

# WHAT IS BAJA?

Baja SAE originated in 1976 as a small organization. Since then, it has grown into a widely popular collegiate design competition for engineering and automotive students all over the world. Pittsburg State has been competing in SAE Baja since 1991, developing quite the reputation. Gorilla Racing has earned multiple top 10 finishes in its 26 years of competing, and we hope to continue the tradition of excellence in the upcoming competition.

**This year, the team will compete in Pennsylvania on May 16th-May 19th.**

Throughout the duration of the project, we use the individual strengths and skills of our members, work as a team, master the ability to adapt to difficult situations, and ultimately represent PSU among more than 100 other competitors in one of the biggest design competitions in the world.



## WHAT DO WE DO?

We design, build, and compete with an off-road machine against schools from across the world. Throughout the year, we work with Pittsburg State Engineering Technology to construct a computer model of our car, put it together piece by piece, and test its durability in off road conditions. We also prepare a document that includes costs of all parts and labor that go into making the vehicle, as well as a report that goes over our design concepts of the vehicle, which includes craftsmanship, originality, and serviceability. During our four-day competition, these events occur:

- Technical Inspection
- Design Presentation
- Sales Presentation
- Dynamic Events
- Four Hour Endurance

## HOW CAN YOU HELP?

Designing and building a competitive car requires both time and quality components. Team members contribute a combined 3,000 man-hours to the project – providing great experience and preparing students for the work force and real-world situations.

However, none of this could be done without the support of donations from companies and individuals to help with the cost of materials, special tooling and equipment. We hope you consider supporting our team and this project.

Thank you in advance!



# PLEASE DONATE



Scan with your phone  
to donate today

**OR**

Complete below and mail with check

Student Name: \_\_\_\_\_

Company: \_\_\_\_\_

Amount: \_\_\_\_\_

Checks Payable to PSU BAJA.

Mail to:

Pittsburg State University  
C/o Trent Lindbloom / Advisor  
1701 S. Broadway  
Pittsburg, KS 66762-7562  
(620) 235-4198  
tlindbloom@pittstate.edu



## SUPPORT LEVEL

### Platinum Level \$1,000+

- X-Large logo on the car
- featured on our social media/website

### Gold Level \$500-\$999

- Large logo on the car
- featured on our social media/website

### Crimson Level \$250-\$499

- Medium logo on the car
- featured on our social media/website

### Gorilla Level up to \$249

- Small logo on the car
- featured on our social media/website

Please cut out and include the page containing the student, company, and the amount of the donation if you would like to support our team. Please also include the student's name who contacted you in the memo of the check. If you have additional questions, please contact Trent Lindbloom.

# SAE BAJA PITTSBURG STATE UNIVERSITY 2023-2024



Society of Automotive  
Engineers

Student Organization



[PITTSTATE.EDU/BAJA](https://pittstate.edu/baja)  
 [PITTSBURG STATE SAE BAJA](#)



# GORILLA RACING

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PITTSBURG STATE  
UNIVERSITY

## Address

909 East Ford Street, Pittsburg, KS  
66762

## Contact

620-235-4198  
tlindbloom@pittstate.edu

Dear Infrastructure Support Alliance,

We are thrilled at Gorilla Racing to explore the opportunity of collaborating with the Infrastructure Support Alliance on the creation of a new entry-level class of emergency response vehicles centered around the new Baja SAE models. Our team recognizes the importance of a competitively priced, well-built four-wheel drive utility terrain vehicle (UTV) capable of undertaking critical inspection and recovery roles. The aim is to showcase the off-grid capabilities of our UTV's through conquering some of the most challenging and rigorous terrain in North America while keeping costs significantly lower than our competitors.

Gorilla Racing has been designing, improving, and manufacturing Baja vehicles for over three decades and is confident in providing 500 units within the first year, followed by a consistent production rate of over 2000 units per year for emergency responder roles. Our company prides itself on offering fair pricing and consistency for all current and past customers. Our engineers have focused on sourcing parts for quicker repairs and easier accessibility to all components, which translates to cost savings for the ISA via easy-to-maintain vehicles.

