Society of Automotive Engineers

1/7/14

Student Services Fee Request for 2013 - 2014 Academic Year

Mechanical Engineering Room 459A, 111 Church St. SE, Minneapolis, MN 55455

Address

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“We acknowledge that the Fees Committee does not award actual dollars, but rather a penny fee that earns dollars based upon student enrollment levels. Any differences between anticipated and actual income resulting from changes in enrollment are the responsibility of the student organization, not of the Fees Committee.”

Kieran McCabe Brandon Henry
Preparer’s Name Co-Preparer’s Name

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Preparer’s Email Co-Preparer’s Email

Is your organization an IRS 501 (c)(3) not-for-profit? Yes X No

If yes, please provide proof of your organization’s 501(c)(3) status.

Since we are a CLP, we get our tax exemption from the University. The form is attached to the email. See http://sua.umn.edu/groups/handbook/clp_vs_rso.php

Funds are being requested for (check all that apply):

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<th>General Operating Support:</th>
<th>$29072.50</th>
<th>Start-Up Costs:</th>
<th>$0</th>
<th>Capital:</th>
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<td>Project / Program Support:</td>
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<td>Technical Assistance:</td>
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<td>Other (List):</td>
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Budget

<table>
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<th>Dollar Amount Requested</th>
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<td>Total Annual Organization Budget</td>
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<td>Total Program Budget (apart from General Operating)</td>
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2013-2014 Student Organization Student Request
University of Minnesota – Twin Cities
Society of Automotive Engineers

Important Note: All Student Services Fee applications will be evaluated using the Guidelines for Decision-Making found on pages 20-21 of the Student Services Fee Handbook. It is critical for your application to address these guidelines in your written application. Please reference/describe how your organization meets particular/applicable guidelines in Section 1, Section 3 and/or Section 5 of the written portion of your application and in your program breakdown included in the SSF budget worksheet.

Section 1: Narrative
Summary and Mission

The University of Minnesota Student Branch of the Society of Automotive Engineers, also known as the Formula SAE team or just SAE team, is a College of Science and Engineering student organization that was established at the University of Minnesota – Twin Cities on November 30th, 1978. Since the late ’90s the Formula SAE team has competed in an engineering design competition hosted by SAE International in which we design, build, test, market, and race an open-wheel, open-cockpit, formula-style racecar. The competition is the culmination of a year-long project where 120 teams from around the world compete at an event held at Michigan International Speedway in the early May.

The team begins each year by going through the information gained from testing the car during the summer to determine which parts on the car need to be redesigned, revised, or can be reused. At this time the team also discusses any major design changes they would like to make on the new car by evaluating the benefits, cost, manufacturability, and time required to complete the project. Once this is completed the team begins the design process.

As designs are completed the testing on these parts is done at the component level, and the system level, sub-system or complete car testing. These test are preformed to validate the design and performance of the part before it is finalized for use on the new car.

As designs become finalized the team begins the transition to the manufacturing and assembly of the car. Since many of the parts are custom they have to be manufactured either by team members in the student shop or with support from our sponsors. As the final parts arrive the car is assembled in preparation for testing before competition.

While the car is being assembled, members on the team are also busy putting together a business presentation that is supposed to be for potential investors. These members have to come up with a business plan and try to estimate the costs and profits that such a business would create. At the same time members are also costing the car itself. We cost every part and process that goes into making the car, from the material used in the frame to the bolts that hold it together to the labor that assembles everything. We then use that cost in the business presentation and use polls to estimate how much potential buyers would be willing to spend on our product.

Once assembled, the car is tested until the team leaves for competition. During testing data is being collected to validate designs and tune the car to improve the performance. This also provides a chance for drivers to practice before driving at competition.

At competition, there are two types of events: static and dynamic. The static events include: cost report, design judging, and marketing presentation. This is where the costing of the car and business presentation come under scrutiny as well as how we designed the car. The dynamic events include: acceleration, skid pad, autocross, endurance, and fuel-economy. Teams compete in all static events but in order to compete in dynamic events the car must pass technical inspection, tilt, sound, and brake test. Even after passing all these tests less than a third of all teams will finish all events due to mechanical failures.
Our mission reflects this trend, “We will design, build, and test a car that: finishes in the top twenty overall, will be testable by mid March, completes and shows improvement in all dynamic events, does not reuse any parts from previous cars.” After looking at previous years’ results: 29th in 2009, 82nd in 2010, 56th in 2011, 61st in 2012, and 30th in 2013 we set a challenging, but attainable goal of finishing in the top twenty. The other statements in our mission truly reflect how valuable testing is; by not disassembling the cars after competition and reusing the parts on the next car, we are able to use the car as a testing platform for the following years.

In addition, the time an average member spends on the team is around 10-15 hours per week. This commitment combined with similar commitments from about 40 other students creates a tight-knit group of people who are all interested in cars and the automotive industry. The team provides all members people they know who are in their classes or have taken their classes before who they can ask for help or advice. It isn’t uncommon for team members to meet up in the team office to study together before big exams or ask someone who has taken a class before to clear up a certain topic. Soon enough every member has a group of 40 other peers they can count on. Even team alumni from 10 years ago still stop by together when they are in town to see how the team is doing and catch up with everyone.

