Mechanical Overview

Year: \_2019\_ Semester: \_Spring\_ Team: \_\_17\_\_ Project: \_Face Tracking Drone\_\_\_\_\_\_

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Assignment Evaluation:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Score (0-5)** | **Weight** | **Points** | **Notes** |
| **Assignment-Specific Items** | | | | |
| **Commercial Packaging Analysis 1** |  | x2 |  |  |
| **Commercial Packaging Analysis 2** |  | x2 |  |  |
| **CAD Model Illustrations** |  | x4 |  |  |
| **Project Packaging Specifications** |  | x2 |  |  |
| **PCB Footprint Layout** |  | x2 |  |  |
| **Writing-Specific Items** | | | | |
| **Spelling and Grammar** |  | x2 |  |  |
| **Formatting and Citations** |  | x1 |  |  |
| **Figures and Graphs** |  | x2 |  |  |
| **Technical Writing Style** |  | x3 |  |  |
| **Total Score** |  | | |  |

5: Excellent 4: Good 3: Acceptable 2: Poor 1: Very Poor 0: Not attempted

Comments:

1. Commercial Product Packaging

We analyzed two commercial products from the B&H and amazon, which are similar to our face tracking drone. They are “YUNEEC Mantis Q Drone[1]” and “Holy Stone HS100 Drone[2]”.

* 1. Product #1



Figure 1: Packaging for product #1

The ‘YUNEEC Mantis Q Drone’ is a commercial product that is similar to our project. It also supports intelligent flight mode which contains face tracking function.

The advantage of its packaging is that the ‘YUNEEC Mantis Q Drone’ is engineered to be folded with hinges connected to four arms. The arms could be folded and reside at the sides of drone. By implementing this property, it is obvious that the drone will be a lot easier to be carried and it keeps the drone from being damaged when transported.

Also, this package protects the battery really well and it is designed to hold the battery in a safe area inside the drone. Since battery can be penetrated by accidents which can cause severe damages, it is important to include this feature. At the same time, the package is designed the way to replace battery easily.

The disadvantage is obvious as well. Although the foldable design means portability, the arms of the drone needs to be designed to be thin in order to realize this feature. Thin arms means high probability of being broken during flight. Since we cannot assume that every customer is a good flyer, we decide to discard the “foldable” feature and use more stable arms.

We definitely will design the package which protects the battery and easy to be installed and disassembled, in addition, we will try to design the package which makes transportation easier. Maybe the arms is hard to be engineered to support folding, but the drone’s mount could be designed to be folded which makes the size of the drone a lot smaller in the vertical dimension.



Figure 2: Packaging for product #1

* 1. Product #2

“Holy Stone HS100 Drone” is packaged with x-shaped plastic packaging with curved edges. Under the main body of the drone, there is a gimbal to hang the camera. Four arms are supported by support brackets when the drone is landed on the ground.

The use of plastic as the packaging material is worth being applied to our project. First of all, the plastic is cheap which allow the product to have a relatively low cost. Because the light weight is definitely a beneficial feature for a flying project which aims to ensure long flying time. The light weight combined with the compact design of the product lead to easy portability for user to carry it everyday. But the drawback of this feature is that it is vulnerable to be broken since it cannot stand significant external forces or extremely drops.

We also plan to use a gimbal to hang the camera. The gimbal can guarantee the stability and reliability of quality of video recording. And we design to use four supporting bar to support our drone when it is landed. Besides that, the red color of the packaging worth to be considered, because the red contrast against the sky and the ground, which make the drone to be easily tracked while flying.



Figure 3: Packaging for product #2

3.0 Sources Cited

[1] Brian and Joe, “YUNEECMantis Q Drone,” About B&H | B&H Photo Video, 17-Dec-2018. [Online]. Available: https://www.bhphotovideo.com/c/product/1432518-REG/yuneec\_yunmqus\_mantis\_q\_drone.html/?ap=y&gclid=CjwKCAiA7vTiBRAqEiwA4NTO6zN36tV8PQY6So0dFMuuxK-LWvlFRxkIx9-FYTV9K6I-dEIjy0266xoCsPEQAvD\_BwE&lsft=BI:514&smp=Y. [Accessed: 08-Feb-2019].

