

GNG1103
Design Project User and Product Manual

ABOLISH THE L.A.W.S

Submitted by:

Abolish The L.A.Ws – Team 2d

Erfun Zadsar, 300188151

Lane Morency, 300365589

Mercy Ayodele, 300259582

Abdulwahid Ahmed

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List of Acronyms and Glossary

Table 1. Acronyms

Acronym	Definition
VR	Virtual Reality
LAWs	Lethal Autonomous Weapons

Table 2. Glossary

Term	Definition
Oculus	Type of VR headset
Autonomous	Having the freedom to act independently
GitHub	Code hosting platform for collaboration and version control
Environment	In the context of this manual environment refers to the VR space in which the game takes place

1 Introduction

The context of this project is to create a VR (virtual reality) environment that would show civilians lives and the adaptation they have made under the rule of LAWs (lethal autonomous weapons). The game highlights the ethical issues regarding the use of LAWs, promote awareness and encourages actions against the use of LAWs.

The assumption for this project is that the players have a VR headset, controller, and internet connection. This document has introduction, overviews, instructions, using the system and other sections that are made to guide the user and maintain the product/recreate the product.

Scope of activities covered in this document are the use of the VR environment and the ethical issues regarding the use of LAWs. The intended audience are the people interested in learning about the ethical issues that accompanies the use of LAWs players of the game, people that want to take actions against the use of LAWs and the players of the game.

Security and safety consideration for this product includes players should remove obstacles from physical environment to prevent fall, possessing appropriate equipment like VR headset and controller, taking breaks to prevent eyestrain. Privacy consideration include player data being collected and stored appropriately according to the privacy laws and regulations.

2 Overview

The customer wants a short 1-minute video of an environment in which lethal autonomous weapons are being used to rule. The exact demands of the client were left open ended however some restrictions were given. The product should not show any specifics (people, places, robots) and there should not be an excessive amount of graphic content. The video must be one minute long and feature a VR environment.

The goal of the project is to convince law makers and the public that the use of lethal autonomous weapons needs regulation. Our client expressed that most people shrug off the potential dangers of LAWs as it seems purely hypothetical of little concern. Our goal is show people that it is a closer reality than they may think. To accomplish this, we decided to showcase an environment where LAWs are guarding an apartment building around the clock. Because LAWs do not need to sleep, eat or take breaks, we were going to showcase how ruthlessly they could occupy a foreign country. Given current world events we thought this would spark a good amount of emotion while not being too specific as to cause someone a panic attack. We showcased this in a number of scenes.



Our first scene is an opening shot in the apartment, in the working product, the news will be playing describing the devastation. Windows are boarded up to protect from gunfire and the general setting is dingy and dark to create atmosphere.



The next scene shows the ruined city outside. Here the player sees fires, knocked over street lamps, flipped over cars, and rubble and debris. It is here that the player receives a phone call from a friend who is dying. The friend will express their need for medicine. The player will be prompted to deliver the medicine to his friend and thus the journey begins. The player exits through a crawlspace in the closet of his apartment. He will enter the laundry room and subsequently the hallway.



The hallway has turrets constantly watching. The player will take the board on the bottom right of the image and walk along the wall to “blend in”. This way they can reach the end of the hall and enter the foyer.



The foyer is being watched by an intense bright light. The player will crawl behind the table and broken bench to reach the final hallway where they will deliver medicine to their friend.

2.1 Conventions

The only convention the game uses is lighting to subtly guide the player along the path. The game has been made linear intentionally, and lighting has been added in convenient locations to draw the players attention to those spots naturally.

2.2 Cautions & Warnings

The biggest worry for most users is motion sickness as most people who have not yet tried VR get motion sick easily. If we had more time, to combat this we would include a warning screen at the beginning of the game along with an option to enable a vignetting effect when moving. Narrowing the field of vision of a player when they are moving helps greatly with VR motion sickness. Additionally, whoever plans to use this product can use a room fan when playing; constant air flow will not prevent overheating and headaches, but also allow the user to orient themselves in their real room preventing motion sickness. Finally, we could also implement teleportation movement which is a lot more beginner friendly in terms of motion sickness.

3 Getting started

In order to use the product, the player will need any VR headset and at least one controller, a computer to run the product on, a USB-C to USB-X cable to connect the VR headset to the computer, the executable file and accompanying files to run the game which can be found on the GitHub, and at least a 1x1 m space to play in.

