

Part 1 :

Prioritized Design Criteria

Functional Requirements:

- A smooth video experience for the user (Measured in FPS)
- Easily shareable and accessible (Time needed to share the video in seconds)
- Show specific cases and ways that citizens adjusted their environment to protect themselves from killer robots, should demonstrate the attributes of Killer Robots policy makers would be most worried about (Metrics: Number of Examples)
- Must be either a VR experience or a short 30 to 60 second video (Metrics: Number of Seconds)

Non-Functional Requirements:

- Display our best knowledge of what a world with Killer Robots would look like by using many examples (Number of examples)
- Must convince decision makers of the dangers of killer robots (Numbers of 4 and 5's obtained on the survey)
- Ensure, that after watching the video, the user has developed a new understanding for what life could look like with killer robots (Numbers of 4 and 5's obtained on the survey)
- The environment should be able to be understood by any adult and refrain from using complicated terminology or elaborate storylines. (Numbers of 4 and 5's obtained on the survey)
- Preferably show first person point of view and third person point of view (especially first). This may give realism to the video and problem. So, the exact metric for this is to have some amount of seconds with first and third person point of view. (Measured in Seconds)
- Any data collected from surveys must be kept private.

Constraints:

- Time management: There are many deliverables for this project, with some rigid due dates. (Days or months) : Weekly meetings, teams, and other communication methods have been working well. Also, noticing how many days the group takes to complete one deliverable or a task is helpful as well as keeping the final due date in mind (the presentation is around November 29, 2023). Resolution and field of view: the VR experience (video) should be simple due to the close deadline.
- No robots should be shown on screen (Metric: Number of robots that appear)
- It was agreed that there would be no blood or any explicit violence shown (Metric: Blood elements appearing)

Part 2 :

Benchmarking

- Previous projects. These can give us an idea of concepts that have been used and if they were effective and convincing. They can also help us find new ideas (without plagiarizing).

Examples:

- [GNG-1103-F21-Stop Killer Robots VR Experience | MakerRepo \(makerepo.com\)](#)- Video depicting a VR environment where we see the surroundings from above and from the perspective of a person moving around on the ground. The city shown in this project is fairly small, which satisfies the need of not being too over the top, it seems very doable. There are also drones in the sky which is something to avoid in our product since we're not supposed to show the robots, only the adjustments that people made to their environment because of them. A voiceover is included as well.
- [F13 - Stop Killer Robots - A Virtual Reality Experience | MakerRepo \(makerepo.com\)](#)- in this video there's a voiceover that explains why the robots were utilized, then the negative consequences of using autonomous weapons is shown. We hear loud noises that sound like machine guns and footage of a group of children being shot (however, this isn't graphic since it's a cartoon which is one of the needs of our product). There's also a voiceover that tells us that a kid that was playing with a water gun got mistaken for a threat and shot, which shows that autonomous weapons can easily mistake people for threats and harm them. Also, the video is a cartoon so it's not very realistic, so it doesn't provoke strong emotions. While watching it, we felt disconnected from the issue. Plus, there's a storyline and the client specified that they prefer to avoid storylines.
- Similar organizations. We have visited websites of organisms like the International Committee for Robot Arms Control (ICRAC) and Norwegian People's Aid. These are also organizations that aim to get decision makers to preemptively ban autonomous weapons. For example, ICRAC wrote a report titled Report on Meaningful Human control, which explains that human approval is necessary before force, especially lethal, is applied to a target.
- Documentations of dangerous situations in real life, like pictures/videos of environments showing the adjustments that civilians make to their daily lives because of a threat or showing the consequences of a threat. These aim to educate their viewers and hopefully evoke feelings of concern to get them to act to prevent what's shown from happening again or to help the people affected, in general, like for example to get them to act by donating money.

