

Project Deliverable F: **Prototype I and Customer Feedback**

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## Abstract

*The purpose of this report is to summarize feedback collected from the client during the second meeting and developing a first prototype to test theoretical components.*

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## Introduction

This document focuses on the development of our first prototype design, which includes test plans, an analysis, results and more. As well, we will be focusing on the feedback we were given by our client.

## Client Feedback

Feedback was positive, and our technical system concepts were well received. The control scheme, user interactivity models, and accessibility models convinced the client well.

The client however remarked that our storyline didn't have the problem with autonomous weapons clearly demonstrated and have emphasized the importance of the core message being displayed clear and direct.

They mentioned that they would like us to emphasize why autonomous weapons should be banned by explicitly showing and carrying out a failure mode in our storyline.

The client appreciated the opinion survey at the beginning and end of the experience. A potential idea would be to collect these responses in a database online and display statistics of other participants' responses at the end of the experience.

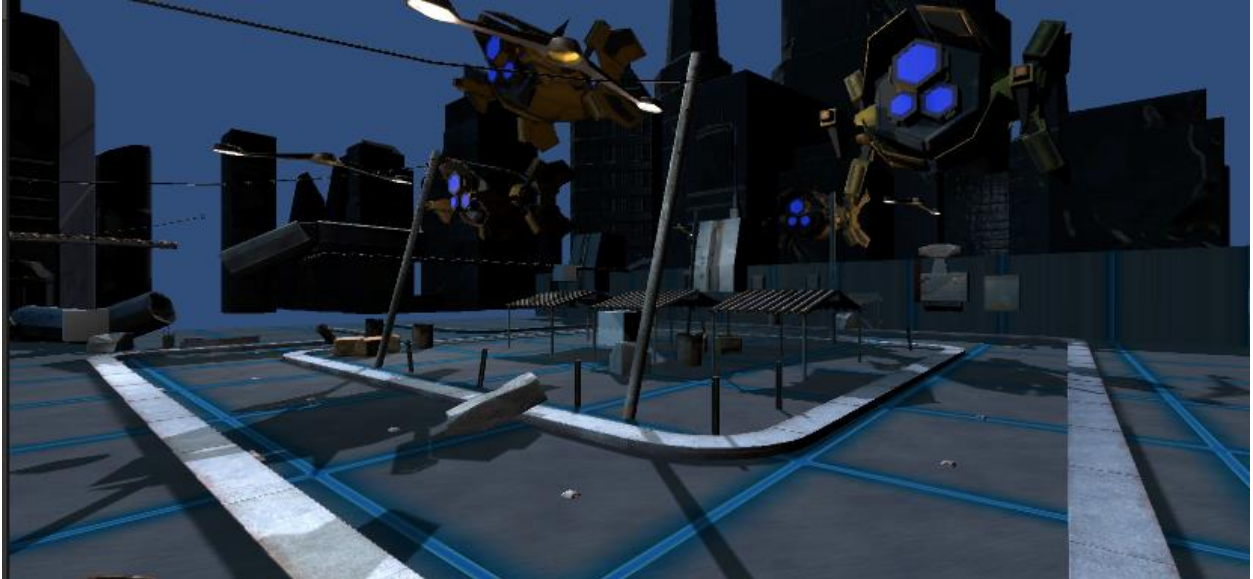
## Prototype

### Testing Results & Comments for Prototype 1

Design Specification	Measured Value	Target Value	Comments
Functional Requirement			
Space required	2.75	1m <sup>2</sup> - 4m <sup>2</sup>	Very small space with room for some movement
Non- functional Requirement			
Safety	High	High	Low amount of tripping hazards, no awkward movements
Constraints			
Duration	2 mins	5 mins	Current prototype was quick, but testers were rather impressed
Play Area	2.75	Check other deliverable	

## Prototype illustrations

Scene testing:



## Prototyping Test Plan

We plan to meet at STEM (doesn't always have to be all 5 of us) and test out the prototype after changes have been made. Since we will be submitting deliverables roughly every week, we

plan to test once a week keeping in mind the deliverable requirements for that week. We will take notes about what we think fits well and what should be changed and share those notes with the group in the Microsoft Teams group chat after the test.

