

# **Deliverable H – Prototype III and Customer Feedback**

**University of Ottawa**

**GNG 1103: Engineering Design**

**March 24, 2024**

<b>Marcel Traore</b>	<b>300379484</b>
<b>Reina Hawa</b>	<b>300307426</b>
<b>Mitchell Bromberg</b>	<b>300380559</b>
<b>Anna Maria Rizk</b>	<b>300368355</b>
<b>Qassim Al-Faesly</b>	<b>300354453</b>

## **Abstract**

In this deliverable, we refine our design criteria, bill of materials, and target specifications, updating them to meet our project's evolving needs. We showcase the progress of our initial prototype by providing screenshots and highlighting the feedback we have received, driving further enhancements to our VR experience. Additionally, we outline a strategic plan for testing and developing our third and final prototype, while also addressing adjustments based on input regarding the environment and storyline such as tweaking it so our targeted audience can easily relate, to adjust the lighting to make the environment darker and adding posters, so the cautious housing does not seem so empty.

1-Introduction.....	3
2-Prototype II and Feedback.....	3
3-Prototype III .....	4
4. 1 Results.....	4
4.1.1 Overview.....	5
4.1.2 Prototype Plan Results .....	5
Table 1: Prototype III testing results .....	5
4.2 Environment.....	6
4.3 VR experience .....	8
4.4 Visual .....	9
6 Bills of Materials update.....	9
7 Target Specifications .....	10
8 Conclusion .....	11
9 Trello .....	12

## 1-Introduction

In this deliverable we present our third and final prototype as well as the customer feedback we received. We will be outlining the testing procedure as well as updating our bill of materials. We will elaborate on the changes we made from prototype II to prototype III such as adding rain, thunder, and breathing sound effects, and changing the light settings and skybox.

## 2-Prototype II and Feedback

Following the in-class presentation, little negative feedback in regard to the second prototype was received. During the presentation, the feedback received from the second and third client meetings was explicitly addressed, either within the VR environment or within the plans for the third prototype. The elements of the prototype that will remain and those that changed due to previous feedback were highlighted, enabling the group to demonstrate the progress made from the last meeting. Specifically, the presentation explored and analyzed each phase of the project, as per the design process, demonstrating to the audience the progression of the project. Questions were addressed at the end of the presentation, and feedback was received from the instructor. The main points of feedback include verbal conduction, as well as physical

presentation. In terms of verbal conduction, the instructor noted that the group used repetitive phrases and noted room for improvement in avoiding such repetitiveness. In terms of physical presentation, the instructor noted room for improvement in the group's dressing of business casual. As design day approaches, the group will closely consider this feedback and apply it to the design pitch. During the in-class presentation, feedback was also received on the general themes and messages conveyed through the VR experience. The instructor noted making the themes of socioeconomic disparities in humanitarian crises more explicit rather than implication, as per the prior approach. Furthermore, he noted that the innocence and empathy that is sought from a child's perspective should also be used more explicitly.

Moving forward, prototype 3, along with design day preparation surrounded the application of these improvements. In terms of repetitiveness, more group practices will be initiated before design day. For physical presentation, a unified dress code amongst the group will be determined (to convey professionalism and cohesivity among the group. Lastly, the narration and scripting of the VR video will be altered such the messages and themes are more obvious and digestible for the audience.

### **3-Prototype III**

Based on the results of our previous prototype and feedback from our class presentation, we decided to focus all our attention on developing the VR environment and experience. The reason for this was that these were our last two subsections that needed improvement due to feedback on the dull, empty look of the environment, with some commenting, "It feels like no one lives here: "It feels like nobody lives here". In addition, when the volunteers finished our simulation, they all said it was boring because they were walking all the time, and one of them said, "I would have liked to have learned more during this experiment". In response to these comments, we decided to make changes to both aspects. For the environment, we added everyday furnishings that would be present in this dystopian future, such as a run-down kitchen, public toilets, tin cans and debris, to highlight the low quality of life of the citizens. To enhance the VR experience, we've added several interactions that allow the user to learn more about the world we've created. For example, we've added guardians with narration in both French and English. By making these changes, we wanted to make the project more interesting so that the public could discover how and why the current adaptations are presented. We then spend the rest of the time optimizing placement, audio settings and lighting to ensure a good user experience.

## **4-Prototype III Testing Results**

### **4.1 Results**

In this third prototype, since our storyline and the audio meet our standards, by provoking the targeted emotions to the audience, we have dedicated all our attention to completing both environments, enhancing the VR experience and improving the visual.

### 4.1.1 Overview

The objective that we set ourselves with this prototype is to add life into it. As we noticed with the previous testing results, our cautious housing and our street was liked and we received great feedback, but everyone advised us to make the whole scene more alive.