Examples:

- Pictures of underground train stations in Ukraine converted to bomb shelters
- Pictures of trenches in the ground to avoid snipers (built in areas where civilians live)
- Images of mass graves
- Documents that show people going into hiding to avoid a threat (for ex. Jews during WW2, Anne Frank's diary)
- In Yemen, people have resorted to underground farms to grow vegetables, as a result of food shortages and the ongoing conflicts.
- In Gaza, civilians have installed water tanks on their rooftops in order to collect rainwater. This is because their access to clean drinking water is very limited.
- Educational videos about horrible events aiming to educate people to prevent said events from happening again. Ex. educational video on human experiments that were done for science aiming to prevent similar experiments from happening again by evicting feelings of horror in the viewer: [The Most Disturbing Human Experiment Ever - YouTube](#)
- Fictional depictions meant to prevent decisions that could cost lives from being made, like anti war movies such as All Quiet on the Western Front. Such movies show the horrors of war and how inaccurate war propaganda is (so these kinds of movies satisfy similar needs since they're also trying to show the negative consequences of certain military decisions to dissuade decision makers from making these decisions).

Part 3 :

| Number | Specifications | Ideal measurements | Units | Verification method |
|--------|------------------------------|--|---|---|
| 1 | Time to create (feasibility) | For the 29 th of November (2 months) | Days | By counting the amount of days needed to create the product |
| 2 | Time to create (simplicity) | Maximum of 3 user interactions with the environment | Number of interactions with the environment | By counting the amount of interactions with the environment |
| 3 | Time duration of product | Must be between 30 and 60 seconds | Seconds | By counting the amount of time required to view it |
| 4 | Ease of use: Technical | Time needed to share the video between 30 and 60 seconds | Seconds | By counting the amount of time required to share it. |
| 5 | Ease of use: technical | Must load successfully between 5 and 10 seconds. | Seconds | By counting the amount of time required to load it. |

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| 6 | Amount of images present of changes made by civilians to their environment | There must be between 3 and 7 images. | Number of images of examples | By counting the amount of examples that correspond to changes made by the civilians to their environment |
| 7 | Precision of message/ focus on message: Narrative effectiveness | At least obtaining a 4 or 5 in every category from every user | Numbers of 5's obtained from the scale | Users will be prompted to fill a form in which there will be a scale |
| 8 | Overall Quality: Frames per second | Must be FPS at least 30 | Frames per second (FPS) | By accessing the specifications of our product |
| 9 | Must cost less than the budget | It must cost below 50\$ | Price (CAD) | By computing the price of each transaction |
| 10 | No robots present | Maximum of 0 Robots present | Number of robots shown | By counting the amount of robots shown |
| 11 | No blood or gore present | Maximum of 0 blood elements present | Number of blood elements | By counting the amount of blood elements present |
| 12 | Immersion of the user in their environment | At least the majority of the length of the video (more than 50%) | Seconds | By counting the amount of time that the user will be placed in first person view |

Part 4. Reflect on how the client meeting impacted the development of your design criteria and specifications when deciding on the relative importance of your criteria and explicitly state any updated needs that have changed from deliverable B.

The client meeting greatly impacted the development of our design criteria and specifications when deciding the relative importance of our criteria. To begin, before the client meeting, our thought process and goals were somewhat linear as we believed from start to finish that the project only required a short succinct VR presentation that showed decision makers the negative impacts of automated weapons.

With the new information after the client meeting, we concluded many things that greatly impacted our design criteria. For example, the project is supposed to be doable and simple as many teams realized too late that they have bitten off more than they could chew thus it had to be straight to the point, and not too time consuming. It also added a time constraint which made it so that we had to prioritize making a small but impactful project by the end of the semester. The project is also to be realistic and in an immersive environment, where the viewer can focus on

the impacts and depict a real environment without too much embellishment. We were also to make it convincing, such that it evicts various convincing emotions like fear, hope, concern, and motivation to ensure a quick reaction from decision makers to get them to act and pre-emptively ban autonomous weapons. With these emotions we can also get the user's attention to show the negative consequences of having autonomous weapons. We do this by showing that the system is automated (uses sensors, etc.), that these systems need human approval since the machine might backfire and do the "wrong thing", which is dehumanizing since what determines whether someone lives or dies is the data about them that's collected by the machine. We learnt that we have to show human approval is necessary before applying force to a target such that robots might be programmed to have certain biases and robots aren't able to evaluate proportionality/distinction so they can't evaluate if the risk to civilians is worth the military advantage. Plus, we can educate the viewers on the consequences of using autonomous weapons by showing an environment where autonomous weapons are rampant as well as the adjustments made by civilians to their environment. The client meeting also encouraged us to make it more captivating, as it should be short/straight to the point but also engaging. We were also told it was to be affordable, functional, and creative.