[2] “Holy Stone HS100 Drone with 1080p HD Camera FPV Live Video RC Quadcopter with GPS Return Home Function Follow Me and Altitude Hold, Drone for Beginners, Kids and Adults, Color Red,” Amazon. [Online]. Available: https://www.amazon.com/dp/B07GS33PTY/ref=sspa\_dk\_detail\_3?psc=1&pd\_rd\_i=B07GS33PTY&pd\_rd\_w=UPs8Y&pf\_rd\_p=2bd81721-c115-4b8d-93a3-2ecd17466ded&pd\_rd\_wg=6GX8q&pf\_rd\_r=2ATJV7GFE52VRJ7D5MN3&pd\_rd\_r=38f6209f-2974-11e9-b139-8fc39df8cf8c. [Accessed: 08-Feb-2019].

Appendix 1: CAD Model Illustrations

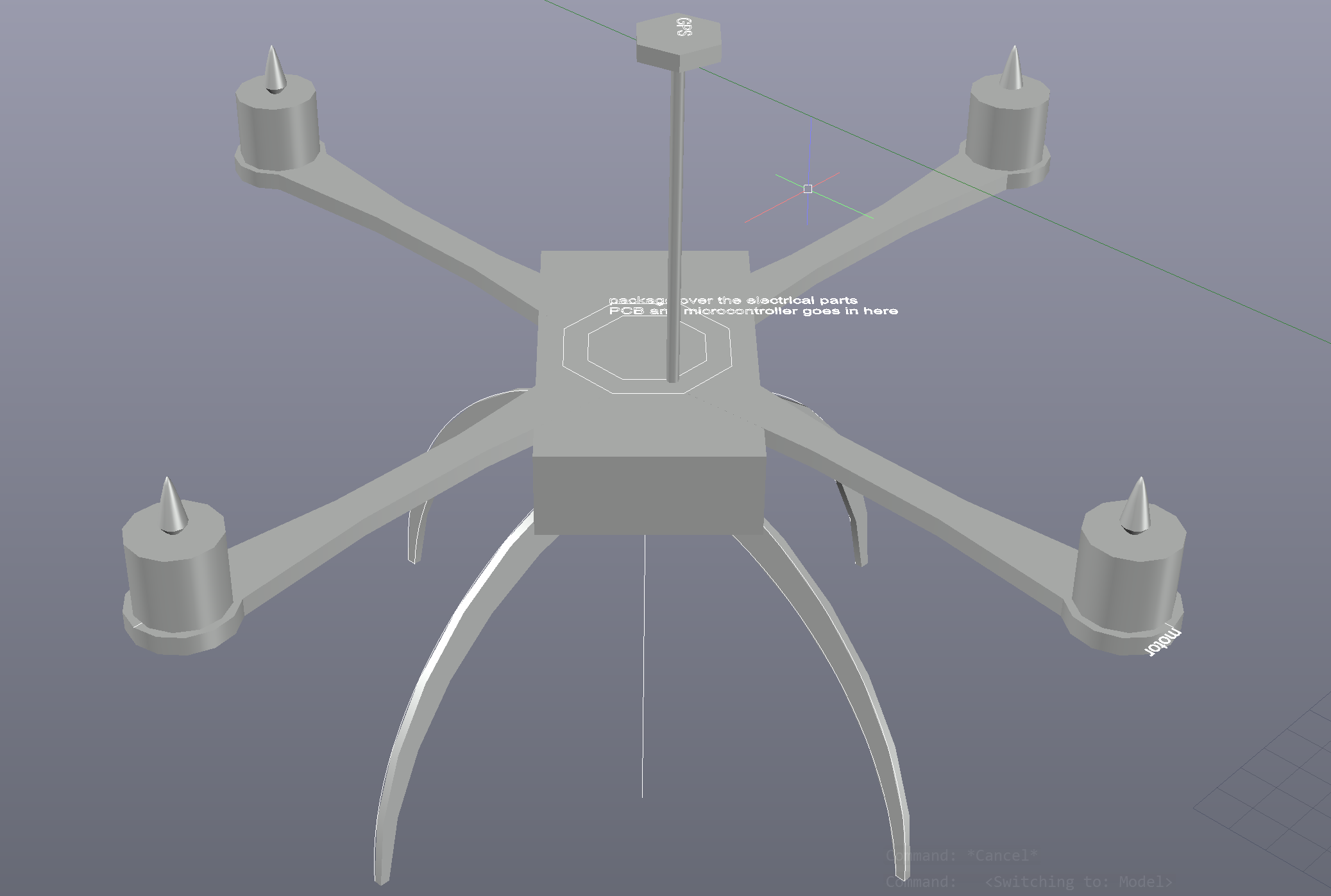
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Figure 4: Model of the drone