To do so, we have modified the environment to make it seem like people are living here and improve the visual aspects. As for the storyline and the audio, we haven't changed nor modified anything since we had amazing results from the previous tests.

### 4.1.2 Prototype Plan Results

**Table 1:** Prototype III testing results

Test Objective (Why)	Goal (what we want to know)	Testing Method (How)	Observe/Record and Results (Analysis of method)	Progression of the task	Results	Commentary
<i>Environment</i>	<i>Collider testing</i>	Using the VR headset, we can test the scene and check if the colliders are working	All the colliders work	The cars colliders are a little too small and we can walk over them		An overall success however there is a need to tweak some things
	Realistic?	Observation	Ask volunteers if they think the environment is realistic	completed		"Nice improvement from the second one"
Audio/sound	Testing if the thunder and rain sound are working	Using the VR headset, we can test the scene and check if the sound is working properly	Earing test during VR experience	Muting the sound when entering the cautious housing		Close to perfect but needing some changes
	Testing if the heavy breathing is working properly	Using the VR headset, we can test the scene and check if the sound is working properly	Earing test during VR experience	Making a "is trigger" collider that will turn of the heavy breathing sound when entering cautious housing		Close to perfect but needing some changes

Legend: green=pass, yellow=modification needed, red=failed

## 4.2 Environment

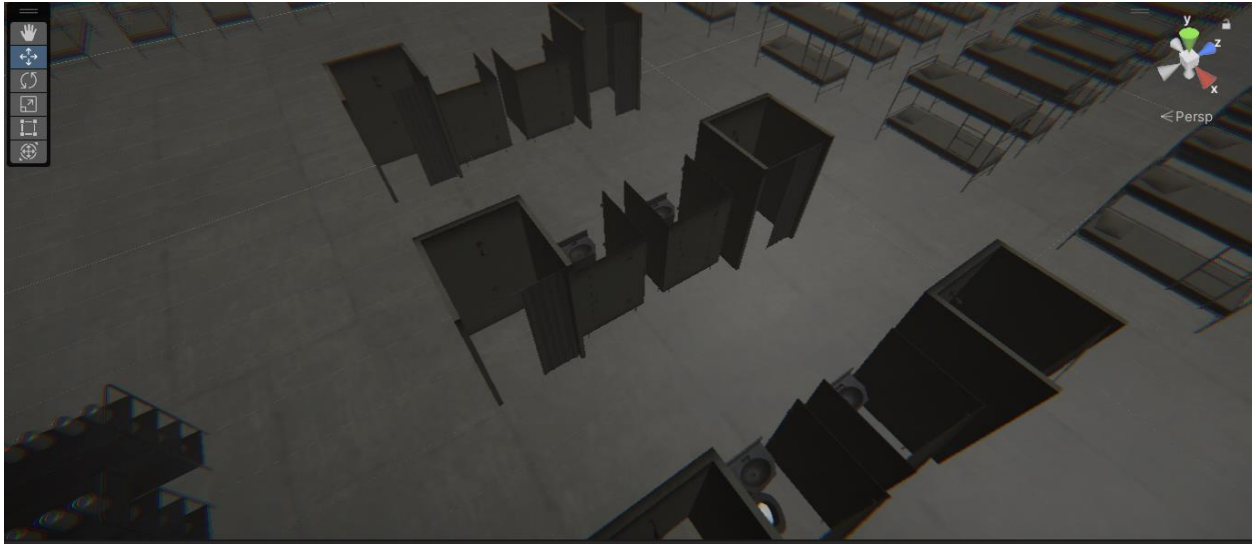
With the modifications we have made, we were able to create the illusion that the whole city is alive. As we have received many remarks on that matter, we have, following a meeting, an added element that would be present in this situation.

For the cautious housing, we have decided to add three sections; a kitchen, food storage and utilities. As for the streets, since we got told that it was too clean, we added trash and various other debris to soil the street. By doing so, we were able to get better results when it came to that matter. For instance, some people said: “That’s a good idea to add a bathroom and showers” and another said: “Now the street looks more like how it should.”

With these results we are confident that we have one of the best environments since, with the results of our tests, we were able to make the view feel obnoxious, stress and fear for the character and themselves.



