries if a tool jams or binds in a work piece.
- Use only approved extension cords that have the proper wire size (gauge) for the length of cord and power requirements of the electric tool that you are using. This will prevent the cord from overheating.
- For outdoor work, use outdoor extension cords marked "W-A" or "W".
- Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- Eliminate octopus connections: if more than one receptacle plug is needed, use a power bar or power distribution strip that has an integral power cord and a built-in overcurrent protection.
- Pull the plug, not the cord when unplugging a tool. Pulling the cord causes wear and may adversely affect the wiring to the plug and cause electrical shock to the operator.
- Follow good housekeeping procedures - keep the work area free of clutter and debris that could be tripping or slipping hazards.
- Keep power cords away from heat, water, oil, sharp edges and moving parts. They can damage the insulation and cause a shock.
- Ensure that cutting tools, drill bits, etc. are kept sharp, clean and well maintained.
- Store tools in a dry, secure location when they are not being used.

What should you avoid when using powered tools?

- Do not wear gloves, loose clothing or jewelry while using revolving power tools. Tie back long hair or wear appropriate hair protection to prevent hair from getting caught in moving parts of equipment.
- Do not use a tool unless you have been trained to use it safely and know its limitations and hazards.
- Avoid accidental starting by ensuring the tool is turned off before you plug it in. Also do not walk around with a plugged-in tool with your finger touching the switch.

- Do not bypass the ON/OFF switch and operate the tools by connecting and disconnecting the power cord.
- Do not disconnect the power supply of the tool by pulling or jerking the cord from the outlet.
- Do not leave a running tool unattended. Do not leave it until it has been turned off, has stopped running completely, and has been unplugged.
- Do not use electric tools in wet conditions or damp locations unless tool is connected to a ground fault circuit interrupter (GFCI).
- Do not expose electric power tools to rain or wet conditions; wet tools increase the likelihood of electric shock.
- Avoid body contact with grounded surfaces like refrigerators, pipes and radiators when using electric powered tools; this will reduce the likelihood of shock if the operator's body is grounded.
- Do not plug several power cords into one outlet by using single-to-multiple outlet adapters or converters ("cube taps").
- Do not use light duty power cords.
- Stop using an electric power tool if you feel a tingle in your fingers. This is a warning that the tool is faulty and needs repair.
- Do not connect or splice extension cords together to make a longer connection: the resulting extension cord may not be able to provide sufficient current or power safely.
- Do not carry electrical tools by the power cord.
- Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.



- Never break off the third prong on a plug: replace broken 3-prong plugs and make sure the third prong is properly grounded.
- Never use extension cords as permanent wiring: use extension cords only as a temporary power supply to an area that does not have a power outlet.
- Do not walk on or allow vehicles or other moving equipment to pass over unprotected power cords. Cords should be put in conduits or protected by placing planks on each side of them.
- Do not brush away sawdust, shavings or turnings while the tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- Do not operate tools in an area containing explosive vapours or gases.
- Do not clean tools with flammable or toxic solvents.
- Do not surprise or touch anyone who is operating a tool. Startling a tool operator could end up causing an accident or injury.

Some basic tips when using woodworking machines

What should you do before using woodworking machines?

Woodworking tools can be dangerous if not used properly.

- Only use woodworking machines that you have been trained to use properly and safely.
- Read the owner's manual carefully.
- Make sure you understand instructions before attempting to use any tool or machine. Ask questions if you have any doubts about doing the work safely.

What safety procedures should you follow when using woodworking machines?

- Always wear safety glasses or goggles
- Wear dust masks when required.
- Wear hearing protection that is suitable for the level and frequency of the noise you are exposed to in the woodworking area. If you have trouble hearing someone speak from three feet away, the noise level from the machine is too high. Damage to hearing may occur.
- Use gloves to protect hands from splinters when handling wood but do not wear them near rotating blades and other machinery parts where the gloves can catch.
- Wear protective footwear when required.
- Make sure the guard is in position, is in good working condition, and guards the machine adequately before operating any equipment or machine. Check and adjust all other safety devices.
- Make sure the equipment is properly grounded before use.
- Check that keys and adjusting wrenches are removed from the machine before turning on the power.
- Inspect stock for nails or other materials before cutting, planing, routing or carrying out similar activities.
- Make sure that all machines have start and stop buttons within easy and convenient reach of an operator. Start buttons should be protected so that accidental contact will not start the machine. A collar around the button 3 to 6 mm (1/8 to 1/4 inch) above the button is recommended.
- Ensure that all cutting tools and blades are clean, sharp, and in good working order so that they will cut freely, not forced.
- Turn the power off and unplug the power cord (or lock out the power source) before inspecting, changing, cleaning, adjusting or repairing a blade or a machine. Also turn the power off when discussing the work.
- Use a "push stick" to push material into the cutting area. Jigs are also useful in keeping hands safe during cutting procedures. Keep hands out of the line of the cutting blade.
- Clamp down and secure all work pieces when drilling or milling.
- Use good lighting so that the work piece, cutting blades, and machine controls can be seen clearly. Position or shade lighting sources so they do not shine in the operator's eyes or cause any glare and reflections.
- Ensure that the floor space around the equipment is sufficient to enable you to machine the size of work piece being processed safely without bumping into other workers or equipment.
- Use extension tables or roller supports for large workpieces. Supports should be placed on both sides (infeed and outfeed).
- Woodworking machines should be fitted with efficient and well-maintained local exhaust ventilation systems to remove sawdust or chips that are produced.
- Electric power cords should be above head level or in the floor in such a way that they are not tripping hazards.
- Keep work area free of clutter, clean, well swept, and well lit. Spills should be cleaned up immediately. Floor areas should be level and non-slip. Good housekeeping practices and workplace design will reduce the number of injuries and accidents from slips, trips, and falls.

What should you avoid when working with woodworking machines?

- Do not wear loose clothing, work gloves, neckties, rings, bracelets or other jewellery that can become entangled with moving parts.
- Avoid awkward operations and hand positions where a sudden slip could cause your hand to move into the cutting tool or blade.
- Do not remove sawdust or cuttings from the cutting head by hand while a machine is running. Use a stick or brush when the machine has stopped moving.
- Do not use compressed air to remove sawdust, turnings, etc. from machines or clothing.
- Do not leave machines running unattended (unless they are designed and intended to be

operated while unattended). Do not leave a machine until the power off is turned off and the machine comes to a complete stop.

- Do not try to free a stalled blade before turning the power off.
- Do not distract or startle an operator while he or she is using woodworking equipment.
- Horse play should be prohibited. It can lead to injuries.

~