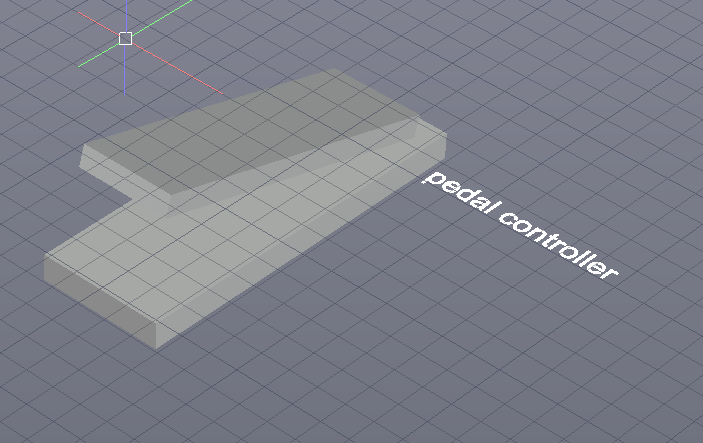
[](https://engineering.purdue.edu/ece477)

Figure 5: Model of pedal controller

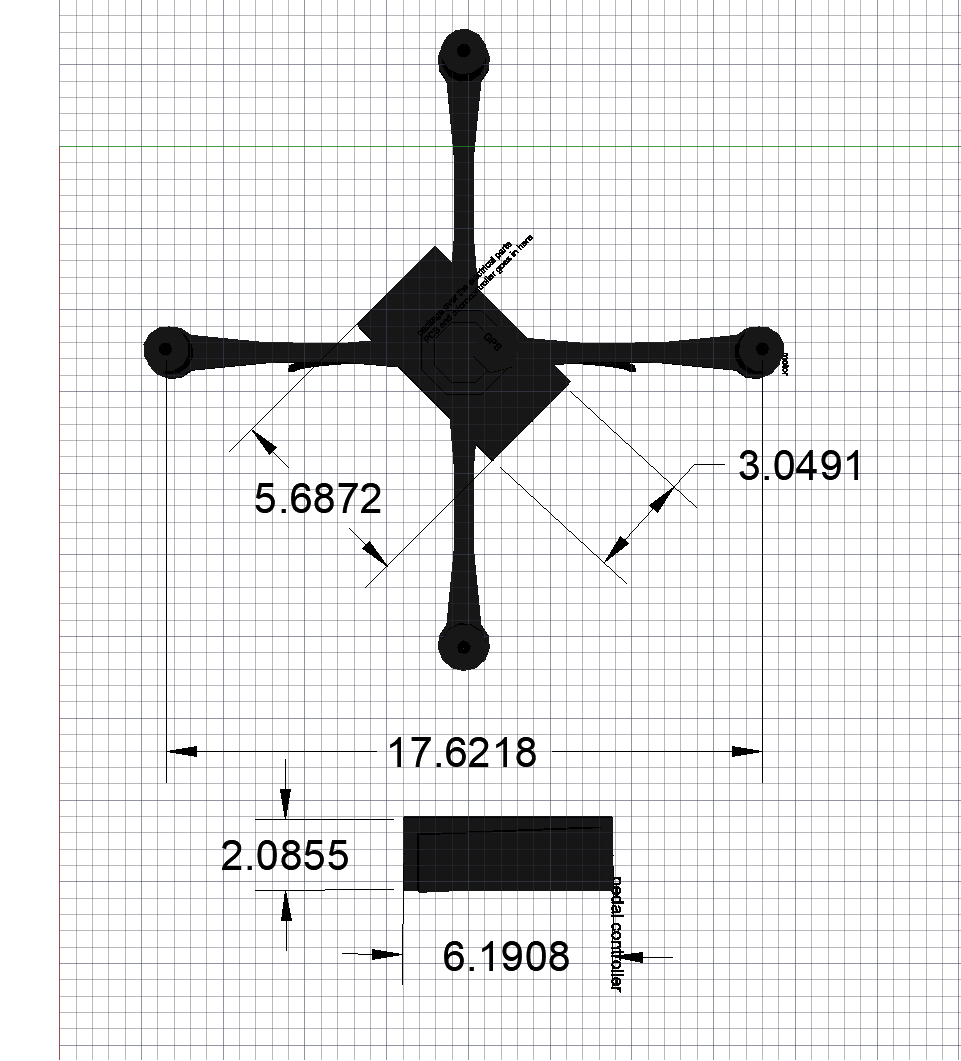
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Figure 6: Top view of model dimensions (unit: inch)

