

Airplane Simulator

Gesture Based URI Development for Bsc (Hons) of Science in Computing in Software Development

March 2020

**Authors:**

Vyacheslav Lukyanov

G00339839@gmit.ie

Marian Ziacik

G00340481@gmit.ie

**GitHub URL** :

https://github.com/majo-z/Gesture-Based-UI-Project

**Table of Contents**

[*Requirements* 2](#_Toc35632466)

[*Purpose of the application* 3](#_Toc35632467)

[*Gestures identified* 5](#_Toc35632468)

[*Hardware used in creating the application* 6](#_Toc35632469)

[*Conclusions & Recommendation* 7](#_Toc35632470)

[*References* 8](#_Toc35632471)

[*Appendix* 8](#_Toc35632472)

*Requirements*

* Development of a Natural User Interface application
* Local implementation of the application using gestures to interact with it (for example, an application using voice control, or implementation of a solution taking advantage of hardware like the Raspberry Pi, Myo Armbands, Leap Motion Controllers, Kinect, HoloLens, Durovis Dive, Arduino, Lego Mindstorms etc.)
* Reproduction of a classic game or system using a gesture-based interface
* The programming language of choice

The project should include the following headings (including all references as evidence of the research):

* Purpose of the application - design of the application including the screens of the user interface and how it works.
* Gestures identified as appropriate for this application - providing a justification for the gestures that can be incorporated into the application
* Hardware used in creating the application – the purpose of each piece of hardware should be given with a comparison to other options available
* Architecture for the solution - the full architecture for the solution, including the class diagrams, any data models, communications and distributed elements that are being creating
* Conclusions & Recommendations – learning outcome from the project and the associated research, different approaches, critical evaluation of the project

*Purpose of the application*

The main aim of this project was to showcase skills we have learned over our 4-year course in GMIT.

The project is a reproduction of a Custom Airplane Physics designed by Indie Pixel (Technical Artist / Programmer / 3D Artist), that can be initially controlled by keyboard or Xbox controller. The project was provided to us and our goal was to implement additional layer of control by using a Myo Armband hardware, so that the airplane could be controlled by the Myo Armband gestures.



The application was created using Unity cross-platform game engine (version 2019.2.19f1) and C# language; and can run locally on a device with Windows 10 installed. The application hasn’t been tested on Apple device.

**About flying**

Flying a plane can be a difficult task as the pilot has to, besides controlling the plane, learn to understand the weather, master crosswind and gusty wind landings, learn to tune in the correct radio frequencies, understand regulations, aircraft specifications and limitations etc. The pilot must always be attentive and notice what is going on around at all times, as being situational will help to avoid many aircraft accidents.

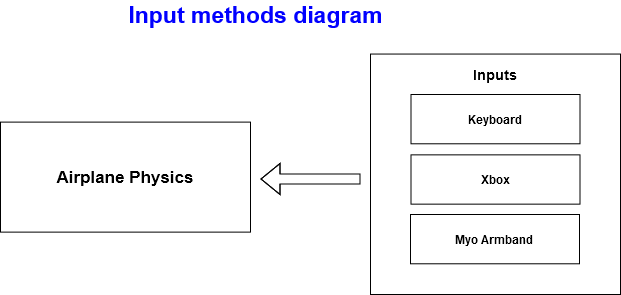
**How the plain works**

**How to control the airplane in our application**

The user can interact with the

The user interacts with this airplane by using Myo Armband hardware attached to the forearm, that sends a signal to the application. Based on the implemented gestures the user can than control the airplane by using following distinguishable movements – waving left and right, double tapping, fingers spreading, making a fist, raising the arm forward and backward, sideways and rotating the arm.

*Gestures identified*

**

*Hardware used in creating the application*

**What is May Airband**

*Conclusions & Recommendation*

*References*

<https://support.getmyo.com/hc/en-us/articles/203398347-Getting-started-with-your-Myo-armband>

<https://venturebeat.com/2018/10/12/amazon-backed-wearables-company-thalmic-labs-kills-its-myo-armband-teases-new-product/>

<https://sites.google.com/site/thebasicsofaviation/rudder-empennage-and-ailerons>

<https://www.grc.nasa.gov/www/k-12/UEET/StudentSite/dynamicsofflight.html>

<https://www.youtube.com/watch?v=aXoDK0EHdzM>

<https://www.youtube.com/watch?v=3VLoGSVORjY>

<https://www.popularmechanics.com/flight/a12454/difficult-descent-4-trick-kinds-of-airplane-landings-15686244/>

<https://www.quora.com/What-makes-flying-a-plane-so-difficult>

<https://books.google.ie/books?id=49uHAwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false>

*Appendix*

**GitHub URL** : <https://github.com/majo-z/Gesture-Based-UI-Project>