To begin playing the user should first ensure their headset is connected to the PC via the cable and that their files are properly installed. When the user is ready to boot up the game, they should double click the .exe file and wear their headset. The game will start them in the apartment and the sequence of events will begin.

3.1 Configuration Considerations

Required device:

Oculus Quest 2 VR headset

Oculus Quest controller

Oculus link App

Compatible USB C to USB-X cable for the VR headset and PC

There must be enough space to play the VR game and a good Wi-Fi for the player to make it comfortable to play the game. A personal audio device is not needed but can be used for large rooms to make it more immersive.

3.2 User Access Considerations

This product will be used by a variety of different users in Canada.

3.3 Accessing/setting up the System

A potential user only needs a GitHub account to acquire the software. They can download it easily from the website and run it as a .exe file on their computer.

To make a GitHub account, follow these steps

1. Open <https://github.com> in a web browser.
2. Click on the Sign Up button.

3. Fill in the form with your personal details, including your email address, username, and password.
4. Choose whether you want to receive updates and announcements via email.
5. Verify your email by entering the code.
6. Select your preferences and click Continue.

3.4 System Organization & Navigation

Our system functions seamlessly from one instance. Players are put immediately into the apartment and all the levels stem from the apartment. Users can get from the beginning of the game to the end without the need for creating separate scenes or subsystems.

3.5 Exiting the System

There are no save points or data considerations that need to be made when exiting the game. Users can simply take off the headset and close the application by right clicking the window and selecting “close window”. To close the game faster you can press and hold ALT + F4 on the keyboard.

4 Using the System

There are two main functions that the player can use to interact with the environment. The right and left grip trigger can be used to grab in game objects like doors and props. The right joystick can be used to move the player through the level. The player can also move their head and physically move in the environment because the player collision box is attached to the camera. Therefore, if a player has enough room, they can walk around in real life to move in game. This also prevents players from clipping through objects by moving to them with the joystick and moving through them by walking in real life.

4.1 Functions

The system functions are all demonstrated in the video.

5 Troubleshooting & Support

Due to the simplicity of the project, there are not many dynamic conditions or situations that could lead someone to break the game. There is one problem that occurs very rarely and that is if the player pushes against a door with their head, it is possible to be teleported on top of the door and subsequently out of the map. This, however, was only a problem when the doors were extremely short in prototype II; since then, they have been increased in height. This problem should not occur anymore but if it does, the player can easily close and re-open the application. As for the headset itself there is one error not exclusive to the product described in section 5.1.

5.1 Error Messages or Behaviors

The main error message users experience is the “tracking lost message” the following is a list of possible solutions.

1. Clear obstructions – Remove objects that are blocking the view of the Virtual reality sensors.
2. Reposition sensors - Reposition the VR sensors base areas.
3. Check lighting conditions – Ensure the area is light but not overly bright.
4. Calibrate VR setup – Put up boundary walls and define a play area.
5. Reduce interference – Minimize interference from other electronic devices such as Bluetooth headphones or speakers.

5.2 Special Considerations

Be cautious and aware of your surroundings while within the VR environment.

5.3 Maintenance

To ensure the game and oculus headset operate effectively the following measures should be taken.

1. Always power off the headset and close the environment after use, this will prevent any electrical hazards from occurring.
2. Clean the headset with a microfiber cloth. This will prevent any dirt or debris from harming the headset. No liquids should be used while cleaning the headset.
3. Clean the lenses of the oculus headset. Wipe the lenses gently to avoid any scratches or damage.
4. Sanitize the headset gently.
5. Ensure the headset is stored properly to prevent any damage between operation periods.

5.4 Support

If support is needed users can contact any of the following designers during our hours of operation,

Erfun Zadsar - ezads056@uottawa.ca

Mercy Ayodele - mayod087@uottawa.ca

Abdulwahid Ahmed - aahme276@uottawa.ca

Lane Morency – lmorc097@uottawa.ca

If users experience an issue outside of the hours of operation, they must write a detailed email outlining the issue to one of the designers listed above and their issue will be analyzed within 24 hours.

6 Product Documentation

The product final prototype was made with Unity software that is used to create 3D games, design visual and realistic environment. The prototype was divided into three design categories which are the emotional aspect, immersive experience aspect and the educational aspect.

