

# Northern Arizona University SAE Baja 2013-2014



SAE NAU CHAPTER 2013-2014

Northern Arizona University



**SOCIETY OF AUTOMOTIVE ENGINEERS AT NORTHERN ARIZONA**  
**DEDICATED TO THE ADVANCEMENT OF ENGINEERING TECHNOLOGIES**

Dear Potential Sponsor,

We are engineering students of Northern Arizona University (NAU), who are members of the Society of Automotive Engineers (SAE), are competing in the 2014 SAE Mini Baja competition. Teams that compete in this event are required to design, build, test and race an off-road vehicle. This vehicle will be designed and built fully by NAU Engineering students. The SAE Mini Baja competitions are held all over the world. These competitions are hosted every year by various universities all around the world to provide a unique environment for students to experience a real life engineering design project. Of all the previous NAU SAE Baja teams the best they have ever done was 27 out of 103 teams. This year we want to break the top 20 as well as win one of the many events at competition.

The object of the Mini Baja competition is to design and build an off-road capable vehicle that is evaluated on a variety of criteria that effectively replicated the real world marketability of the vehicle. Competing university vehicles are independently judged in several events including: maneuverability, durability, performance through speed competitions, rock crawls, hill climbs and endurance events. The main design stipulations of this event are to design a 4 wheel, single seat, off-road capable vehicle that is intended to be sold for non-professional use. The design needs to be safe, reliable, easy to transport and be able to operate in any environment and weather. The NAU SAE Baja team will be traveling to University of Texas at El Paso to compete against 100 other universities.

NAU is constrained in the amount of support it can provide to a student professional organization; this situation means we can only build the vehicle and attend the event with generous support from external sponsors. Furthermore in this packet you find our goals, and expected cost for this competition. We look forward to hearing from you and establishing a partnership for the year to come.

Thanks you for your time,

Chris Bennett  
Team Captain NAU SAE Baja  
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NAU-CEFNS  
P.O. Box 15600  
Flagstaff AZ, 86011

Dr. John Tester  
NAU SAE Faculty Advisor  
[John.Tester@nau.edu](mailto:John.Tester@nau.edu)  
Ph: 928-523-0032



## WHO IS SAE BAJA AT NAU?

The Society of Automotive Engineers here at Northern Arizona University is a student organization focused on the applications of engineering principles on automotive technologies and design. For the past 3 years, SAE at NAU focused on efficiency vehicle design competitions. This year marks a return of the SAE Mini Baja vehicle event where we can demonstrate the ability to apply those engineering principles, leadership techniques, organization and design experience in competition. Past design competitions that SAE at NAU competed in include, SAE Mini Baja, Aero Design, Shell Eco-Marathon and Urban Concept Vehicle.



## WHAT IS SAE BAJA UTEP?

The SAE mini Baja Competition at the University of Texas, El Paso, is a combination of five events. These dynamic events consist of; acceleration, hill climb or traction, land maneuverability, specialty and endurance. Beginning with the acceleration test, this event will test the vehicles ability to complete a flat course varying from pavement to loose dirt in as short period of time as possible. The next competition can be administered in the form of a hill climb or, if the landscape doesn't support it, a traction event. This would include an excess load instead of the vertical climb of a hill. The staff will be determining the winner of this competition by either the lowest time for completion or the largest distance traveled if no one is able to complete the full length of the course. Following the hill climb, there will be an examination of the maneuverability of the vehicle. This will consist of a variety of objects being placed in a set course and the analysis of the procedure to overcome these objects or lack thereof. These objects are typically a combination of tight turns, pylon maneuvers, ruts and bumps, drop-offs, sand, rocks, gullies, logs, and inclines. Then, the specialty event is near one hundred percent unique to UTEP's competition. This event is seen in a rock crawl event or maybe a mug bog, but is almost always a



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test of the suspension in some form or fashion. Finally, the endurance event which is worth more than all other tasks. This is administered through either a four hour long race or until at least one car has traveled a predetermined distance. These endurance events are obviously over an undetermined rough terrain that will test the vehicle's true limits and ruggedness.

### NAU SAE BAJA 2013-2014 GOALS

The last time the Northern Arizona University SAE chapter competed in the Mini Baja competition was in 2010. This year there are 15 seniors working on the SAE Baja project. The collective of students involved possess a great deal of talent in both design and building stages of the Baja's development. Therefore, our objective this year is to design, build, and race our Mini Baja vehicle in the El Paso competition in May 2014 and finish as one of the top 20 teams.