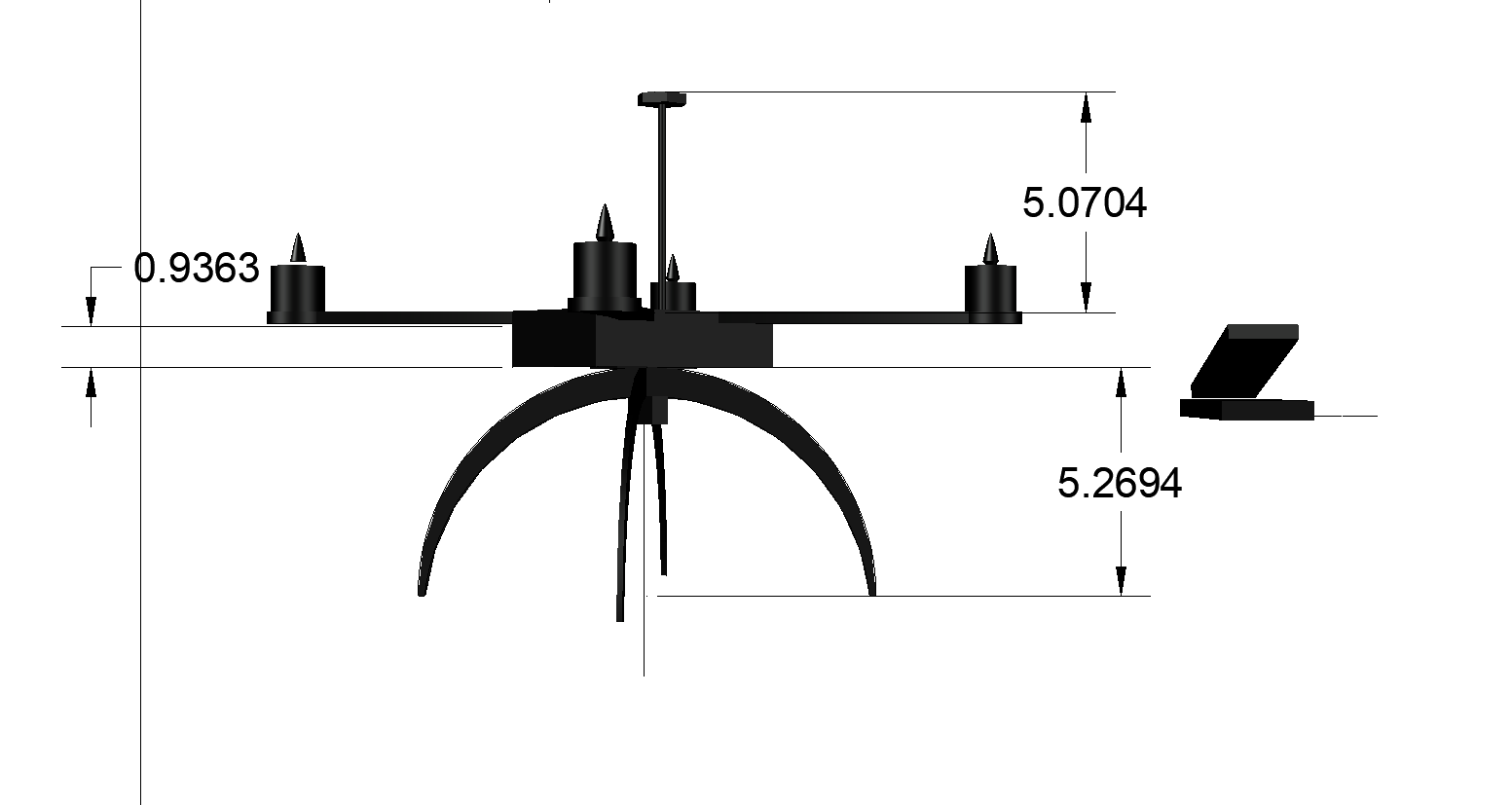
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Figure 7: Side view of model dimensions (unit: inch)