Adaptability, improvement, and consistency in quality are attributes we value and possess. We hope to expand and elevate the recognition of the ISA while also educating the market about everything Gorilla Racing has to offer. Thank you for your time and consideration throughout this process. This partnership with the ISA will accomplish and exceed our mutual goals and develop a successful relationship.

Sincerely,  
Gorilla Racing

# PROPOSAL SUMMARY

At Gorilla Racing, we understand the importance of collaborating with organizations such as the ISA to create the best experience for the ISA's latest entry-level emergency response vehicles. Our approach is to deliver expertly engineered, designed, manufactured, and tested UTV's that can withstand the toughest terrain of the western seaboard of the United States. One of the critical aspects of our current vehicle design is the ease of reparability, achieved by making components accessible, which allows for faster repairs. This feature enables us to address any issues that may arise while navigating challenging and remote terrain worldwide.

We would like to provide you with an overview of our operations and how we can fulfill the expected vehicle demand mentioned earlier. Our emphasis is on easy-to-source parts, which can be acquired over the counter from most power sports establishments. The Kohler engines, Fox Shocks, Wilwood brake master cylinders and calipers are critical components that fall under this category. We utilize a lot of Polaris parts, including the CV axles, U-joints, and differentials. Our partnership with The WALSH Group provides us with all our Polaris parts and structural tubing, which makes up the roll cage and the vehicle's primary suspension components.



Gorilla Racing boasts of its in-house machine shop, comprising of highly skilled machinists who consistently strive to deliver top-quality parts. We utilize cutting-edge CNC machines to create parts, ensuring smooth assembly. Our most noteworthy CNC parts include the Knuckles and backing plate for our CVT. Moreover, we employ CNC plasma cutters to create a host of other parts, such as sprockets, spacers, brake rotors, shock and pedal support, and every suspension mounting bracket. Every UTV we produce adheres to the rules and requirements, ensuring that all units leaving our shop meet the highest standards of quality.

Thus, let's now transition to our design philosophy at Gorilla Racing, which emphasizes not only reliability and ease of repair but also superior performance. At Gorilla Racing, we believe that our customers deserve the best. That's why we design our vehicles with both functionality and reliability in mind. Our team of experienced mechanics and engineers work tirelessly to ensure that every aspect of our vehicles is optimized for maximum performance and durability. We use only the best materials and components in our vehicles, ensuring that they can handle even the toughest off-road conditions.

In addition to our commitment to quality, we also prioritize safety. All of our vehicles are rigorously tested to ensure that they meet or exceed industry safety standards. We believe that our customers should be able to endure the oppressive terrain they sustain without compromising on safety. At Gorilla Racing, we are passionate about what we do, and we are committed to providing our customers with the best possible experience.



One of our major advantages over competitors is our high degree of reparability, a feat made possible by specially designed knuckles. These knuckles offer unparalleled accessibility to vehicle components like the axles, without compromising on quality. While this level of precision and attention to detail adds to the cost of production, we stand by it as an essential feature.

Additionally, our UTV's are designed for one person, unlike many of our competitors' two-seater vehicles. Our team dedicated many months to refining and testing this design, resulting in a product with several notable characteristics as listed below that justify its cost. After the prototype phase, we will be selling our UTV for \$15,000. Our design will be filling the scarce market for single-seat UTVs that our competitors no longer participate in.

**SINGLE  
SEAT, ALL  
TERRAIN**

**MAXIMUM  
SPEED: 30-35  
MPH**

**WEIGHT :  
500 LBS.**

**GROUND  
CLEARANCE:  
18-20 IN**

**TURNING  
RADIUS: 10 FT.**

**APPROACH  
ANGLE: 90°**

**DEPARTURE  
ANGLE: 90°**

**SUSPENSION  
TRAVEL: 16 IN**

# IMPLEMENTATION PLAN

We have evaluated various ways in which our UTVs surpass those of our competitors. However, these advantages are meaningless if we don't have an effective implementation plan for providing our services to the ISA.

