# Deliverable I-Design Showcase Presentation

GNG 1103-Engineering Design

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*Abstract*

This deliverable focuses on our product showcasing and our presentation specifications. This includes our project presentation template, pitch script, video representation of our product and more. In general, this document is dedicated to our design day presentation.

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# Introduction:

As the Design Day approaches our final product is being tuned to be presented as the final outcome to address the issue of autonomous weapons and the dangerous repercussions of approving them to be an active weaponry in the battlefield.

## 1. Content Background:

### 1.1 Problem statement:

Autonomous weapons raise several moral and ethical concerns that decision makers need to be made aware of. It is important for decision makers to start negotiations on these weapon systems before they are available to use. However, politicians and diplomats still see this issue as theoretical, and they don't see how such a revolution in warfare would have a major impact on many individuals.

Our task was to design a virtual reality experience that shows the ethical and moral issues that autonomous weapons raise. We had to take this problem from the abstract side and make it into reality for decision makers.

### 1.2 Client:

The client, Mines Action Canada, is a humanitarian disarmament organization with advocacy, research, capacity building, youth engagement and gender as its pillars. They are fighting a digital dehumanization battle as autonomous weapons turn people into simple numbers used to decide who lives and who dies, violating international humanitarian law.

## 2. Design specifications:

### 2.1 Design specifications:

This process was very beneficial since it provided us clear instructions on this project's purpose, performance, and creation. We were able to identify which qualities and standards should be applied to our product, as well as materials and constraints. As well, it gave us a base idea for our conceptual design and allowed us to identify requirements.

| Design Specifications | Relation =, < or > | Value | Units | Verification Method |
|---|---|---|---|---|
| **Functional Requirements** | | | | |
| Space required (Play area) | < | 1 | Meter squared (m^2) | 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 |
| **Constraints** | | | | |
| 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 | < | 400 | 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 |
| **Non-functional Requirements** | | | | |
| 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 |

## 2.2 Benchmarking:

This step of our product development was very important. It allowed us to set performance expectations, identify areas of improvement and gave us an idea of how we differed from other companies.

| Values | Colors | # |
|---|---|---|
| High | Green | 3 |
| Average | Yellow | 2 |
| Low | Red | 1 |

| Specifications | Importance | Product 1 | Product 2 | Product 3 |
|---|---|---|---|---|
| Product Name | - | Bear 71 VR | Meet your carbon footprint | Universe Sandbox |
| Company | - | National Film of Canada | United Nations Environment Program | Giant Army |

| | | | | |
|---|---|---|---|---|
| Cost | 3 | Free | $26.99 | $38.99 |
| Duration | 3 | 30 minutes | 5 minutes | No limited duration |
| Graphics | 2 | Simplistic | Stylized | Realistic |
| Emotional Stimulation | 3 | High sentimental value | Abstract interpretation | No emotional value – purely educational |

### Numerical Evaluation

| Specifications | Importance | Product 1 | Product 2 | Product 3 |
|---|---|---|---|---|
| Product Name | - | Bear 71 VR | Meet your carbon footprint | Universe Sandbox |
| Company | - | National Film of Canada | United Nations Environment Program | Giant Army |
| Cost | 3 | 3 | 2 | 1 |
| Duration | 3 | 1 | 3 | 1 |
| Graphics | 2 | 1 | 2 | 3 |
| Emotional Stimulation | 3 | 3 | 2 | 1 |
| Total | | 24 | 25 | 15 |

## 2.3 Quality of design solution:

The quality of our solution is high since we delivered most of the client's needs and met their expectations and goals. We also met the technical and design criteria we set based on the client's request and other existing products in the VR market. Moreover, the product is efficient and delivers the message clearly and is able to make an impact on the user's decision which is the primary purpose of the program.

## 2.4 Health and safety:

We considered safety while testing the product so that the user will not be overwhelmed in case, they are using VR for the first time. So, the user will be in a fixed position and the

movement will be convenient by teleportation without the user having to physically move around.

## 2.5 Economic:

We tried to save as much of our budget as possible in order to try and create the program ourselves, in hopes to gain more experience and skills by the end. Our final spendings were an estimate of $20. This will contribute to the programing community as there are more original works on that subject instead of already bought ones.

