Project Deliverable C

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Introduction

The goal is to create an intuitive VR/AR based application that will allow for increased productivity and efficiency in the construction workplace. With the implementation of a user-friendly interface, multi-disciplinary view of the model, and a wide range of compatibility between devices, this can be achieved at minimal cost while providing open-source availability. This document will outline the design criteria associated with each need from the previous document, and separate them based upon if they affect the functionality or not. Following this, metrics are assigned to all relevant design criteria, to help quantify them.

Design Criteria

Imp	Need	Design Criteria
5	Virtual Reality/Augmented Reality	1. Compatible with VR/AR technologies 2. Multi-perspective 3. Free to user
5	User-friendly interface	4. Simple vocabulary 5. Clear and concise commands 6. Easy access to definitions 7. Doesn't require previous experience with software 8. Option to make markup/annotations
4	User Manual	9. Comprehensive User Manual to explain the usage of the device
4	View multi-disciplinary layers of the model	10. Switch between views 11. View behind walls/ceilings and inside structures 12. Load in models from different disciplines
4	Usable with IOS and Android	13. Designed for usage on multiple platforms
4	Costs kept to a minimum	14. Limit of $100 CAD
4	Increase worker productivity/efficiency	15. Allow for teams to simultaneously access and edit different layers
3	Offline usage	16. Not tied to WIFI

		17. No headset required
3	Open-source app	18. All code uploaded to public libraries

Functional Requirements

Functional requirements are the design criteria that will affect the overall functionality of the project and its success.

- Compatible with VR/AR technologies
- Multiple perspectives
- Free to User
- Ability to switch between views
- View behind walls/ceilings and inside structures
- Designed for usage on multiple platforms
- Not tied to WIFI

Non-Functional Requirements

Non-functional requirements are design criteria that have been deemed necessary toward the success of the project but do not affect the overall functionality of the project.

- Simple vocabulary
- Clear and concise commands
- Easy access to definitions
- Option to make markup/annotations
- Comprehensive User Manual to explain the usage of the device
- Provide innovative techniques to make work more efficient
- Small and Portable
- All code uploaded to public libraries

Constraints

Constraints are the obstacles that we foresee in the future, affecting the success of our project.

- Smartphones with lower spec hardware may suffer instability
- Cost
- The project is being designed to operate on open job sites. However, it will be developed in a significantly more restricted area. Trials will be restricted

Metrics

The list below features metrics created from the design criteria, along with the units they will be measured in.

Design Criteria	Metric	Units
2	Types of Perspectives	*num.*
3	The app is free to download	CAD$
4,5,6,8	Quality of Communication	*subj.*
9	Comprehensive user manual (simple jargon)	*subj.*
10	Time to switch between views	Time(s)
12	Time to load multi-disciplinary views	Time(s)
14	Cost of Software Development	CAD$

Benchmarking

Listed below in the chart, is a list of metrics for similar products.

Criteria	NYT VR app	Google Cardboard	Expeditions VR app
1	VR	VR	VR/AR
2	1(First Person)	1(First Person)	2(First, Third Person)
3	$x = 0$	$x = 0$	$x = 0$
4,5,6,8	Exemplary	Exemplary	Exemplary
9	Exemplary	Exemplary	Exemplary
10	N/A	N/A	N/A
12	N/A	N/A	N/A

14	50-100K	50-100K	50-100K

Target Specifications

Target specifications assign marginal and ideal values of our metrics. They will be used to quantify the quality of the final product, along with serving as a guideline.

Design Criteria	Metric	Marginal	Ideal	Units
1	Virtual Reality/Augmented Reality	VR	VR/AR	*Subj.*
2	Types of Perspectives	$x > 1$	$x = 3$	*num.*
3	The app is free to download	$x = 0$	$x = 0$	CAD$
4,5,6,8	Quality of Communication	competent	exemplary	*subj.*
9	Comprehensive user manual (simple jargon)	competent	exemplary	*subj.*
10	Time to switch between views	$x < 5$	$x < 3$	Time(s)
12	Load time for multidisciplinary views	$x < 5$	$x < 3$	Time(s)
14	Cost limit	$x < 100$	$75 < x < 95$	CAD$

Conclusion

This document is an overview of the design criteria associated with each need identified in the last deliverable. The design criteria were ranked based on their importance, and divided into functional and non-functional components. This document will act as a reference for each team member to understand the basis of our decisions. The team is excited to design a VR/AR system that increases overall worker productivity and efficiency in the field of construction.