Our proposed timeline for manufacturing, testing, delivering, and maintaining our UTVs is as follows: we aim to provide 500 units within the first year and continue with a production rate of over 2000 units annually thereafter. While we anticipate potential supply chain issues, we have prioritized using easily accessible parts to shorten the idle time for repairs. In the manufacturing phase, we will conduct rigorous mechanical and automotive tests to ensure that our UTVs meet our high standards. We will document all testing results and findings for quality assurance purposes. Once we have assembled and tested the UTVs, we will dispatch them to the relevant ISA locations in preparation for remote area infrastructure support. Detailed instructions on how to repair both minor and major damages that might occur while deployed on emergency response missions will also be provided.

It's crucial to clarify what we at Gorilla Racing will be providing to the ISA. Thus, we will provide an itemized list to avoid any confusion. Additionally, it's essential to note that Gorilla Racing will be dedicating all of our resources (personnel, materials, machines, and testing equipment) to support the ISA in launching and promoting a new entry-level class of emergency response vehicle.



Based on our projected production rate, we anticipate that it will take approximately one and a half weeks to manufacture the first five UTVs. It will then take an additional week to test and confirm that these five units meet our quality standards. Upon receiving payment from ISA for the five UTVs, it will take two weeks to ship and deliver all units to the customer. We will temporarily halt production until we receive approval from ISA regarding the satisfactory quality of our product. Subsequently, we will resume production and aim to manufacture ten UTVs per week to meet the 500-unit minimum requirement for the first year. The proceeds from the sale of the initial 500 units will enable us to invest in an expanded manufacturing operation. By upgrading and scaling our CNC machines, we anticipate that our production capabilities will increase to over 40 units per week.

The aforementioned estimations are based on our workforce and machine constraints, with allowances made for potential supply chain delays. Our UTV design is not reliant on computer chips, providing us with a degree of insulation from the volatile computer chip market. Additionally, we have a large inventory of raw materials, which can provide us with some security during prolonged lead times. Our UTV distribution plan encompasses multiple modes of transportation to enable us to find the most cost-effective and efficient delivery routes. We will utilize the railroad industry for cross-country shipments, and over-the-road trucks for one- to two-day deliveries, ensuring that we can deliver the required number of units each week.



# LET US BE YOUR EMERGENCY RESPONSE UTV MANUFACTURERS



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PSU

# Written Cost Reduction Report





## Cost Reduction Endeavor

The UTV industry is consistently updating, revising, and making their products in more efficient ways. Gorilla Racing should do the same. That is why we are presenting two ideas on how to reduce the overall costs of our own emergency response UTV design. We decided to do one small scale change and one big scale change to provide a range of business capacity. It is worth noting that the two ideas presented here were not implemented in the final UTV design.

### Method #1: Additional Machinery

For our first cost reduction idea, it would save both money and time if we bought additional CNC machines to create an even more streamlined manufacturing process. Plus we would replace our 3 axis CNC mill with a 5 axis one. The additional CNC machinery to be implemented in the manufacturing process would be a CNC tube bender, CNC tube cutter, and CNC laser. Each new machine would eliminate labor costs as well as cut down on the machined time needed to create each part for the UTV. Even though the initial cost of the new machines would be exorbitant, we would be saving money in the long haul.



## Method #2: Implementation of JIT Manufacturing

For our second cost reduction idea, we chose to utilize the concept of Just in Time manufacturing (JIT). JIT manufacturing is a production approach where products are produced to fulfill immediate demand rather than being produced in excess or beforehand. The main notion here is the fact that we would not be making anything that we know we would not be selling. With this method, we should be able to experience a significant boost in both productivity and profits by implementing measures such as reducing throughput time, minimizing inventory, adopting smaller lot sizes in manufacturing, and eliminating waste across the department.

### References

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