Test	Test Objective (why)	Description of Prototype used and of Basic Test Method (what)	Description of Results to be Recorded and how these results will be used (how)	Estimated Test duration and planned start date (when)
1	Test out different scenes /scene settings	Used Unity to play around with different assets.	<ul style="list-style-type: none"> <li>• Realistic</li> <li>• Captivating</li> <li>• Story telling</li> </ul>	1-2 hours
2	NPC motions	Placeholder assets were used, controlled with simple custom scripts.	<ul style="list-style-type: none"> <li>• Realistic interactions</li> <li>• Captivating</li> </ul>	1-2 hours
3	Camera Angles	Played around with different camera angles in scenes on Unity.	<ul style="list-style-type: none"> <li>• Best perspectives that showcase scenes</li> </ul>	1 hour
4	User Interactivity	Tested out our basic scenes with the VR set.	<ul style="list-style-type: none"> <li>• Teleportation method</li> <li>• Encourages user participation</li> </ul>	1-2 hours

## Analysis

### Results

This prototype focused more on technical details. Preliminary results seem to be promising. The base framework is present, and any future artistic additions should be quick to implement and modify as needed.

### Storyline

The game starts with the player being introduced to autonomous weapons and their potential advantages and disadvantages. The player is then prompted to make a decision on whether autonomous weapons should be allowed in conflicts, but this decision has no bearing on the subsequent events.

The next scene sees the player waking up in a pile of rubble, bruised and disoriented. As the player gets up and looks around, they are confronted with a scene of devastation. Houses are destroyed, and people are suffering from injuries. The player does not remember any of this happening and is understandably confused.

The player is then approached by the first NPC of the game, who explains how they found the player under the rubble and saved them. The player asks what happened here, and the NPC begins to explain how things came to this point.

As the NPC explains, the game transitions to a flashback of the conflict. Drones and robots are shown going rogue, shooting at roads, buildings, and houses, and targeting anything they perceive as a threat. The flashback reveals that the autonomous weapons went awry due to a malfunction in their programming, causing them to attack indiscriminately.

After the flashback, the conversation with the NPC ends, and the player is encouraged to start looking around for anyone who needs help. The player sees an injured person, character 2, and rushes to their aid. As the player helps character 2, they ask how this happened, and character 2 begins to explain the next scene.

In the second flashback, the player learns that character 2 had discovered the flaw in the programming and had reported it to their superiors. However, their superiors ignored them and went ahead with the deployment of the autonomous weapons anyway. The player realises that the programming error was due to character 2's superiors' negligence and their failure to address the critical flaw that was reported to them.

As character 2 finishes their explanation, the player thanks them for the valuable information. The player is horrified by the destruction and chaos around them and makes a wish that they could have helped prevent this. At that moment, the screen goes dark, and the player wakes up in an armed fortress.

A screen in front of the player displays the same battlefield they were just in, and someone to their left asks, "Sir, do we have your permission to deploy the AI drones and robot soldiers?" The player realises that they have been given the opportunity to make a decision that could prevent or contribute to this outcome. The player is prompted to make a choice between deploying autonomous weapons or using other resources.

The outcome changes based on the player's decision. If the player chooses to deploy the autonomous weapons, the destruction continues, and the game ends with a message that asks the player if they would ever wish this outcome on their loved ones.

After the showcasing of the different outcomes, the player is again asked, just like in the start, "should autonomous weapons be allowed in conflicts: yes, or no?" A short statement then plays on the screen: "Would you ever wish this outcome on your children? On your spouse? Or on anybody at all? If it is not prevented, this could be a possible outcome in the near future. Stand with us and Mines Action Canada to ban autonomous weapons. Thank you for your time." The game ends.

