**Design Criteria and Target Specifications**

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Our goal is to develop a solution to allow EllisDon’s construction team in the field to easily view multidisciplinary Building Information Model (BIM) in Virtual or Augmented Reality (VR/AR) on a mobile device. In this report we are identifying design criteria to better understand the prototyping process to come. First, we translate the client’s needs into clear design criteria as shown in the first table, and we specify which criteria are functional requirements, non-functional requirements, or constraints. After that, the next two tables include benchmarking the specifications of three competing products and analyzing them to determine clear targets to strive for. Finally, we pinpoint our target specifications for each aspect of the design criteria.

**Design Criteria:**

|  |  |
| --- | --- |
| **Needs** | **Design Criteria** |
| Software that can customize the view and isolate the multidisciplinary systems of a room | View 3D BIM in VR/AR |
| Should be compatible with common mobile devices and tablets using iOS or Android | Compatibility |
| Open-source software that is free to use, along with affordable VR/AR systems | Cost |
| Solution is user friendly, regardless of the technical skill level | User guide for ease of use |
| Should be able to download 3D model and view anywhere | Offline use |
| Solution allows use of different files/building models, access 2D model, and access to multiple users | VersatilityAccess 2D model |
| Be able to change rooms/floors and view dimensions | Versatility |
| Compatible with VR/AR platforms such as Google Cardboard | CompatibilityWeight  |

The next table shows which of these design criteria are functional requirements, non-functional requirements, and constraints.

|  |  |  |
| --- | --- | --- |
| **Functional Requirements**  | **Constraints** | **Non-functional requirements** |
| View 3D BIM in VR/AR  | Cost  | Aesthetics |
| Access 2D Models  | Weight  | Versatility  |
| User guide for ease of use | Compatibility | Durability |
|  | Offline use | Product Life |

**Technical Benchmarking:**

The different products (separated by column) are compared in each category (separated by row). The green (best) to red (worst) scale indicates how the products compare in each category.

|  |  |  |  |
| --- | --- | --- | --- |
| **Specifications** | **IRISVR** | **Jasoren** | **VR Vision** |
| **Cost** | $350/month | $16,000-$75,000 per project | $50,000 per room |
| **Weight of VR** | 600g | 600g | 600g |
| **Headset support** | Oculus rift, Vive, Windows mixed reality | Oculus Rift, HTC Vive, WMR headset | Oculus Rift S, HTC Vive, Go, Focus,Quest, Cosmos |
| **Software** | Prospect Vr | Unreal Engine 4, 3D Studio Max, Maya | 3D Studio Max |
| **Compatibility** | Pc  | iOs, Android, and Pc | iOs, Android, and Pc |
| **View BIM** | Yes | Yes | Yes |
| **Diversity** | Construction, Engineering, Architecture, Educators, and Students | Construction, Engineering, Healthcare, Military and Police, Education, Entertainment | VR and AR specific solution  |
| **URL:** | [**https://irisvr.com/**](https://irisvr.com/) | [**https://jasoren.com/**](https://jasoren.com/) | [**https://vrvisiongroup.com/virtual-reality-training/**](https://vrvisiongroup.com/virtual-reality-training/) |

In the table below, the products were assigned 3 points for the best solution, 2 for a moderate solution, and 1 for less than ideal solutions. These values were then multiplied by the importance of each category to determine which product we should aim to compete with.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Specifications** | **Weight**3 [Crucial], 2 [Highly desirable], 1 [Desirable] | **IRISVR** | **Jasoren** | **VR Vision** |
| **Cost** | 2 | 3 | 2 | 1 |
| **Weight of VR** | 1 | 3 | 3 | 3 |
| **Headset support** | 1 | 1 | 2 | 3 |
| **Software** | 2 | 1 | 3 | 1 |
| **Compatibility** | 3 | 1 | 3 | 3 |
| **View BIM** | 3 | 3 | 3 | 3 |
| **Diversity** | 3 | 2 | 3 | 1 |
| **Total**  | **30** | **42** | **31** |

**Design specifications:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Design specifications** | **Relation (=, <, >)** | **Value** | **Units****(Metrics)** | **Verification method** |
| **Functional Requirements** |  |  |  |  |
| View 3D BIM in VR/AR  | = | Yes | N/A | Test |
| Access 2D Models  | = | Yes | N/A | Test |
| User guide for ease of use | = | Yes | N/A | Test |
| **Constraints** |  |  |  |  |
| Cost  | < | 50 | $ | Test |
| Weight  | < | 600  | g | Test |
| Compatibility | = | Yes | N/A | Work for multiple operating systems and VR/AR platforms |
| Offline use | = | Yes | N/A | Test |
| **Non-functional requirements** |  |  |  |  |
| Aesthetics  | = | Yes | N/A | Test |
| Versatility  | = | Yes | IOS/Android | Test |
| Durability | = | Yes | N/A | Test |
| Product Life | > | 1 | Year | Function for different versions of iOs and Android |

Now that we have benchmarked against industry standards and identified design specifications, we have a clear idea about the marks our product needs to hit. We know how we need to proceed with designing prototypes and continuing development going forward. This project is very relevant today as the market of AR and VR is already quite large and has been projected to hit $150 billion by 2021.