Appendix 2: Project Packaging Specifications

|  |  |  |  |
| --- | --- | --- | --- |
| Material | Tool required | Weight (g) | Cost ($) |
| PLA Filament | 3D printer | 500 | 19.99 |
| Lock Nuts | Wrench | 11.04 | 1 |
| Bolt M3\*6 | hex key | 19.2 | 2 |
| total |  | 530.24 | 22.99 |

Table 1: Materials, tools, weight and cost

Appendix 3: PCB Footprint Layout

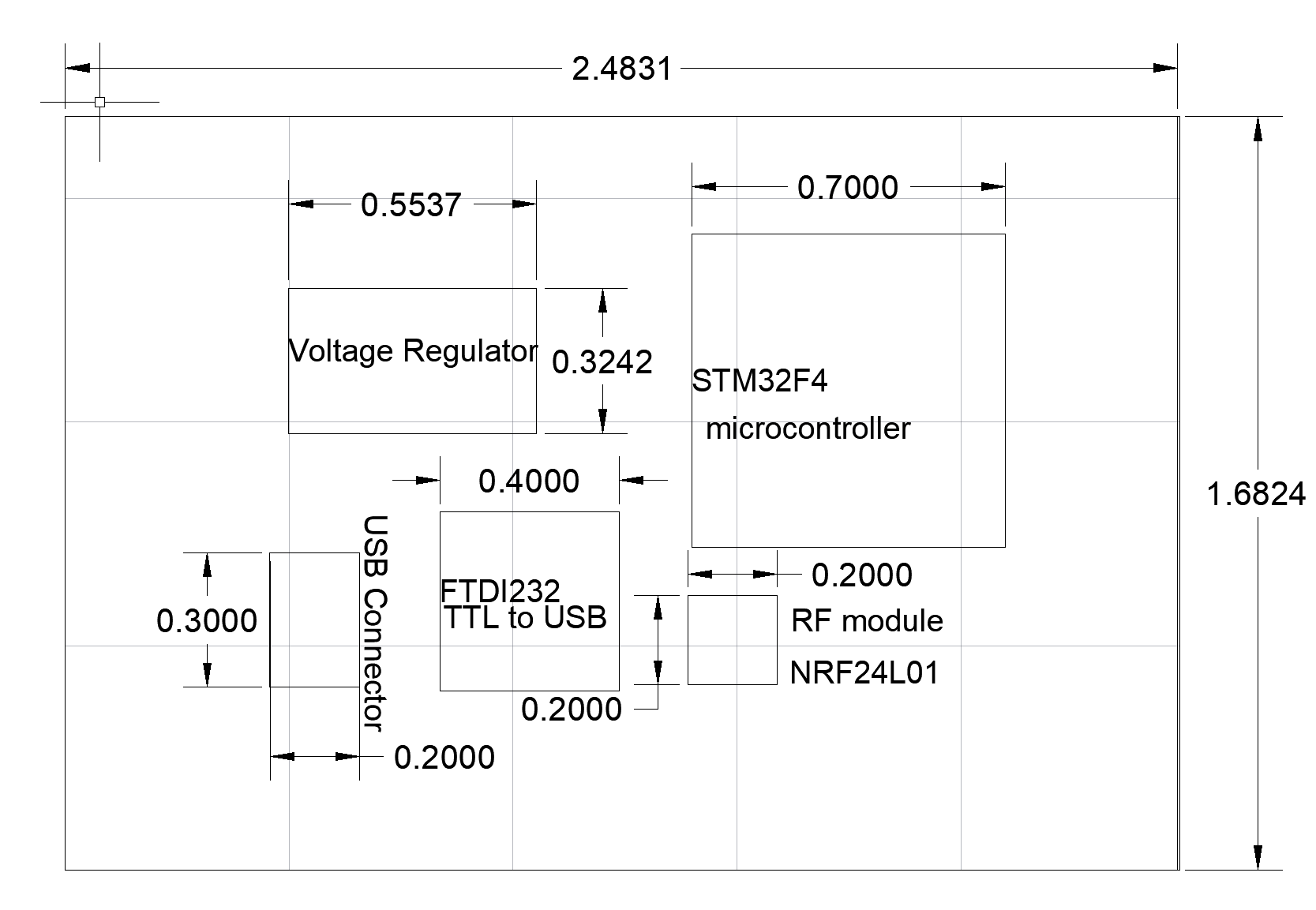


Figure 8: PCB layout for the ground part (unit: inch)

