Legal and Regulatory Analysis

Year: 2022 Semester: SPRING Team: 8

Project: Automatic Filming Vehicle

Creation Date: ­3/23/2022 Last Modified: March 24, 2022

Author: Haiwen Zhang Email: zhan3237@purdue.edu

Assignment Evaluation:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Score (0-5)** | **Weight** | **Points** | **Notes** |
| **Assignment-Specific Items** | | | | |
| **Regulatory Analysis** |  | x3 |  |  |
| **Analysis of Patent 1** |  | x3 |  |  |
| **Analysis of Patent 2** |  | x3 |  |  |
| **Analysis of Patent 3** |  | x3 |  |  |
| **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:

*Comments from the grader will be inserted here.*

1.0 Regulatory Analysis

* 1. Federal Communications Commission

For our remote controller, we are using nRF24l01 transceiver which communicate with another nRF24l01 on the vehicle using radio operating within the worldwide 2.4 -2.5 GHz ISM band.

According to “UNDERSTANDING THE FCC REGULATIONS FOR COMPUTERS AND OTHER DIGITAL DEVICES” [1], our product falls in the category of digital device. The reason is not only due to the transceivers on our product, but also that our product contains two microprocessor which operate at the frequency higher than 9 KHz. The STM32F446RE [2] has an operation frequency up to 180 MHz whereas the STM32F091 has an operation frequency of 48 MHz. Under the digital device category, our product further falls under class B devices due to the fact our product will be marketed as to be used in environments including residential environments. There will be technical standards imposed by the FCC on our product since our product has potential to interfere with radio, TV, and other types of receivers. Therefore, our product needs to undergo a test by FCC and obtain certificate to be marketed.

* 1. Restriction of Hazardous Substances Directive [3]

We need to obtain RoHS certificate to sell our product in European countries. RoHS regulates all products that operate at a voltage less than 1000V AC or 1500V DC, including toys, electronic devices, surveillance devices, etc. Our product has a operating voltage of 3.3-5V, thus will be regulated by RoHS therefore needs to be certified by RoHS. The order of RoHS aims to protect the environment by imposing restriction on the materials that will be used in the product.

* 1. Electromagnetic Compatibility for the European Commission [4]

This is the European version of the FCC which prohibits electronic products interfere each other. According to their official website, “**the standards ensures that electrical and electronic equipment does not generate, or is not affected by, electromagnetic disturbance.”**

**Since the nature of our project is a consumer product, thus in effort to make out product marketable, we need to meet the above standards. As for the FCC and EMC, we need to make sure that the radio wave from our product will not interfere the function and communication of nearby products. We will design our packaging so that the packaging will retain most of the electromagnetic waves from the microprocessors. And since the** nRF24l01 transmit data on a certain frequency worldwide standard band of 2,4-2,5 GHz, there will not be much problem caused by the transceivers. In order comply with RoHS, we will have to limit the number of specific materials used in our products. After analyzing several similar products that are marketed in European countries, we are confident that our product will meet the standards by RoHS.

2.0 Legal Liability Analysis

2.1 Analysis of Patent 1 [5]

US Patent Publication Number US 20200278072 A1:

Filing Date: Sep 3, 2020

Abstract: “A gimbal includes a follow-configuration button, a memory storing gimbal control instructions, and a processor configured to call the gimbal control instructions to detect whether the follow-configuration button is triggered and adjust a follow parameter of the gimbal for following a target object in response to the follow-configuration button being triggered.” [5]

Potential Infringements:

1. DJI in their patent introduces a *gimbal* including a follow-configuration button. Using the button, user can switch between object-tracking mode and balancing mode. This is like our provision of implementing human-tracking using TensorFlow Lite.
2. DJI include in their patent that within their gimbal, that there is a processor configured to accept parameter of object tacking.
3. The other claim is that the processor with the ability of adjust how quickly the gimbal follows the object in compensation of the steadiness of the camera.

As we mentioned in our midterm review presentation, we will be implementing the function of object tracking on our product. However, the patent above put some restriction on some desirable function we might implement on our product, such as the ability to let the user configure the parameter of the tracking function using a user platform.

2.2 Analysis of Patent 2

US Patent Publication Number US D936,538, S [6]

Filing Date: November 23, 2021

Abstract: This is a patent of the design of the steering wheel of a remote controller vehicle. Since we are also designing our own remote controller, there will be potential infringement.

Potential Infringements:

1. This patent mainly protects the packaging design of the remote controller. The packaging design of the patent is as shown below.