Relationship with other organizations of like mission

The Formula SAE team, like many other competition focused student groups in CSE, has been very active within the College of Science and Engineering to promote STEM (Science, Technology, Engineering, and Mathematics). This has been done by participating in events such as: freshman welcome week, mechanical engineering alumni and national merit semi-finalist presentations and dinners, homecoming parade, math and science family fun fair, CSE student organization fair, on campus 5k runs (Freezin’ for a Reason 5k collaborated with Science and Engineering Student Board), Formula car unveiling, CSE/Engineers week events and the state fair to name a few.

Not only are we active in both on and off campus events, we also have countless industry connections like many of the other competition based student groups. The benefit to the University from groups like ours is we draw many engineering companies to the University for recruiting purposes; therefore, the Formula SAE team is a link to connect engineering companies with University of Minnesota students.

Student benefit and involvement within our organization

The Formula SAE team is as close to an industry experience as you can get without actually being in industry. Members are highly encouraged to take advantage of all of the perks our group offers. We stress the importance of efficient Computer Aided Design (CAD); therefore, we offer a copy of a CAD package called SolidWorks to all members for their personal computers. SolidWorks is not only used on our team, but many engineering classes at the University use it as well. Next, we have a variety of books, articles, and programs stored electronically as well as filed for future use by members. Another big benefit that directly comes from joining our group is machining experience; designing a part without machining experience is like trying to read a book without knowing the language. In order to be successful in the engineering industry, it is imperative that you have had experience machining. The team also gives all members experience with marketing, business plans, and cost analysis. Every team member helps in the cost report, which determines how much each part and system on the car costs us to make. In addition, any team member who is interested can also help with putting together a business plan as if the team were a new start-up company looking for investors. Some of the other things the Formula SAE team offers include: driving a high-performance race car, networking with other students and sponsors, opportunities to go to engineering conferences and lectures, and participation in on-campus events through the team.

Even for students not interested in pursuing a career in engineering or business, involvement in our team provides many benefits. Since we assemble and maintain the vehicles ourselves, anyone on the
2013-2014 Student Organization Student Request
University of Minnesota – Twin Cities
Society of Automotive Engineers

Team gains important experience working on real automotive parts that they can then use in their daily lives on their own vehicles. All that is asked of students looking to join the team is a willingness to learn and contribute. We teach all members the needed skills to contribute and anyone interested in anything automotive from any major can earn valuable experience and knowledge.

By highlighting the aforementioned during our recruiting season, we were able to increase our membership from 20 to 44 members. We ask that members commit 15 hours per week to the team on top of school, work, and their social lives. Members spend this time designing, machining, building, and testing components that will go on the car. One of the things the team prides itself on is the fact that this is a team run by the students. There is limited faculty support for the team, which allows the team to be very independent. One other great aspect about the team is that members are able to see their projects to the end; they are asked to be involved in every process. There is no doubt that this is one of the most active and rewarding student groups on campus.

Section 2: Organizational Chart

Section 3: Performance Report

Membership

Due to the nature of the project having an exact member count at all times is extremely difficult. Last year we had 49 students on our emailing list, in 2012 we had 41 students on the emailing list, and this year we have 56 students on the mailing list. However, this is not the best measure as to true contributing members since we rarely had more than 20 students show up for any work times in 2013. This year we had over 65 students attend our informational meetings and were able to retain 44 as dedicated members. We consistently have 30+ members at work nights and have 44 members who paid the team fee for a team polo. Our membership is mainly mechanical and aerospace engineering students with a few miscellaneous majors. We are also going to be presenting to classes in the Carlson School of Management this spring trying to recruit more business-oriented majors. A large part of the competition has to do with costing the car and coming up with a business plan so having these students on the team will help the team at competition and give the students experience that relates to their major.
2013-2014 Student Organization Student Request
University of Minnesota – Twin Cities
Society of Automotive Engineers

Race Attendance

Each year the team members travel to Michigan International Speedway to compete in the largest Formula SAE competition in the world. In the past this has required team members to make arrangements with all their professors to either take final exams early or allow them to be taken at competition. Last year, competition fell the week before exams making the trip even harder since it meant missing some material and review sessions for the exams. However, we were still able to have 17 students attend, up one more student from 2012. This coming year we expect to have closer to 25 students attend since it falls during the last four days of exams and we have more than doubled the team size.

Going to competition is one of the single largest things a team member can do to learn and gain experience. While at competition, there is a decent amount of down time in which team members can go around to other teams and see how 120 other teams approached the same types of problems we faced ourselves. All teams are open to discussion and enjoy talking the pros and cons of all the options available. It allows everyone to see other approaches to problems they never thought about and allows them to explain the reasoning behind their own decisions. It also helps them network with all the big name companies that attend and sponsor the competition.