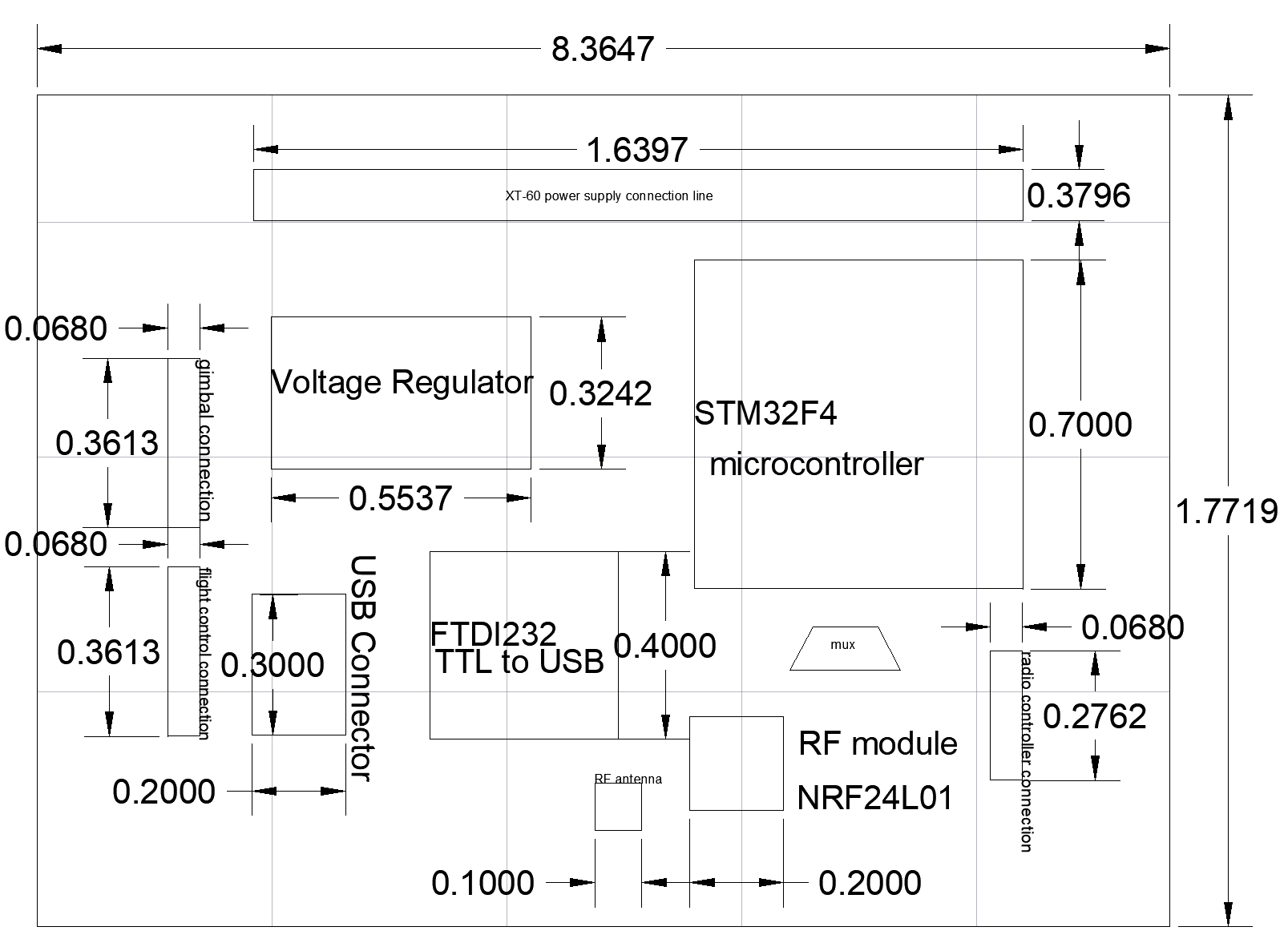


Figure 9: PCB layout for the drone part (unit: inch)