

ORBITRON

Project Proposal



Tyler Taewook Kim' 20
Kent School

I. Introduction

I would like to appeal for funding and assistance for my independent project, "Project Orbitron". I decided on this project after a thorough consideration of its merits, and despite the costs it will come with, I am very confident the results will be worth it. This project will be actively continued with the assistance of several sources, including the inventor club itself, Mr. Choi, Mr. Kim and others. Beginning my developing experience in 7th grade, I have gone through several independent projects of myself. I have done projects including "T-33", Drone_Dropper, and a security system for my own bedroom. All of these projects were honestly *for fun*, without a specific motivation nor objective other than fun. However, now that I've learned several more skills such as 3d modeling and CAD in FIRST Robotics, I am trying to reach to another step that has a specific objective and a purpose to it. I would consider this project as my first *actual* project, so It would be greatly helped if I can get any additional support from different sources.

II. General Idea/Inspirations

First of all, allow me to introduce about the simple idea of this project. To sum everything into a sentence, this project is basically building a vehicle with a spherical wheel. I was thinking of revolutionizing the common wheel system on vehicles since 7th grade, but I couldn't actually build a prototype because of lack of skills, experience, and confidence. The basic idea was to make the wheels rotatable in horizontal directions so the vehicle would be able to move more freely.(See Figure 2.1) I mainly got inspirations from the concept idea "Eagle-360" from Goodyear inc. Here is a video from Goodyear listing all the benefits we would gain from spherical tires.

Video Link : <https://www.youtube.com/watch?v=oSFYwDDVgac&t=55s>

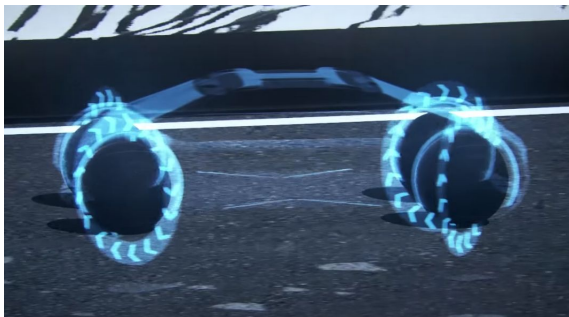
In their concept idea, they mentioned about using magnetic levitation to the wheels to fix the wheels, but this was the main problem of the idea because with current technology, it is very hard and inefficient to hover a moving object. Therefore, I came out with my own method of making a sphere tire with total 2 axis, creating a same effect with the same benefits.

III. Benefits of Spherical Tires

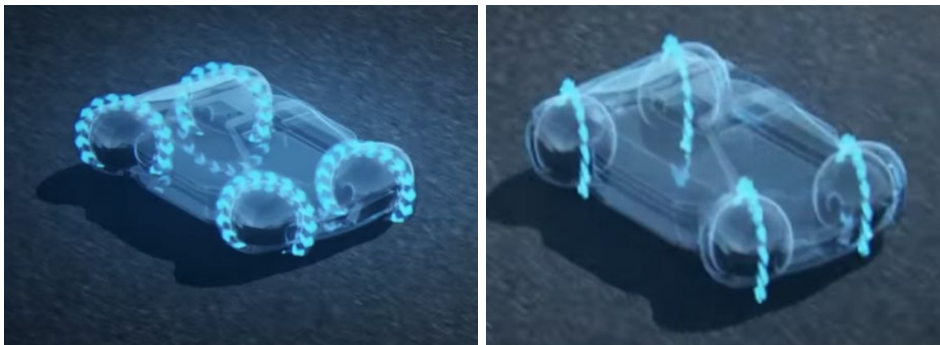
1. Larger contact area of the tire results in more stable control of the vehicle



2. Active technology allows the tire to move as need to reduce slides on potential hazards



3. Free rotation of the tire directions allows vehicle to move in a smooth, lateral movement.



4. It can avoid obstacles/change directions without changing the actual driving direction.
5. When the wear of a tire is detected, it can simply be fixed by changing the tire axis.
6. In a wet environment(especially a water puddle), spherical shape will be able to push water side and reduce the probability of sliding.
7. In a snowy environment, the grooves on tire with larger contact patch will increase the vehicle's mobility.

IV. Justification

The big question here is whether it will be worth it. In a word, yes. Kent choosing to accept and support this project will be valuable for a number of reasons.