2013 Event Attendance

Here is a list of events and attendance participated in 2013:

- Car unveil and cookout
  - Held in Lind hall courtyard we provide students and staff an opportunity to ask questions and look at the car. This year there was very little attendance since it snowed.
- Sponsor Drive Day
  - This event is held to allow our sponsors an opportunity to drive the Formula SAE car. This event also allows all members to network with industry professionals. 50 people attended this event.
- CSE Welcome Week
  - All incoming freshman are given a chance to see the car and ask questions about the team. We had an attendance of around 150 freshmen.
- Homecoming Parade
  - The car is driven in the homecoming parade. An estimated 25000 people attend the parade.
- CSE Alumni Breakfast
  - The car is displayed and alumni are given the opportunity to ask questions about the car and the team. Roughly 40 people attended this event.
- 5k Freezin’ for a Reason
  - The car is used as the pace car for this event. There were approximately 100 who ran in the race and an estimated 50 more saw the car on its route.
- Math and Science Family Fun Fair
  - The team hosts a station at the fair every year. We bring actual parts from the car that the kids can pick up and inspect, pictures of the car in all stages of production, and a race simulator they can climb in and try. This year we had 130 kids sign up for the simulator with an estimated 50 more that came in but did not use the simulator. If you
2013-2014 Student Organization Student Request  
University of Minnesota – Twin Cities  
Society of Automotive Engineers  

assume one parent for every two kids in attendance, that brings the estimated attendance to 270 people.

Section 4: Reserve Accounts

We have no reserve accounts

Section 5: Fees Request

The Formula SAE team is requesting $34,733 from student services fees which is an increase from the $19,890 requested last year. We are requesting that student services fees cover half of all programming costs which include room rental and travel. This portion has increased by approximately $1,500 from last year since we have more than doubled our team size and want to make competition available to all members. We are also requesting that student services fees cover the equipment upgrades. The largest of the equipment upgrades is asking for equipment to begin testing on switching to using ethanol fuel. This is a large switch since everything from the fuel system to the intake must be redeveloped. However, a switch to ethanol will not only boost performance of the car but also look great for the team and University. We are also asking for money to begin research into new engines. The team currently uses a four cylinder engine from 2004, but we would like to look into using either a newer version of the same model engine or moving to a more economical one cylinder engine. The other equipment upgrades include a new welder, vacuum pump, impact wrench, cordless drill, GoPro, and computer hard drives. Our current welder is outdated and not fully functional, we could use new wireless tools for use on track, and our computer hard drives have filled up. We could also use a vacuum pump so we are able to do more complex carbon fiber layups and a GoPro for better on-track testing and documentation. We are also asking that Student Service Fees be put towards 25% of the cash cost of the car. Cash cost means what we actually have to spend out of pocket, which is much less than the car actually costs since we have most of our sponsorship come in the form of free parts or machining. The car gives great hands-on experience to University students, attracts industry recruiters to the campus, and is a great way to advertise and promote the University. By helping with the cost we can keep previous cars completely intact (we won’t have to steal parts) and will therefore have more cars to display for University purposes.

This year we were audited for the first time. Our report from the auditors had an overall difference of only $5 from what we had in our records to what they found for our year-end balance. All of our consumables showed no difference except driving shoes which was only a $1 difference. The one area they did find a large difference was between what we had estimated for our 2012-2013 budgets and what it actually was. The main reason for this difference is the volatility in our budget from sponsors and available parts on the car every year. We have a pretty good idea of what our costs will be and if sponsors will carry over to the next year, but unpredicted part failures and sponsors with changing management or profits make it hard to get an exact number. Many parts integral to the team are carried over year to year due to high costs and when an unexpected failure happens to one of these parts we need to switch our budget around to account for that. We also have a few sponsors that come and go depending on how their business is doing along with other factors. In the end, we always make up for what we need in income, it might just come from other sources. Another big difference was that we found an old account with $10,000 in it that nobody knew about from the early 2000’s. We were able to put a majority of that into paying off the team debt from the mid 2000’s. Finally, there was also a $147 difference between what the University disbursed to us and what our ledger has us as receiving. This was mainly because of a difference between the fiscal years and when we received our check.
The Formula SAE team operates at 100% in the summer. Members and students interested in joining the team who are around over the summer plan and execute testing on the car. Data from this testing is then documented and used in the design of the next car. The testing done and the problems faced over the summer lay the groundwork for the next years’ successful operation. We also participate in events listed above, such as: Cars and Coffee and the State Fair. Finally, we lay out a schedule and make goals for the next year. The Formula SAE team is very active over the summer!

Section 6: Description of Impact of a 10 Percent Reduction in Fee Request

A 10% reduction in fees would come out of our operational expenses. Since 10% would be around $3,500, we would have to delay buying a new TIG welder. As I said before, our current TIG welder is not reliable. We can’t count on it being ready when we need it and the welding quality is definitely subpar. If we can’t buy a welder next year, it will affect the timeline of the car. Not being able to count on a welder while trying to assemble the frame could put us weeks behind schedule in no time at all. The frame is the first thing that needs to get done and it is also one of the more involved processes on the car. Time lost on frame assembly leads to less time for every other part and eventually less time available for testing. Since testing is one of the most important aspects in building a top 20 car, the more time that gets taken out of testing, the higher the chance our car won’t perform at its most optimal in competition and that will cost us points and finishing places.