Deliverable C
Design Criteria

Introduction

After carefully considering the interpreted needs of the client, we have compiled a list of design criteria to satisfy them. These criteria were then weighted for importance and categorized into three separate sections: functional requirements, constraints and non-functional requirements. From here, a careful benchmarking examination of related products was also conducted in order to assess their relative viability. Upon conducting these analyses, we were able to establish final target specifications for this project.

Design Criteria

Category	Requirements	Rank
Functional	Access and display design models	5
	Switch between 3 different layers/models	5
	Displays video overlay (AR)	4
	Displays (VR)	3
	Runs locally	5
	Phone/Tablet compatible	5
	Stores models	5
	takes position and orientation data input	5
	Unobstructive	5
	Tutorial video series	5
	Written instructional manual	5
Constraints	Program size	3
	Minimal storage	3
	Cost($100)	5
Non-Functional	Multiple OS compatibility	5
	Save annotations on existing model or 2D drawing	4
	Warning System	5
	Intuitive interface and tips feature	3

Technical Benchmarking

	Construction App Examples			
Company	Akular	Gamma AR	Reflect	VREX
Cost	14 day free trial, after that, you are able to purchase a $1,000 (USD) version or $1,200 (USD) version	Starts at $46(USD) a month	Personal verison is free, Unity plus is 399/year (USD), Unity pro is 1800/year (USD)	Free 14 day trial, no further details about the cost
Available devices	IOS and Android	IOS, Android, MacOS, Windows 10	IOS, Android, MacOS, Windows 10, VR	MacOS, Windows, VR
Displays 3D models	Yes	Yes	Yes	Yes
AR Capable	Yes	Yes	Yes	No
VR Capable	Yes	No	Yes	Yes
Phone Compatible	Yes	Yes	Yes	No
Stores Models Locally	No details given on offline capabilities	Certain app functions require an internet connection	Models can be viewed offline after syncing	No details given on offline capabilities
Program takes user orientation	Yes	Yes	Yes	Yes
Unobstructive	No, unless VR is being used	No	No, unless VR is being used	Yes
Where can the app be used	Anywhere	Anywhere	Anywhere	Anywhere, however, limited to only using the VR headset
File size limit	No file size limit	No file size limit	No file size limit	No file size limit
Tutorials	Videos only	Videos only	Live lessons, videos, live workshops	Videos, virtual workshop
Written Instructional Manual	No	FAQ instructions	Online, comprehensive manual	No

Program File Sizes	126.2 MB	192.9 MB	69.78MB	No details given on download size
Minimum System Requirements	Requires iOS 11.0 or higher	Requires iOS 12.0 or higher	iOS 10.0 or higher OS 4.4 or higher	OS: Windows 10 GPU: NVIDIA GTX 1070 CPU: Intel i7 Memory: 8GB RAM VR-equipment: Oculus Rift, HTC Vive or Windows mixed reality VR-software: SteamVR

Target Specifications
EDS Functional Requirements

Design Requirements	Relation	Value	Units	Verification Method
Access and display 3D models	=	yes	N/A	test
Switch between 3 layers/models	=	yes	N/A	test
Displays video overlay (AR)	=	yes	N/A	test
Displays VR	=	optional	N/A	test
Runs Locally	=	yes	N/A	test
Phone/Tablet Compatible	=	yes	N/A	test
Stores Models	=, >	3	model	test
Takes position/ orientation of user	=	yes	N/A	test
Unobstructive	=	yes	N/A	test
Video tutorials	=	# of program features	videos	Analysis, test
Instructional Manual	=	yes	N/A	Analysis, test

EDS Constraints

Design Requirements	Relation	Value	Units	Verification Method
Cost	=<	100	$	Research/Estimate
Program size	Limits x	50<x<200	Mb	test
Model storage	Limits x	150<x<500	Mb	test

EDS Non-Functional Requirements

Design Requirements	Relation	Value	Units	Verification Method
Multiple OS Compatibility	=	yes	N/A	test
Save annotations on current model/ drawing	=	yes	N/A	test
Warning System	=	yes	N/A	test
Intuitive interface and tip feature	=	yes	N/A	test
Group session feature	=	yes	N/A	test

Weighted Comparison

		Construction App Examples			
Design Requirements	Ranks	Akular	Gamma AR	Reflect	VREX
Access and display design models	5	15	15	15	15
Switch between 3 different layers/models	5	10	15	15	10
Displays video overlay (AR)	4	12	12	12	4
Displays (VR)	3	3	3	9	9
Runs locally	5	5	10	15	5
Phone/Tablet compatible	5	15	15	15	5
Stores models	5	5	10	15	5

Takes position and orientation data input	5	15	15	15	15
Unobstructive	5	15	15	15	5
Tutorial video series	5	5	5	15	10
Written instructional manual	5	5	10	15	5
Program size	3	6	6	9	3
Minimal storage	3	3	3	9	6
Cost($100)	5	5	10	10	10
Total		119	144	184	102

Conclusion

To summarize our findings, it appears that the companies best suited to our list of functional requirements and constraints would be Reflect Unity as it has the best specs in comparison to the other four companies we researched. Apps such as Vrex and Akular failed to provide sufficient information or fulfill essential requirements, such as: running local servers, being phone compatible or even having a written instruction manual for new users, while Unity satisfied all of those needs and multiple others to the highest degree on the scale. However, Unity does have an issue when it comes to the cost of the program, as it exceeds budget set in the project guidelines, which could create a significant obstacle for our client. From these findings, development of an augmented reality construction app that adheres to our criteria should be most attainable. However, the collection of additional data and completion of further analysis may impact the viability of various solutions.