

ECET 430 -

Remote Controller Monocycle

[Christian Hansis](mailto:christian.hansis@njit.edu)

Students:

Arturo Garcia

Joao Sarmiento

Jeury Abreu

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# **Client**

* contact information.-
  + Arturo Garcia
    - arg68@njit.edu
    - 856-558-0271

Joao Sarmiento

* + - js2669@njit.edu
    - 201-772-9021

Jeury Abreu

* + - [ja528@nit.edu](mailto:ja528@nit.edu)
    - 732-925-7059

# **Communication**

Regarding communication we as a team have our own discord chat where we discuss anything relating to our project. We created a todo list to make sure that we are going in the same path and also clarifying any dude or concern, also to make easy for us in what part are working or what is missing, for this last feature mentioned we are using Github In addition, we are filling all the stuff regarding hardware even software in our team Github logbook

# **Objectives**

**DESCRIPTION:**

Our product is basically inspired by a MIB (Men in Black) vehicle. The concept of this product is similar to that vehicle, it is a self-stabilized unicycle where the active driving area is around the payload/core of the cycle and it is also manageable by a remote control which will play a crucial role in the performance of our product. The particularity of the design which demonstrates the innovation in our product itself and also brings a new idea to the public. To add, this product is aimed at people of any age. We have in mind to create two models, the first one in mind would be the simplest implemented for the aforementioned, and the second would provide certain features such as a camera and a speaker included to connect Bluetooth equipment and also the remote control would also have variations such as the implementation of a screen in it, basically, assimilating the functions of a drone.

# **Scenario**

## **User Interaction Stories**

When you receive your product basically you will get a very detailly box with images referring to our product. When you open it, you will see the remote controller packed in its own box, inside it it will be covered with a bubble bag, then you will find the monocycle also inside in a separate box and also cover for a bubble bag. Besides, you will also find a manual, this will guide you on how to use it and how to install the batteries for the monocycle and the remote controller, the basics functionalities and the proper ways to use it. Relating to use, once you put the batteries on product and remote controller you will manipulate thru RC the product, it basically gives you the entertainment of a RC car, But the difference or the fun part here will be to see how it moves forward or backward and even when it makes turns, that is what makes it innovative and outstanding compared to conventional RC cars. Regarding troubleshooting, if an problem exists the product contains replacement for the wheel, and for the RC, in the manual explain how replace the damage part, is not too difficult to solve by ourselves, in addition, the product have a 1 year guarantee which cover any problem relate to RC or the product itself.

## **User Interface**

In terms of user interface, as mentioned before our product will have two versions, one with a display in the controller and the other without it. Basically, both versions in the remote controller will not have a button, but it will have a joystick whose functionality will consist in guiding the craft to the direction desired, also will count with an on/off switch for craft and controller. Also an indicator will be added as a proof that the craft is on or off also the controller will have one with the same functionality.

# **User Acceptance**

* Given-When-Then criteria
  + when craft is active,it should auto balance
* quantifiable goals

# **Parameters**

## **Technical**

* dimensions .- **21x10x5 cm or 8.3x3.9x2 in**
* weight.- 500g or 1.1 pound
* Electromagnetic compatibility (EMC) and electromagnetic interference (EMI)
* protection

## **Functions**

Our product will have main functions that will make it a unique model, the main functions are self-balancing, with this function it will be easier to manipulate and handle it with this functionality it will provide greater comfort and fun to the user. The other function is to be able to get up again after a fall, this function is basically when the user collides with a structure, after the impact the vehicle will return to its initial position. Another function is the ability to go forward and backward, either for the comfort of the user. Our product offers the ability to go forward and backward correctly to provide a great maneuverability experience of our product. The other function of this product is to keep the load (core) stable and the track is what moves, this means that while the vehicle is in motion the core and what is inside it will remain stable while the tire or belt that surrounds it is what moves. and the last function refers to the automatic accelerator and manual accelerator options, this is basically to provide greater entertainment to the user who, if he wants can accelerate with the remote control or the vehicle itself can accelerate on its own.

## **Integration**

**Interface**

**it counts with a bluetooth system incorporated and also a remote controller which will be the mechanism to make it work. (app?)**

## **Operational**

* **restrictions. -** No restrictions
* **duty cycle.** - The battery life expectation of our product is 7 hours after charge, and the charge process of it is around 2 to 3 hours to fully charge.

## **Regulatory**

* laws
* regulations
* policies

## **Life Cycle**

* manufacturing.-
* programming
* tracking
* service
* associated services

# **Environment**

Our product has the ability to work in different types of environments, the temperature ranges in which it will work are between 14 degrees Fahrenheit and 110 degrees Fahrenheit, below 14 degrees Fahrenheit it might not work very well due to the low temperature which damages some cables, the same happens in temperatures above 110, some cables and components may start to melt.The product should avoid smooth surfaces as it will be difficult to drive properly and could also damage the core due to the constant dangers of falling due to these surfaces. Also, as an electronic device, you should avoid water as water will destroy all the internal components and render it useless.

* **power.-** it will count with a 4V 1200mAh Li-Ion Battery implemented to the craft. The purpose of using this battery is that it is reliable, very durable, easy to get a replacement and also easy to replace.

# **Starting Point**

* **existing prototypes**

<https://www.instructables.com/Making-a-Monowheel/>

In the link above is a prototype of our project but on a big scale and using foundations of mechanics, basically from this we just use the idea of how our project will look.

<https://youtu.be/fIADzTanDo8?si=Uh0wI1ux-ViAeKzg>

And from this link we will get an idea of ​​how to use the appropriate wiring and how our project will work and the functionalities it will have. In addition, we will add the rest of the elements mentioned above to give it a different and innovative look.

# **Key Concerns**

The most important thing that we can observe in our product is basically what refers to self-balancing, it is possibly the most important feature that we can appreciate, another one that we could talk about is the distance between the remote control antenna and the vehicle receiver, they can communicate with each other for a better experience, another important point is the sideways turn or rather the turns, and the self-balancing also depends a lot on this, which would allow the product to have perfect stability and avoid any unforeseen event when trying to turn right or left or a total turn (180 or 360 degrees)

# **Future**

* plans
* ideas

# **Glossary**

* common vocabulary
* project specific terms

# **Open Questions**

to be discussed with team/clien