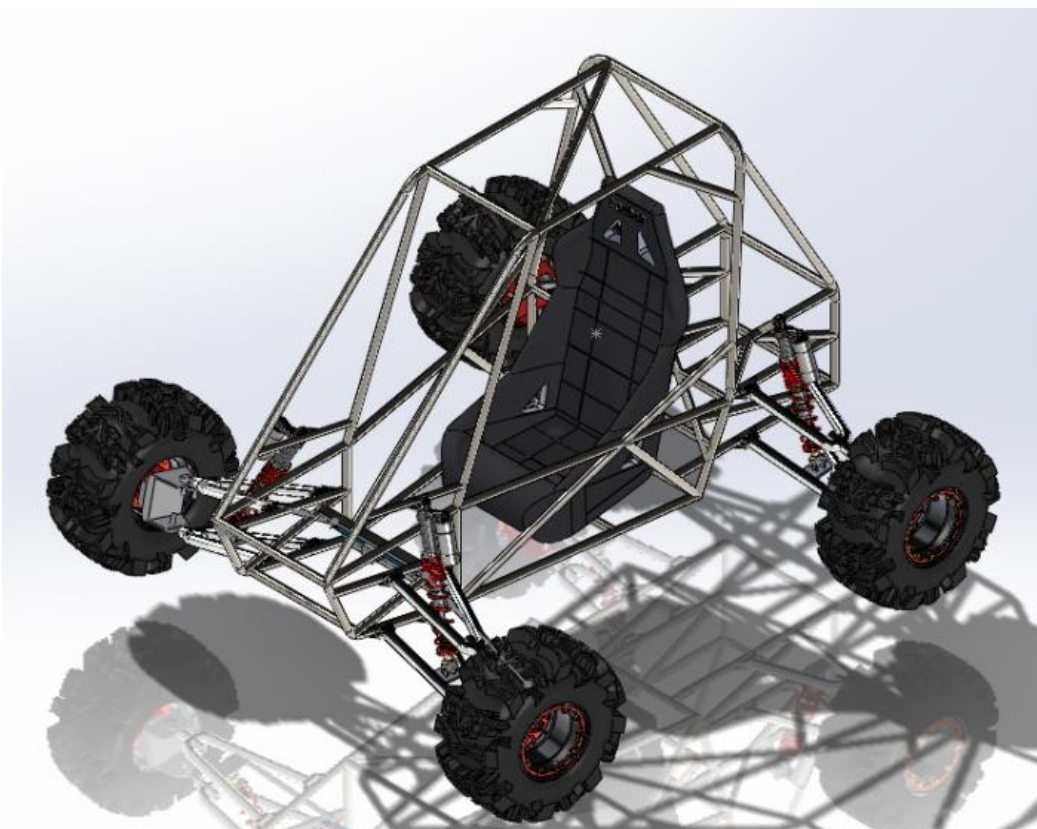


Figure 1 Potential Baja Design





## SAE NAU BAJA TEAM EXPENSES FOR 2013-2014 YEAR

Table 1 Team Expenses

<b>VEHICLE DESIGN AND FABRICATION</b>		
<b>Area</b>	<b>Description</b>	<b>Costs</b>
Frame/ Chassis	Tubing for the Frame	\$700.00
Engine	Shipping and Handling for Engine from Brigg and Stratton	\$200.00
Drive-Train	Transmission, differential, axels, hubs, skid plates etc.	\$2,000.00
Suspension	Shocks, A-arms, Steering, tires wheels	\$3,000.00
Electronics	Lights, tail lights, electric starter for motor, Driver Display	\$600.00
Other	Body panels, paint, carbon fiber, fasteners, bearings, chain, etc.	\$1,000.00
Replacement Parts	All parts not mentioned above/ and spare parts	\$1,000.00
Safety	Racing seat, helmet, 5-point harness etc.	\$600.00
<b>LOGISTICS</b>		
Insurance	Vehicle Insurance in case of accident or theft	\$250.00
Testing	Vehicle testing, track time, fuel, etc.	\$600.00
<b>COMPETITION</b>		
El Paso Texas	Trip to competition, transportation of the vehicle	\$3,600.00
Registration	Entry fee for competition	\$1,100.00
<b>MARKETING/ UNEXPECTED</b>		
	Banners, T-Shirts, etc. and all unplanned costs	\$1000.00
<b>TOTAL PROJECTED BUDGET: \$15,650.00</b>		