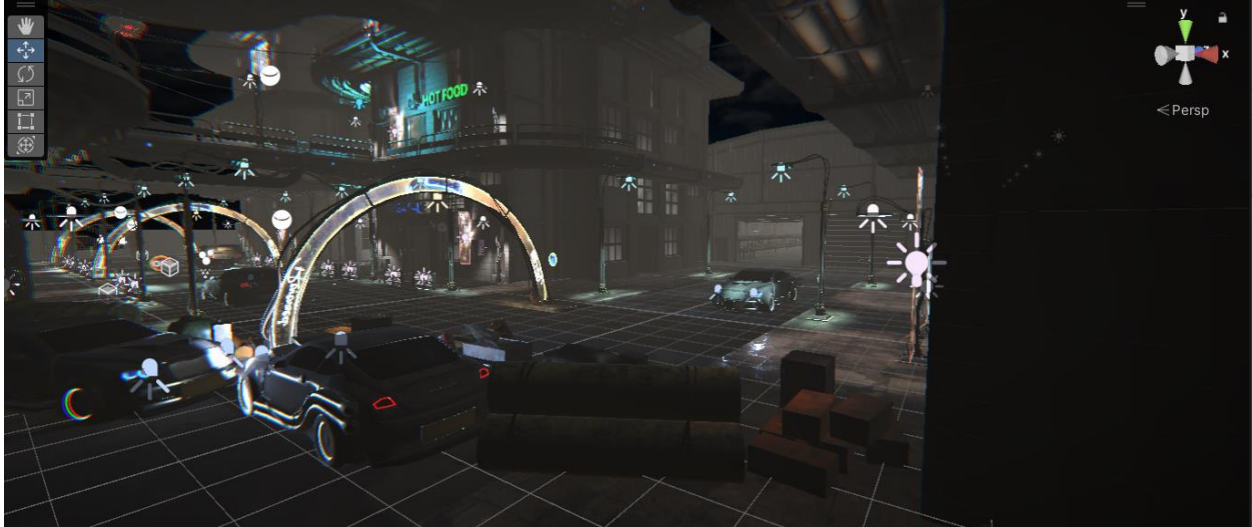
*Figure 1- Food storage*



*Figure 2- Bathroom*



*Figure 3- Kitchen*



*Figure 4- Debris on street*

### **4.3 VR experience**

In the second prototype, the overall VR experience was good, but interactions were missing. So, we began to create various interactions for the user to experiment with.

The first is the previously mentioned posters. When the user interacts with them, depending on the adaptation present, an English narration will start to play to explain the adaptation. In addition, there will be French subtitles to make the experience accessible to a wider audience. We've also added dialogue to the guards at the gate. To make the experience even more accessible, we decided to have one of the guards speak in French and the other in English.

We carried out several individual tests with volunteers to get their feedback. They all liked the dialogue, and the French volunteers understood each adaptation perfectly, saying: "I like that you added subtitles to help people like me understand without the need of me speaking English" (translated from French to English). What's more, those who experienced the previous VR prototype were more satisfied with this one. We have also added invisible walls to prevent the user going the wrong way.





*Figure 5- Interactive soldier*

#### 4.4 Visual

To fix the visual problems that occurred in the second prototype we need to switch the quality settings in the project settings. Switching from ultra to very high allowed us to change the skybox from a blank sky to the dark cloudy night sky. Playing with the light settings we decided to make the screen a little brighter as well as adding fog. The fog adds to the atmosphere as it complements the rain and thunder.

### 6 Bills of Materials update

The following table includes the most recent compilation of the materials anticipated to be used in the VR environments. The items highlighted in green have already been implemented into the project, and the items highlighted in yellow are newly added to the list.

**Table 3:** Bill of Materials

Item no.	Description	Store	Price (CAD)	Link
#1	VIS – PBR Grass texture	Unity Asset store	FREE	<a href="https://assetstore.unity.com/packages/2d/textures-materials/floors/vis-pbr-grass-textures-198071">https://assetstore.unity.com/packages/2d/textures-materials/floors/vis-pbr-grass-textures-198071</a>
#2	Fence Gate Pack	Unity Asset store	\$4.99	<a href="https://assetstore.unity.com/packages/3d/environments/urban/fence-gate-pack-119711">https://assetstore.unity.com/packages/3d/environments/urban/fence-gate-pack-119711</a>
#3	Abandoned Car	Unity Asset Store	\$4.99	<a href="https://assetstore.unity.com/packages/3d/environments/urban/abandoned-car-181912">https://assetstore.unity.com/packages/3d/environments/urban/abandoned-car-181912</a>
#4	Streetlights Pack	Unity Asset Store	FREE	<a href="https://assetstore.unity.com/packages/3d/props/exterior/street-lights-pack-31644">https://assetstore.unity.com/packages/3d/props/exterior/street-lights-pack-31644</a>