### BOM Update
Below is a list of potential asset options-meaning not all of them will be used.

| 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.<br>Student/Personal edition used | 5 | NA | NA |
| 3 | HTC Vive | VR set, provided by university | 1 | NA | NA |
| 4 | Unity Asset: Apocalyptic Wasteland | Unity Asset<br>https://assetstore.unity.com/packages/3d/environments/urban/apocalyptic-wasteland-105051 | 1 | $20.60 | $20.60 |
| 5 | Unity Asset: Ambulance | https://assetstore.unity.com/packages/3d/vehicles/land/ambulance-70313 | 1 | $0.00 | $0.00 |
| 6 | Unity Asset: Broken Vector- Low poly road pack | https://assetstore.unity.com/packages/3d/environments/roadways/low-poly-road-pack-67288 | 1 | $0.00 | $0.00 |
| 7 | Unity Asset: Building Apartment | https://assetstore.unity.com/packages/3d/environments/building-apartment-80004 | 1 | $0.00 | $0.00 |
| 8 | Unity Asset: Destroyed_city | https://assetstore.unity.com/packages/3d/environments/sci-fi/destroyed-city-free-6459 | 1 | $0.00 | $0.00 |
| 9 | Font: IBM_Plex_Mono | Font<br>https://fonts.google.com/specimen/IBM+Plex+Mono | 1 | $0.00 | $0.00 |
| 10 | Unity Asset: Low Poly Soldiers_demo | https://assetstore.unity.com/packages/3d/characters/low-poly-soldiers-demo-73611 | 1 | $0.00 | $0.00 |

| | | | | | |
|---|---|---|---|---|---|
| 11 | Unity Asset: Pavement Textures Pack | https://assetstore.unity.com/packages/2d/textures-materials/roads/yughues-free-pavement-materials-12952 | 1 | $0.00 | $0.00 |
| 12 | Unity Asset: LowPolyOffice | https://assetstore.unity.com/packages/3d/characters/low-poly-office-pack-characters-props-119386 | 1 | $0.00 | $0.00 |
| 13 | Unity Asset: Rune Assets- Simple Urban Buildings | https://assetstore.unity.com/packages/3d/environments/urban/simple-urban-buildings-pack-1-33563 | 1 | $0.00 | $0.00 |
| 14 | Unity Asset: Rune Assets-Road Blocker | https://assetstore.unity.com/packages/3d/props/exterior/road-blocker-663 | 1 | $0.00 | $0.00 |
| 15 | Unity Asset: Russian_buildings | https://assetstore.unity.com/packages/3d/environments/urban/russian-buildings-pack-113375 | 1 | $0.00 | $0.00 |
| 16 | Unity Asset: ScifiOfficeLite | https://assetstore.unity.com/packages/3d/environments/sci-fi/free-sci-fi-office-pack-195067 | 1 | $0.00 | $0.00 |
| 17 | Unity Asset: Sky Series Freebie | https://assetstore.unity.com/packages/2d/textures-materials/sky/skybox-series-free-103633 | 1 | $0.00 | $0.00 |
| 18 | Unity Asset: Small Tank | https://assetstore.unity.com/packages/3d/vehicles/land/small-tank-186792 | 1 | $0.00 | $0.00 |
| 19 | Unity Asset: VRCinemaForMobile | https://assetstore.unity.com/packages/3d/props/interior/vr-cinema-for-mobile-150120 | 1 | $0.00 | $0.00 |
| | | | | **Total** | **$22.60** |

## 3. Presentation Specifications

### 3.1 Pitch Script:

**Intro**

Hello and welcome to our VR experience by the TroubleShooters in GNG1103F! We are delighted to walk you through our design to highlight the impact and significance autonomous weapons have on the safety of innocent citizens. Autonomous weapons take the human deciding factor out of the picture and leave the responsibility of people's lives in the hands of

machines.  This causes a significant issue as autonomous weapons are subject to malfunction and tampering at the hands of outside sources.

### First scene points

Within the first scene the user is given the opportunity to choose their language with both French and English built into our game. We aimed to be as inclusive as possible, including subtitles, audio in both languages and technical instructions the user would need to continue. The user interactivity is heavily built into this scene because we aimed to capture the attention of the user right off the bat with the use of buttons, voice overs and script displayed on the tv screen.