The Emotional aspect: This category involves creating an emotional response for the user while playing the VR game. It involves tools like lightning, sounds and posters to create an interactive and immersive environment for the players that would allow them to step into the shoes of the civilian's life and adaptations. This will motivate them to quickly take actions against LAWs rules.

The immersive experience aspect: This category involves creating an environment for the players that would allow them to interact with the VR environment. This allows them to be in the civilian's shoe and feel what they felt without being physically there while learning about the ethical issues regarding the use of LAWs.

The Educational aspect: This category focuses on providing the players with authentic information about the ethical issues regarding the use of LAWs. This help promote awareness and a need for urgent actions against LAWs.

6.1 Final Product Breakdown

6.1.1 BOM (Bill of Materials)

VR headset: Meta Quest 2 <https://www.meta.com/ca/quest/products/quest-2/> (\$349.99)
Unity Hub (Development Software): <https://unity.com/unity-hub> (Free)
Computer for Development: Depends on computer minimum \$400
Assets for Game Development: <https://assetstore.unity.com/> (Free)

6.1.2 Equipment list

The only equipment used was the Meta Quest 2 and a computer for developing the software.

6.1.3 Instructions

VR functionality was achieved by following a [YouTube series](#). The level design and layout are all made asset by asset and thus a step-by-step guide would be extremely long as wall and floor and object in the scene are a combination of fine translations that lead to a cohesive product. In the future, assets could be made from these collections to make re-assembling the level easy, however for the purpose of developing software the finished build is enough and re-assembly of a product is not required like with physical products.

6.2 Testing & Validation

Primarily, testing was done using a VR headset and a connection to the computer. It is possible to run the game through Unity so there were continuous checks and tests done to ensure each individual part of the VR worked properly. For example, when developing the doors, we would come up with an initial solution, test the solution in VR, identify any problems, apply the necessary tweaks to the unity build and test again. This iterative process was repeated for all major functions in VR, such as walking, grabbing objects, and spawning in.

7 Conclusions and Recommendations for Future Work

One lesson we learned as a team was the importance and effectiveness of dividing work officially. Early on, we took an approach where whoever was available on that day would help do whatever needed to be done, which was ineffective and led to some members not doing anything on some days. Later we decided that at the beginning of each week, everyone would have a task assigned to them; this way, at the end of the week finishing a task was as simple as copying and pasting what everyone had done into one document. As for the product itself, the focus and direction of our development would be completely different knowing what we know now. After, discussing design day with the professor we found that what the client really wanted was an experience that would be accessible to anyone who tried it. We also learned that the client themselves tried some of the games but got too motion sick to continue playing. Knowing this, we would have poured all our development time into the actual software and not the final video. Motion sickness prevention would have not only been used in our design but made up a significant chunk of our sales pitch on design day.

Vignetting effects for when the person was moving, the option to switch between continuous movement and teleportation, a fan so people can orient themselves in the real room and to cool them down. We did not see anyone using these techniques on design day despite them being quite simple to implement. We would have also focused on telling the story through the game instead of through the video.

8 Bibliography

No external references were used in writing this document or development of the prototype.

APPENDICES

9 APPENDIX I: Design Files

<https://makerepo.com/lmore097/1944.gng1103-team-2-abolish-the-laws>

Table 3. Referenced Documents

Document Name	Document Location and/or URL	Issuance Date
Deliverable A: Team Contract	Deliverable A Link	Jan 21, 2024
Deliverable B: Needs Identification	Deliverable B Link	Jan 28, 2024
Deliverable C: Design criteria	Deliverable C Link	Feb 4, 2024
Deliverable D: Conceptual Design	Deliverable D Link	Feb 11, 2024
Deliverable E: Project plan and cost estimate	Deliverable E Link	Feb 25, 2024
Deliverable F: Prototype 1	Deliverable F Link	

Deliverable G: Prototype 2	Deliverable G Link	March 10, 2024
Deliverable H: Prototype 3	Deliverable H Link	March 24, 2024
Deliverable I: Design Day Materials	Deliverable I Link	April4, 2024
Deliverable J: Team Presentation	Deliverable J Link	March 14, 2024

10 APPENDIX II: Other Appendices

Youtube series we followed to learn VR development

https://youtu.be/YBQ_ps6e71k?feature=shared

Final Video:

<https://youtu.be/9yjjbPNTzE8>