- I. Total revolution of wheels
 - A. First of all, this would be a very innovative approach where that 'thinking out of the box' applies. Although there were many concept ideas of making a vehicle with spherical wheels, I realized there were no real attempts in making an actual prototype because most of them focused into the magnetic levitation, which definitely looks impossible with current technology. However, here I am trying to create a same effect of those benefits by approaching more realistically. This whole new wheel structure will create all the benefits I have mentioned above, and I also expect a lot of attention and interest from others simply by the use of a spherical wheel.
- II. Bragging Rights
 - A. Yes, I look forward that this project will eventually bring out that reaction how "high school student built a revolutionary wheel project!". Also, exhibiting this finished project in the Pre-Engineering center will create that 'wow' reaction from Kent school families, parents, and even those who are touring our school. This will show the general idea of Pre-Engineering programs in Kent how the school cares about enthusiastic students and actively provides all support for an independent project, encouraging students to think out of the box.
- III. Taking another step
 - A. Although I am planning on 'finishing' this project before the summer break, I am planning on doing extended projects with this base vehicle as I go through rest of my Kent school life. With the extended features and improved mobility, I am sure that I will be able to attach additional features such as self-driving with image-processing camera and modifying it to use it in real-world problems. Additionally, I am looking forward to contact the Goodyear company after finishing the project to see how they think of the project that is based on their concept ideas.
- IV. College Preparation
 - A. As mentioned by Skyler in his own project proposal, I always had the same thought; that in order to success in college admission, there has to be something 'unique' about me that shows who I am and what I'm capable of. I would strongly argue that this project will be a very influential experience of me that shows how I tried to take an approach of improving the wheel technology as a high school student.

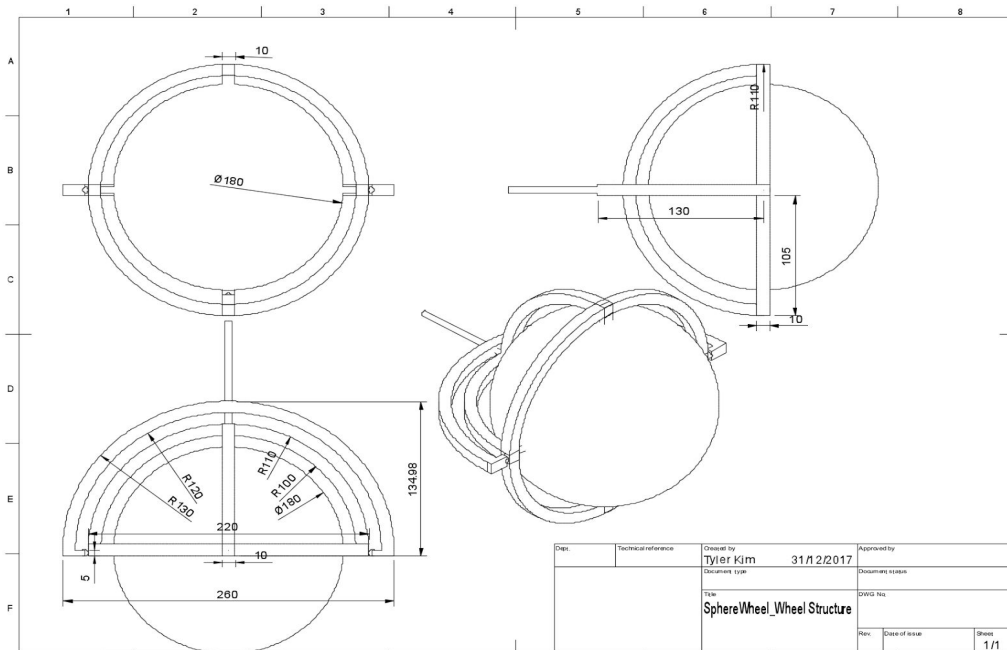
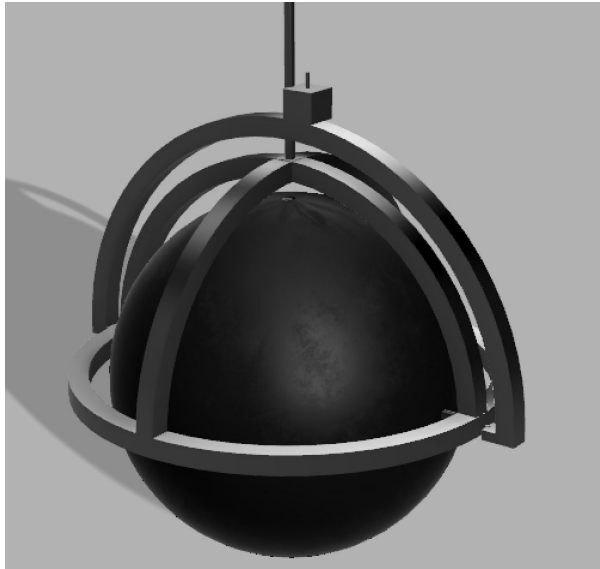
V. Additional Support