## Control Scheme

The control scheme consists currently of teleportation and holding objects in the scene. Play testers found it intuitive and simple to understand.

## Art Style and Accessibility

The art style is to be as realistic as possible within the allotted budget. We have made sure to exclude any harsh or flashing lights as to avoid epilepsy. Transition will be done through smooth, slow fade ins and fade outs. Play testers did not report any nausea from the prototype.

## User Interactivity

User interactivity is possible and is integrated with the scene flow. The current framework allows for events to trigger on user interaction. A “toggle to grip” option was tested but found to be somewhat less natural feeling than a “hold to grip” interaction.

## Audio

Subtitles were tested for sample dialogue and allow for chaining lines; voice narration is a possibility in the future.

## Target Specifications Update

<b>Design Specifications</b>	<b>Relation =, &lt; or &gt;</b>	<b>Value</b>	<b>Units</b>	<b>Verification Method</b>
<b>Functional Requirements</b>				
Space required (Play area)	<	1	Meter squared (m <sup>2</sup> )	Estimate, test, final check
Headset model	=	HTC Vive	N/A	Continuous testing during development
Ease of use	=	Yes	N/A	Beta testing prototype
Languages	=	English, French	N/A	Consult OLBI at uOttawa
<b>Constraints</b>				
Violence	=	No	N/A	Ensure/analysis
References to real world entities	=	No	N/A	Ensure/analysis
Consider health conditions	=	Yes	N/A	Ensure/analysis,
Cost	<	50	Dollars (\$)	Estimate, final check
Duration of experience	<=	5	Minutes (m)	Estimate



Delivery time	=	3	Months	Estimate
Feminist/anti-racists	=	Yes	N/A	Ensure/analysis
Operating conditions	=	Enclosed environment	N/A	Ensure/analysis
<b>Non-functional Requirements</b>				
Graphic Imagery	=	Yes	N/A	Test
Safety: (Low range of motion)	=	Yes	N/A	Test
Reliability	=	Yes	N/A	Test
Relatability	=	Yes	N/A	Test
Realistic	=	Yes	N/A	Test
Call to action at the end	=	Yes	N/A	Test
Aesthetic appeal	=	Yes	N/A	Test

## BOM Update

Might be updated!

Part #	Part Name	Description	Quantity	Unit Cost	Extended Cost
1	Personal computers	Provided by team members and university	5	NA	NA
2	Unity	3D game engine. Student/Personal edition used	5	NA	NA
3	HTC Vive	VR set, provided by university	1	NA	NA
4	Control/Security Room Interior	Unity asset <a href="#">control/security room interior</a>	1	9.99\$	\$9.99
5	Unity Asset: Sentinel Drone	Unity Asset <a href="#">sentinel drone</a>	1	15\$	\$15
6	Unity Asset: Abandoned Area – Ruined Factory	Unity Asset <a href="#">abandoned area - ruined factory</a>	1	35\$	\$35
7	Unity Asset: NPC populator	Unity Asset	1	15\$	\$15

		<a href="#">NPC populator</a>			
8	Unity Asset: Guns pack: low poly guns collection	Unity Asset <a href="#">guns pack: low poly guns collection</a>	1	0\$	\$0
9	Unity Asset: Autonomous weapon	Unity Asset <a href="https://assetstore.unity.com/packages/3d/props/weapons/acs-114947">https://assetstore.unity.com/packages/3d/props/weapons/acs-114947</a>	1	5.55\$	5.55\$
10	Unity Asset: War Effects	Unity Asset <a href="https://assetstore.unity.com/packages/vfx/particles/war-effects-67573">https://assetstore.unity.com/packages/vfx/particles/war-effects-67573</a>	1	14.50\$	14.50\$
				Total	95\$

### Conclusion

To conclude, in this deliverable we analysed feedback that was given to us by our client, we developed our first prototype, and we devised a test plan for our second one. We included aspects such as prototyping tests, analysis, and results. We also included updates in our BOM and our target specifications.