

DELIVERABLE F: PROTOTYPE I AND CUSTOMER FEEDBACK

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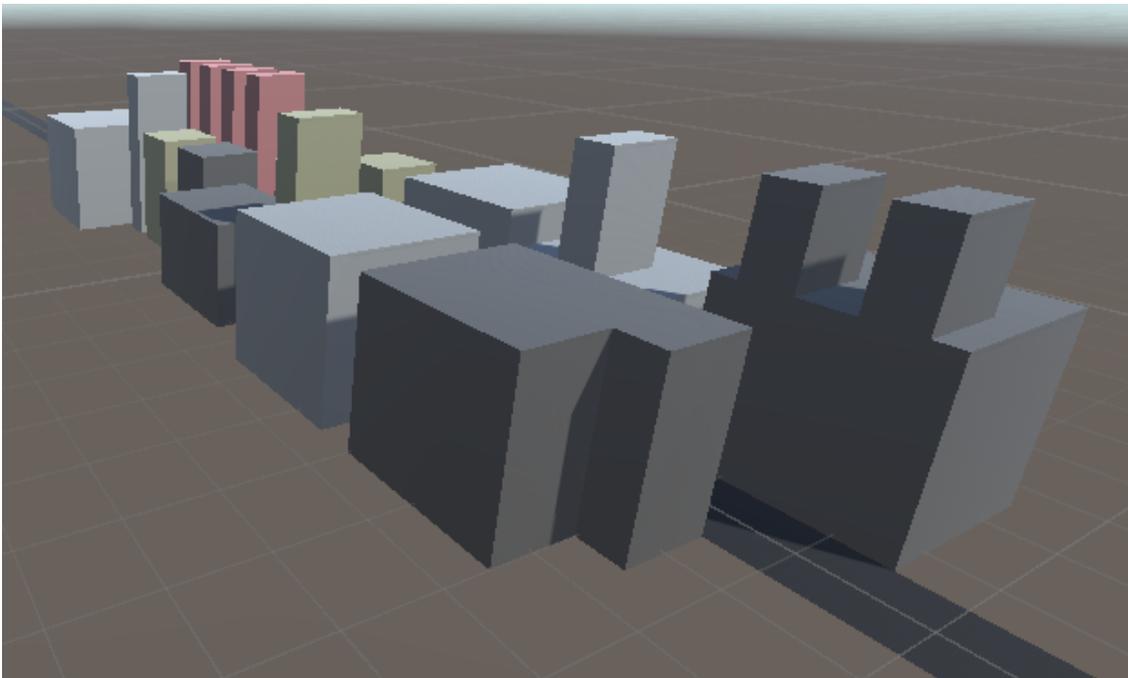
1. Introduction

The following technical document outlines the first set of prototypes that were created for the VR experience requested by Mines Action Canada. It explores the characteristics associated with the designs, which encompass fidelity, level of comprehensiveness and other details, while also critically examining the test audience response to the given prototypes. It should be noted that the first set of prototypes were generally low-fidelity and encompassed only the visual aspect of the project. These first prototypes effectively set a base to build on to ensure that the project solutions could be feasibly generated and were in line with the design criteria and target specifications set based on the customer/user needs.

2. Generated Prototypes

Pictured in the figures below are the first set of prototypes that were generated. They were all generated within the Unity game design engine (the software which will be used for the final product) in order to ensure the feasibility of replicating them, albeit to a higher degree of fidelity and comprehensiveness in the final project file.