1. Mr. Choi - Jae-Pil Choi
 - a. General Manager of Ltd. Raon Square (<http://raonsquare.com/>)
 - b. Mr. Choi has taught me IOT developing, especially using Arduino boards. He has led me through a progress of doing several independent projects. He showed great interest in my first actual project of doing something that has an actual objective, just like what I promised him that I will do when I first met him. I will actively receive support from his advices in hardwares and Arduino programming.
2. Mr. Park - Sung-il Park
 - a. Former COO of MyGenomeBox(<https://www.mygenomebox.com/>)
 - b. Mr. Park has been a great life advisor to me specifically in searching for my passions in computer science. He has taught me general coding skills with C# programming language, and inspired me as I went through several projects so far. He also showed significant interest in this new project, and was willing to help me in any software related issues
3. And of course, all my friends and my parents!

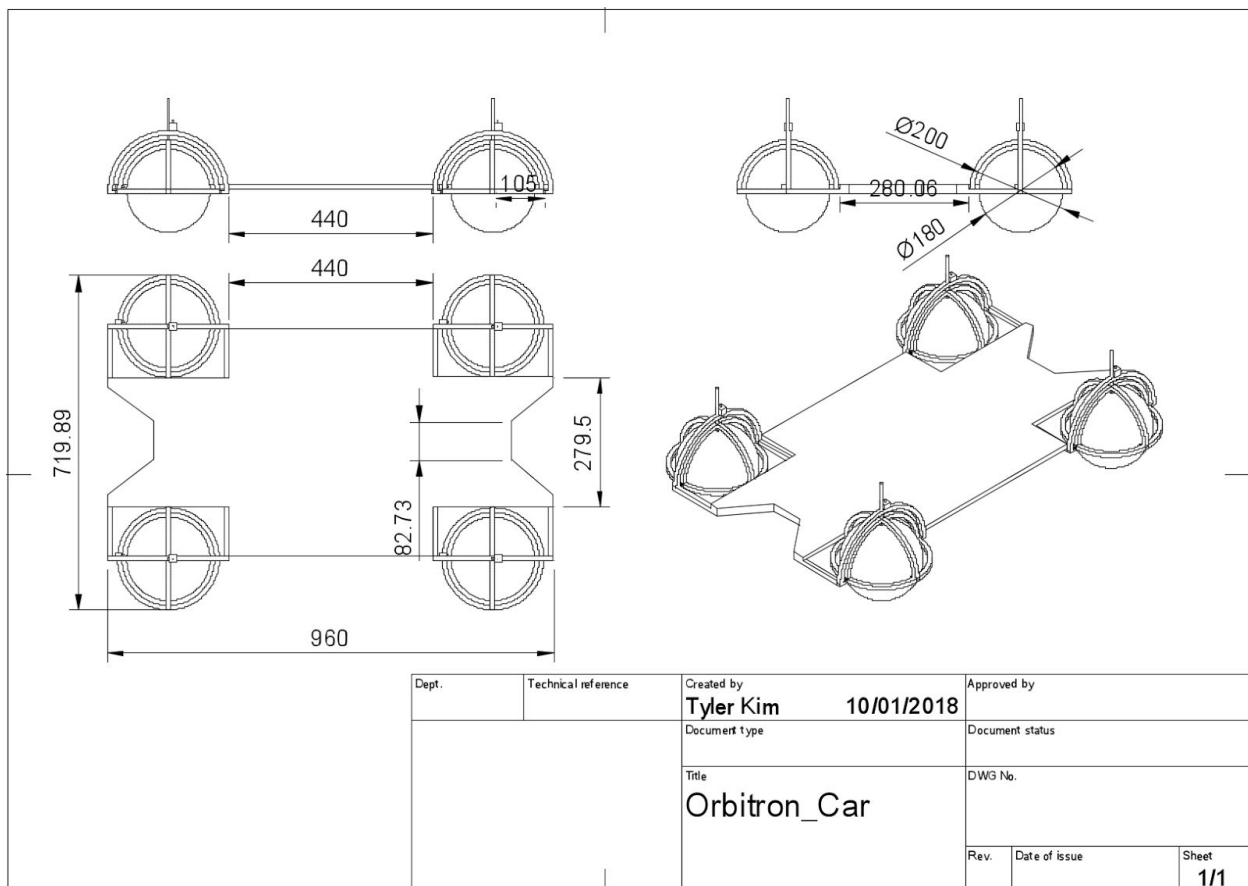
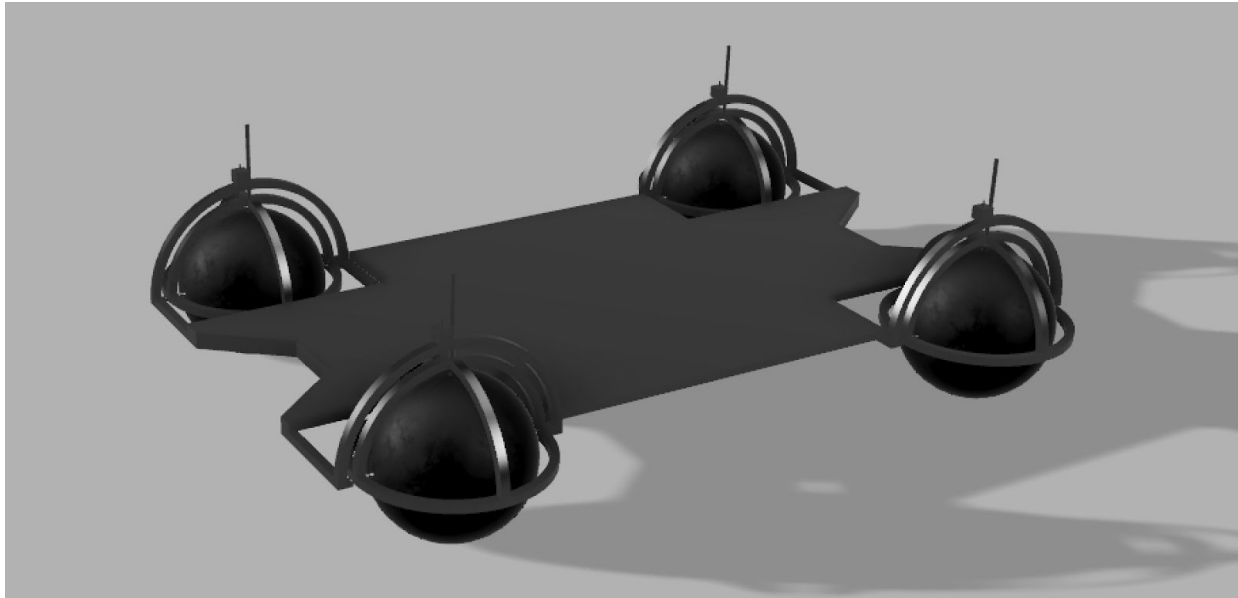
VI. Concept Ideas/CAD

Here are some of the CAD designs I have made so far.

1. Spherical Wheel



2. Orbitron



VII. Financing

Upfront, I will quote the school a cost ranging around 1000 USD. Because I am still in the progress of planning and designing the vehicle, I am not certain about the exact finance I will need for this project. I am currently designing the project in a way that I can mostly gain parts from what we already have in Pre-E center, and trying to keep the cost low as possible. I am confident that the final cost I will be quoting would probably around 800~1000 USD, as I set that cost right now because I'm not sure yet of what Pre-E center can provide me so far.

Most of the budget will be used on parts and raw materials used on the vehicle.

VIII. Conclusion

I hope that what I've written here has adequately conveyed the merits of this project to you. I hope that you see the potential to be had here, and the dedication of myself in seeing this project to completion. Thank you for your consideration.

For any other information, please feel free to contact me: kimt20@kent-school.edu

Sincerely,

Tyler (Taewook) Kim
Kent School' 20