### Second scene points

Present in this scene is user interactivity with the intention of making the user feel as though they are engulfed within the experience and as a tool to keep the game going in an interesting way.

### Third scene

A potential scenario is depicted within this scene with the intention of exposing the user to the possibility of autonomous weapons being hacked by an outside source. This gives the user first-hand experience of autonomous weapons and the effect they could have if they became uncontrollable.

### Forth scene

We flash backward to a normal day before the attack of the autonomous weapons seen in the previous scene. The dialogue present here is meant to bring an element of realism to the experience. *User turns around to see the tank* The user is now brought into a citizen's shoes where destruction at the hands of autonomous weapons occurs for no reason at all.

### Fifth scene

This scene depicts the regret and remorse of a solider who had initially thought that autonomous weapons would supply them with the upper hand against their competitor. The feelings of the solider in this scene is meant to have the user learn for their mistakes. This scene was the only one we spent our budget on, making the entire experience only $20.

### Sixth scene

The intention of the dramatic feel in this scene is to make the user reflect on their feelings and illustrate the seriousness of the consequences of autonomous weapons.  This scene relates back to the first main menu scene where the user is asked if they support autonomous weapons or not. They now unconsciously make an informed decision on the proliferation of autonomous weapons based on our design.

**Conclusion**

Our project takes the user through a worst-case scenario and puts them directly into the shoes of the innocent people that would be ultimately affected using autonomous weapons. Where our design sets us apart is the main menu at the start and the user interactivity that comes along with the scene; it is meant to immerse the user in the experience, provide necessary information and a way to make the user connect and interact with the game. As well, our experience provides the user with a full circle moment in terms of our introduction where they are asked their initial opinion and concludes with an opportunity to reflect upon what they experienced.