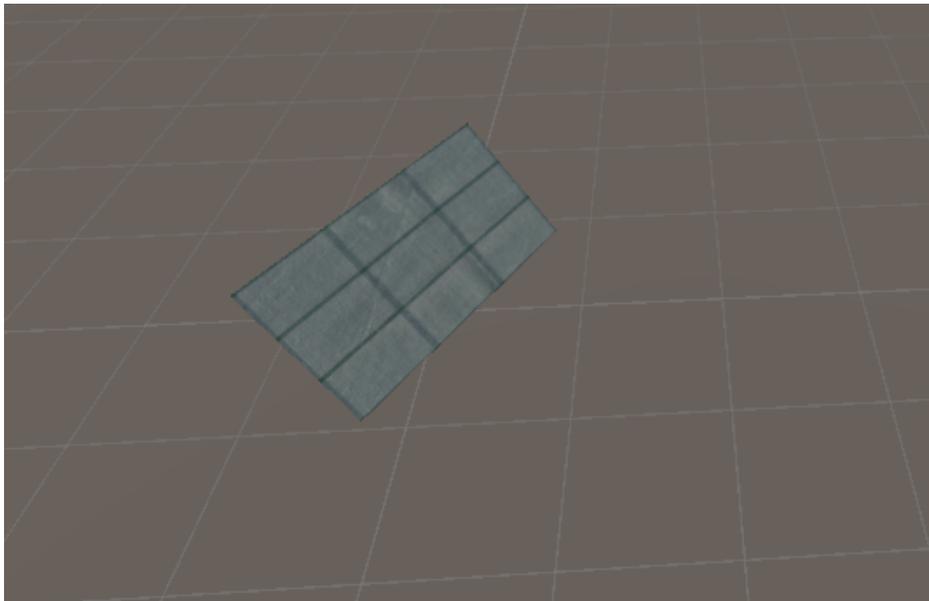
Figure 2.1 - General Setting/Environment Prototype



Shown above is a prototype generated to offer a glimpse into the shape that the final product's environment could take. It depicts a series of buildings of varying shapes, sizes, and textures on either side of a road. This is in line with the kind of setting selected as the optimal solution based on design criteria and target specifications (it equally received lots of positive feedback in the second client meeting).

The prototype is very low fidelity. The buildings consist of simple cubes and rectangular prisms and have assigned textures that are simply colours; there is very little detail associated with the design. Furthermore, the road consists solely of a black-coloured plane, and the project file as a whole features no scripts or codes whatsoever, which will be present in the final product. Conversely, the level of comprehensiveness is actually relatively high. The setting was conceived to be simple and while the street in the final product may be a little longer and feature more detailed assets, this prototype rather accurately depicts the general shape of the environment.

Figure 2.2 - Tarp/Sheet Texture Prototype



The second prototype seeks to examine the functionality/aesthetic of the tarps/sheets that were proposed to be hung between buildings in the final VR experience (as a means that humans might take to shield themselves from the view of aerial drones/robots). This prototype is very focussed - it zeroes in on an extremely specific area of the project that could be tricky to implement provided it is not fully planned out. It is also rather high fidelity; this aesthetic likely approaches the limit of what we as a team can reasonably accomplish within the tight timeline associated with the project, particularly when considering the limited scope of our knowledge of Unity.

3. Customer Feedback and Testing

3.1 Client Feedback

During the last client meeting the clients restated what they wanted, they wanted a simple scene with no machines, along with wanting our team to focus on 1-3 details that we can perfect in the given timeframe. Among the client's examples of what we should add they restated factors from the first

meeting, such as emergency radio broadcasts, posters, signs, modified structures, as well as tarps and coverings in the environment. Of these, we decided on posters and tarps, but we are also looking into the radio broadcast for the background.

3.2 Audience Test Feedback

The following table presents the reaction (affirmative vs. dissenting) and comments associated with audience members who were polled regarding the effectiveness of the initial two prototypes. As per the testing plan, all members were pseudo-randomly selected and exhibited no strong feelings about killer robots (either in favour of or against).