## SPONSORSHIP OPPORTUNITIES

The Society of Automotive Engineers is a non-profit organization that is funded by membership dues and industrial sponsorships. Likewise, the Northern Arizona University chapter of SAE relies entirely on donations, sponsorships, and student membership dues. Any support for individual SAE projects or the NAU SAE chapter as a whole are greatly appreciated and put to good use. Donors that contribute to a specific project will have their logos displayed on the final vehicle and on the team banners and T-shirts. SAE competitions are attended by dozens of industry leading companies, creating a great opportunity to promote our sponsors. All donations to SAE are also completely tax exempt. We offer a variety of different sponsor benefit packages as shown below.

All sponsors will have their company logo displayed on the vehicle, the team banners and shirts, and the NAU SAE website. This is a great opportunity to get your company name displayed for many industry leading companies to see. A list of last year's sponsors can be found at the end of this packet.

## LEVELS OF SPONSORSHIP

SPONSOR LEVEL	SPONSOR AMOUNT	ASSOCIATED SPONSOR BENEFITS
Platinum	\$2,500 +	<ul style="list-style-type: none"> <li>• Plaque for display in business</li> <li>• X-Large Company Logo on Vehicle</li> <li>• Opportunity to display vehicle at company event</li> <li>• Opportunity to test drive once finished</li> <li>• Company Logo on Team Shirts</li> </ul>
Gold	\$1,500-\$2,499	<ul style="list-style-type: none"> <li>• Plaque for display in business</li> <li>• Large Company Logo on Vehicle</li> <li>• Company Logo on Team Shirts</li> </ul>
Silver	\$500-\$1,499	<ul style="list-style-type: none"> <li>• Certificate of appreciation</li> <li>• Medium Company Logo on Vehicle</li> <li>• Company Logo on Team Shirts</li> </ul>
Bronze	Under \$500	<ul style="list-style-type: none"> <li>• Certificate of appreciation</li> <li>• Small Company Logo on Vehicle</li> <li>• Company Logo on Team Shirts</li> </ul>



## HOW TO CONTACT SAE NAU BAJA TEAM FOR SPONSORSHIP/ DONATIONS

If your company is interested in making any sort of donation, whether it is monetary value or parts to NAU SAE Baja please feel free to contact one of the members listed below. Once donations have been received, companies will receive updates on the progress of the Baja Vehicle. All donations received will go through the NAU SAE chapter and are tax exempt. NAU SAE will provide a tax id number to all donating companies.

## NAU SAE BAJA CONTACTS:

### NAU SAE Chapter Advisor:

Dr. John Tester  
 Email: [John.Tester@nau.edu](mailto:John.Tester@nau.edu)  
 Ph: 928-523-0032

### NAU SAE Baja Team Captain:

Chris Bennett  
 Email: [clb248@nau.edu](mailto:clb248@nau.edu)  
 Phone: 928-853-7813

### NAU SAE Baja Frame Design:

Eric Lockwood  
 Chris Bennett  
 Anthony McClinton  
 Robin McRee  
 Colin Pemberton

### NAU SAE Baja Suspension Design:

Benjamin Bastidos  
 Victor Cabilan  
 Jeramie Goodwin  
 Bill Mitchell  
 Eli Wexler

### NAU SAE Baja Drive-Train:

Abdulrahman Almuflih  
 Caizhi Ming  
 Rouheng Pan  
 Andrew Perryman  
 Zan Zhu



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## PREVIOUS SAE NAU BAJA SPONSORS

# Raytheon

Raytheon Company

Tucson, AZ



Copper State Nut and Bolt Co.

1841 E. Huntington Dr.  
Flagstaff, AZ 86004



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2740 S Woodlands Village Blvd  
Flagstaff, AZ 86001



College of Engineering, Forestry, and  
Natural Sciences

Flagstaff, AZ



*Creative Technologies  
Worldwide*

W.L. Gore & Associates, Inc.

3750 W Kiltie Ln

Flagstaff, AZ 86001



Frito Lay Casa Grande

1450 W Maricopa Hwy

Casa Grande, AZ 85222

Novkinetics, LLC

3920 East Huntington Dr. Suite A

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