## 3.2 Presentation Display:
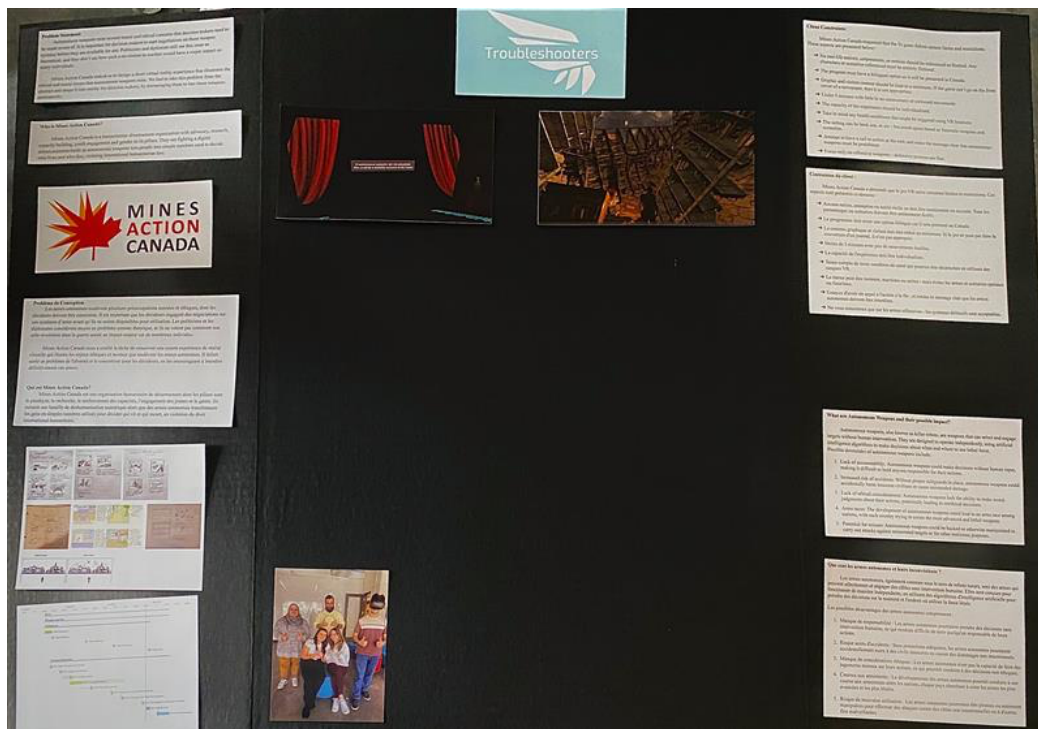
These images will be added to our presentation display.
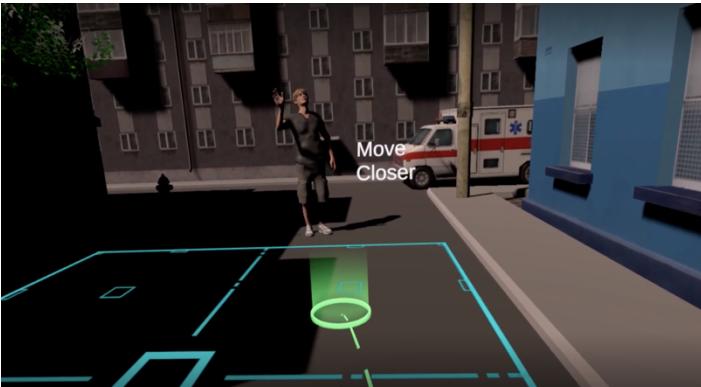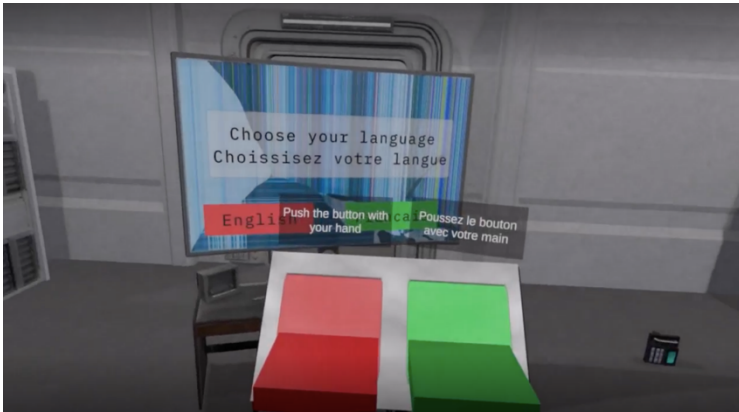
# 4. Final Product:

## 4.1 Prototype analysis:

**Prototype functionality and quality:**

The final prototype is the product that we will present as our final product. It is fully functional and incorporates several channels of communication. It is immersive and indulging so it conveys the message in an effective way to the user.

It does that visually as the scenes are so interactive and speak to the user. This will grab the attention of the user and make them pay attention to what the product is communicating. Also, the sound effects help the user to experience the program more and make them have the full experience of being in such an environment that relates them to the problem. This would make them know the severity of their decisions if they chose to approve the autonomous weapons.

**Message clarity:**

The user interactivity is another quality aspect of our product as it makes the user understands the depth of the matter in hand. The user can interact with the environment and be in touch with the potential repercussions of deploying autonomous weapons of the ground. That is why we chose an environment that can show the danger of these repercussions the best which is a city environment. This is because where usually non-combatant civilians are targeted in case of failures of autonomous weapons.

The storyline is a point of strength of our product. The story was plotted to put the user on both sides of the problem. The user experiences the side of the victims of the autonomous weapons that resulted from their failure as one of the scenes is from the perspective of the civilians who are facing the autonomous weapons. On the other hand, after this scene, the user will be transferred to the other side where they would be in the position of making the decision of deploying these weapons.

**Solution testing:**

Our product also has active feedback. As we seek to change the view of decision makers we want to know if they actually would change their mind by the end of the experience. So, we incorporated a survey at the end of the program asking the user if they will deploy these autonomous weapons if they have to make a decision. This will serve as a success measurement of our product and give an immediate result of how effective and impactful the product was on the user.

4.2 Sample Video:

https://uottawa-my.sharepoint.com/personal/salsh036_uottawa_ca/_layouts/15/guestaccess.aspx?share=Eerzzf XYvMVDrfbC-jiXvtoBsjx4xOwNo8HFL2WIm9wcxw