#5	Garbage and Trash props	Unity Asset Store	\$9.90	<a href="https://assetstore.unity.com/packages/3d/props/industrial/garbage-and-trash-props-74482">https://assetstore.unity.com/packages/3d/props/industrial/garbage-and-trash-props-74482</a>
#6	Garbage Heap The last	Unity Asset Store	FREE	<a href="https://assetstore.unity.com/packages/3d/environments/industrial/garbage-heap-the-last-70773">https://assetstore.unity.com/packages/3d/environments/industrial/garbage-heap-the-last-70773</a>
#7	Guard	Unity Asset Store	\$5	<a href="https://assetstore.unity.com/packages/3d/characters/humanoids/low-poly-soldiers-53612">https://assetstore.unity.com/packages/3d/characters/humanoids/low-poly-soldiers-53612</a>
#8	Bunks bed, Cautious Housing Utilities	Unity Asset Store	\$8	<a href="https://assetstore.unity.com/packages/3d/environments/urban/survive-nuclear-war-interior-35996">https://assetstore.unity.com/packages/3d/environments/urban/survive-nuclear-war-interior-35996</a>
#9	Wall Graffiti	SketchFab	FREE	<a href="https://sketchfab.com/3d-models/cc0-decal-graffiti-textures-69a07e3d256e4b0490ac49e99ac57896">https://sketchfab.com/3d-models/cc0-decal-graffiti-textures-69a07e3d256e4b0490ac49e99ac57896</a>
#10	Street Pack	Unity Asset Store	FREE	<a href="https://assetstore.unity.com/packages/3d/environments/urban/low-poly-street-pack-67475">https://assetstore.unity.com/packages/3d/environments/urban/low-poly-street-pack-67475</a>
#11	Outdoors bunker with observatory	Unity Asset Store	10\$	<a href="#">Outdoors bunker with observatory   3D Props   Unity Asset Store</a>
#12	Sad walk	Mixamo	FREE	<a href="#">Mixamo</a>
#13	Free cans pack	Unity Asset Store	FREE	<a href="#">Free Cans pack   3D Props   Unity Asset Store</a>
#14	Unity	Unity	Free	<a href="https://unity.com/">https://unity.com/</a>
#15	Computer	N/A	N/A	N/A
#16	GitHub	GitHub	Free	<a href="https://github.com/">https://github.com/</a>
#17	Modular Warehouse	Unity Asset Store	4.99	<a href="https://assetstore.unity.com/packages/3d/environments/modular-warehouse-231449">https://assetstore.unity.com/packages/3d/environments/modular-warehouse-231449</a>
#18	shelf	Unity Asset Store	Free	<a href="#">Shelf   3D Interior   Unity Asset Store</a>
#19	Modular city pack	Unity Asset Store	19.99	<a href="https://assetstore.unity.com/packages/3d/environments/sci-fi/city-builder-cyberpunk-182821">https://assetstore.unity.com/packages/3d/environments/sci-fi/city-builder-cyberpunk-182821</a>

## 7 Target Specifications

**Table 3:** Updated Target Specifications

- Green: Signifies the successful completion of target specifications.

- Yellow: Indicates specifications anticipated to be met.
- Red: Highlights specifications that are currently off track.
- White: Denotes specifications that have not yet been addressed in the prototype.

Design Specification	Relation (<, >, =)	Target Value	Units	Verification
<b>FUNCTIONAL</b>				
VR Environments	=	2	# of Scenes	Measure
One minute video	=	60	Seconds	Measure
Technical adaptations	=	Yes	N/A	N/A
Visual elements	=	Yes	N/A	N/A
Auditory elements	=	60-70	Decibels	Measure
Avoid use of autonomous robots in video	=	None	N/A	N/A
Evoke empathy		10	1-10	Testing
Evoke anger	>	7	1-10	Testing
Evoke urgency	>	9	1-10	Testing
<b>NONFUNCTIONAL</b>				
Video narration	=	Yes	N/A	N/A
Complexity of concepts	=	Yes	N/A	N/A
Reaction time	>	Yes	Seconds	Measure
Attention Span	>	Yes	Seconds	Measure
<b>CONSTRAINTS</b>				
Avoid graphic content	=	4	1-10	Testing
Generic background	=	Yes	N/A	Testing
Avoid geographical identifiers	=	None	N/A	N/A
Cost	<	50	\$ (CDN)	Measure

## 8 Conclusion

As we near the Design Day presentation, our foremost attention turns to the refinement of our final prototype. With user and judge interaction looming, our aim is to present a succinct pitch, providing a comprehensive overview of our product and its core objectives. Our program

is meticulously crafted to immerse the audience, illuminating the complexities inherent in autonomous weapons. Ultimately, our goal is to catalyze a positive transformation in the perspectives of decision-makers.

## **9 Trello**

<https://trello.com/invite/b/D5G8Kyy9/ATTI483a5cf8b8e5dda1785f6f92c7e6056eD9705434/gng-1103-group-3>