Table 3.2.1 - Audience Test Results and Comments

Audience Member	Reaction	Comments
1 - Sadie	Affirmative	- Looks convincing
2 - Matthew	Affirmative	- Would be more effective if there was something affecting me in the present - Why are there no robots? - Robot noise/ Heartbeat noise - Otherwise pretty good
3 - Evan	Affirmative	- Looks very good - More environmental effects like fire might be nice - Should include a skybox
4 - Arlo	Dissenting	- Should include killer robots
5 - Peter	Affirmative	- Add a hospital - Add tunnels, different roads, intersections - Will you have the ability to enter buildings - Consider having a single giant building from which robots originate

6 - Tudor	Affirmative	- Good approach - Good spacing (adequate for tarps or other accessories that may be placed between buildings) - Approach does not seem overcomplicated
7 - Kiera	Affirmative	- Appreciates the simplicity as it facilitates trying to understand it - Feels like more normal things could be added to the beginning to properly feel the transitioning of things
8 - Mahasin	Affirmative	-Simple to understand for those who are less tech-savvy
9 - Jake	Dissenting	- Looks too simple - Could include audio features besides radio broadcast (i.e. sound effects)
10 - Kate	Affirmative	- Good amount of realism - Loves the emphasis on three ways of protection

4. Analysis of Critical Components

The critical components of this project can be broken down into the following components:

1. Storyline
2. Environment
3. Audio
4. Coding
5. Creative Style

4.1 Storyline

The user starts off by walking around a typical city. Initially, the environment looks normal. It includes familiar objects and surroundings such as tall buildings, trees, park benches etc. Once the user reaches a certain distance x , the surrounding environment begins to change.

At a certain timestamp, the city transitions into an environment under the influence of autonomous weapons. There are two indications that humans are trying to protect themselves against the surroundings - warning signs/posters and tarps. As the distance x increases, the intensity of the damage increases as well. Visuals become more disturbing. Throughout the entire video, a radio broadcast can be heard of somebody giving tips and advice on protection and safety. This voice might become more and more intense.

Near the end of the video, somebody yells something along the lines of “They’re coming!”, “Watch Out!” or “Duck!”, and then the scene cuts to black. At that moment, it is indirectly implied that the user has become part of the environment and may have gotten injured/killed. A message will pop up on the black screen about the downside of autonomous weapons. This message will be something along the lines of: “If we don’t ban autonomous weapons, this could be our future - is this what you want?”.

4.2 Environment

The location is a typical suburban city. The user is walking along a road and tall buildings can be seen on both sides of the road.

4.3 Audio

As mentioned above, there will be a radio broadcast throughout the video to reiterate what humans should be mindful of when walking in the city. In terms of the viewers, it gives them clarity on the specific precautions that we chose to focus on. This radio broadcast will be similar to an emergency broadcast () that will repeat information in loops so that people can be reminded at all times.

Besides the broadcast, there will be little to no dialogue in order to break the language barrier. Most of our communication will be done through visuals and text (at the end). We plan on recording the radio broadcast ourselves so that copyright issues will be avoided.

4.4 Coding

There is little interaction between the user and the environment and mainly interactions between the environment and the objects in the environment. To facilitate the amount of coding that needs to be done, the buildings may be built taller. We plan on using Mixamo to make animations, in order to create smooth transitions for objects going from a “normal” state to a “damaged state”.