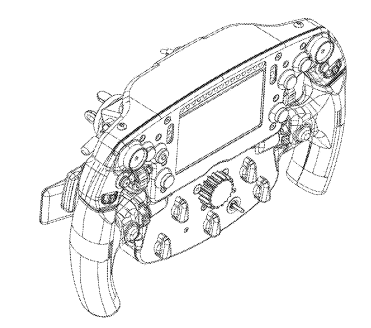


Figure 1. [6]

Our remote controller will have a similar set up as the one shown above. There will be two joysticks, one for controller the movement of the vehicle and the other one for controlling the gimbal. There will be a screen on the remote controller showing the gimbal data or the rpm data of the wheels.

2.3 Analysis of Patent 3

US Patent Publication Number US 20200137292 A1 [7]:

Filing Date: Apr 30, 2020

Abstract: “A remote control for controlling a gimbal includes a body configured to carry a battery, a first wheel assembly and a second wheel assembly mounted on the body. The first wheel assembly includes a first wheel, and the second wheel assembly includes a second wheel. The first wheel and the second wheel can rotate under a driving force to control at least two axle movement of the gimbal.” [7]

Potential Infringements:

This is another patent for a remote controller. This one is even more like our product since it is also a remote for a vehicle with a gimbal. According to the document of the patent, the patent is a remote control for controlling a gimbal with 2 axis movement. There are 20 claims for this patent. The following is a figure demonstrating the product of the patent.

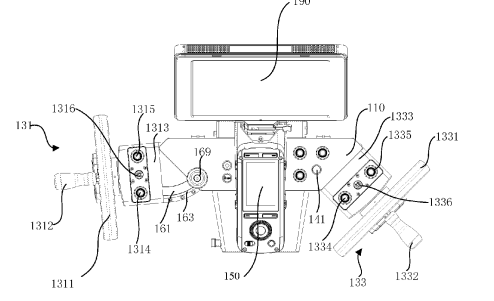


Figure 2. [7]

This remote controller has a mount for a phone. We are considering using the same design in our product. Now, our product lacks the ability for the users to view the real-time footage from the filming vehicle which largely lower the quality of the footage. If we implement a phone mount on the remote controller, the user could easily view the real-time footage from the camera on the vehicle through the phone.

3.0 Sources Cited:

[1] UNDERSTANDING THE FCC REGULATIONS FOR COMPUTERS AND OTHER DIGITAL DEVICES

<https://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet62/oet62rev.pdf>

[2] Arm® Cortex®-M4 32-bit MCU+FPU, 225 DMIPS, up to 512 KB Flash/128+4 KB RAM, USB OTG HS/FS, seventeen TIMs, three ADCs and twenty communication interfaces

<https://www.st.com/resource/en/datasheet/stm32f446re.pdf>

[3] **Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment**

<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0095:EN:HTML>

# [4]Electromagnetic Compatibility (EMC) Directive

<https://ec.europa.eu/growth/sectors/electrical-and-electronic-engineering-industries-eei/electromagnetic-compatibility-emc-directive_en>

# [5]USPTO PATENT FILL-TEXT AND IMAGE DATABASE

<https://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.htm&r=14&f=G&l=50&d=PTXT&p=1&S1=%22gimbal%22&OS=%22gimbal%22&RS=%22gimbal%22>

# [6]USPTO PATENT FILL-TEXT AND IMAGE DATABASE

<https://pdfpiw.uspto.gov/.piw?Docid=D0936538&homeurl=http%3A%2F%2Fpatft.uspto.gov%2Fnetacgi%2Fnph-Parser%3FSect1%3DPTO2%2526Sect2%3DHITOFF%2526p%3D1%2526u%3D%25252Fnetahtml%25252FPTO%25252Fsearch-adv.htm%2526r%3D29%2526f%3DG%2526l%3D50%2526d%3DPTXT%2526S1%3D%252522toy%252Bcar%252522%2526OS%3D%252522toy%252Bcar%252522%2526RS%3D%252522toy%252Bcar%252522&PageNum=&Rtype=&SectionNum=&idkey=NONE&Input=View+first+page>

[7] USPTO PATENT FILL-TEXT AND IMAGE DATABASE

<https://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&u=%2Fnetahtml%2FPTO%2Fsearch-adv.htm&r=24&f=G&l=50&d=PTXT&p=1&S1=%22gimbal+camera%22&OS=%22gimbal+camera%22&RS=%22gimbal+camera%22>