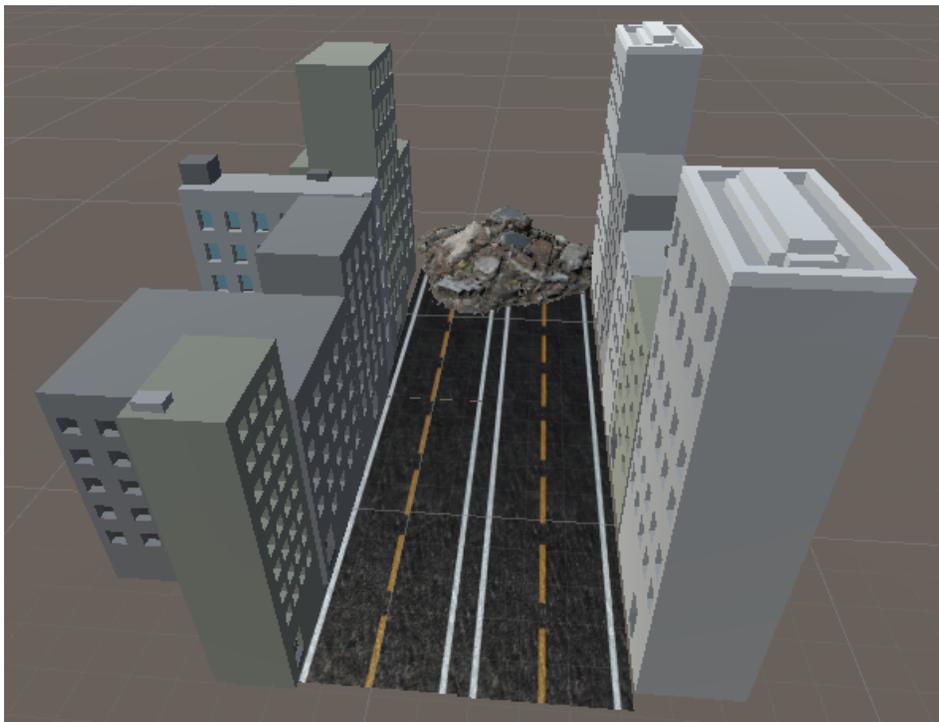
Our VR has some stationary objects and some movable objects. The movable objects will need to be given more emphasis on the code. Furthermore, since we have established that damage begins once the user reaches point x , coding will need to be done with respect to that point as well as beyond that point since damage becomes more intense.

4.5 Creative Style

Our concept is simple, yet engaging and portrays how the influence of autonomous weapons can affect civilians. The virtual reality experience is simple yet looks somewhat realistic. Our components all go well together and are somewhat compatible with each other. All of our buildings resemble block features for simplicity.

5. Revised Prototypes

Figure 5.1 - Revised Setting/Environment Prototype



This revised prototype addresses the concerns that audience members had about the initial prototype. It also further fleshes out the initial design and adds a distinct level of fidelity. It features Unity models with increased levels of realism and a widened road consisting of two lanes, which is more reflective of a real-world downtown environment.

6. Adjustments to BOM and Design Criteria

Table 6.1 - Additions to BOM

Item name	Description	Quantity	Cost (\$CAD)	Link
The Wasteland LITE	This asset includes Tarp assets that will be used to decorate the streets.	1	0	https://assetstore.unity.com/packages/3d/environments/industrial/the-wasteland-lite-73054
Low poly street pack 67475	This asset pack has street related assets like roads, trees, signs, and traffic lights that look realist and not cartoony.	1	0	https://assetstore.unity.com/packages/3d/environments/urban/low-poly-street-pack-67475
Rubble and debris modular set free sample 118763	Rubble to make the street look more run down	1	0	https://assetstore.unity.com/packages/3d/props/exterior/rubble-and-debris-modular-set-free-sample-118763
Ground dirt material	Used to give the ground other than street texture	1	0	https://assetstore.unity.com/?q=dirt&orderBy=1
Low poly vehicles pack 2670	This asset pack has different kinds of cars to fill the street with.	1	0	https://assetstore.unity.com/packages/3d/vehicles/land/low-poly-vehicles-pack-26707
Free concrete materials	This asset pack is used to add a sidewalk area in the street	1	0	https://assetstore.unity.com/packages/2d/textures-materials/concrete/yughues-free-concrete-materials-12951

7. Conclusion

In the above technical document, a series of generated prototypes were generated in order to be presented to test audiences for evaluation. The client needs were reiterated, and a table presenting audience reactions and comments was equally presented. It was determined that the initial prototypes were in line with the design criteria and overall vision of the project. As a result, a more refined version of the prototype was generated to be evaluated once again by the test audiences.

An analysis of critical components was also presented, along with all adjustments/additions to the bill of materials and changes to the design criteria and target specifications. The test plan was adjusted for the second round of prototypes, the most prominent change being an increase in the total amount of test audience members polled in order to ensure more accurate test results.