James High fidelity prototype Evaluation

1. Technology audit

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| Feature | Presence | Associated Problems |
| Operation of the users presence | Present | Hand avatars were present, these were sufficient and necessary |
| Lack of Haptic Feedback | Present | Passive haptics present from controllers and button presses. No further haptic feedback was needed |
| Interactive Techniques | Present | Mix of grab and ray cast selection. Appropriate to type of actions. Some lag occurred during interaction which will cause simulator sickness |
| Realistic Graphics | Mixed | Depth perception could be improved with better depth cues. Eg. Shadows, fog to give better shape perspective |

1. Heuristics rating and interpretation of problems encountered

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|  | Heuristic | Rating | Problems Encountered |
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| 1 | Natural engagement | S | User instructions were too close to user making them hard to read. No animation when menu wheel spins making it hard to tell which direction it moves in. Scaling of map is not 1-to-1 with hand movements (see also 4). Initial terrain size is too large. Walking is slow and jerky which may lead to sim sickness (see also 7, 12). No sense of scale of the terrain or depth cues (see also 12) |
| 2 | Compatibility with the user’s  task and domain | - | No Problems |
| 3 | Natural expression of action | S | Can accidently draw ridge instead of creating point constraint. Rotating through the circle menu sometimes not reactive. Changing the size of the terrain type constraint painter too slow. No undo functionality. Texture writes are too slow. Tended to drop pencil when creating a constraint. Constraint sometimes lagged and continued to move after released. Using the pencil to select teleport location seemed unintuitive. |
| 4 | Close coordination of action  and representation | A | Texture painting does not match circle indicator. Not all points on the Terrain are grabbable. |
| 5 | Realistic feedback | D | Display of area of effect indicator on the paintbrush tool is incorrect when painting small areas. |
| 6 | Faithful viewpoints | A | Constraint widgets are too densely packed when the terrain is scaled down |
| 7 | Navigation and orientation  support | A | Location markers do not scale with the terrain |
| 8 | Clear entry and exit points | N/A |  |
| 9 | Consistent departures | - | No Problems |
| 10 | Support for learning | I | Not clearly indicated that the circle menus rotate continuously |
| 11 | Clear turn-taking | N/A |  |
| 12 | Sense of presence | S | Rotating while in the first person POV is too fast |

1. Classification of problems encountered with severity ratings and suggested design improvements

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| Feature | Problem Description | Problem rating | Design Change |
| Graphics | Texture rendering delays and terrain update delays | Distracting | Use better optimized terrain simulation software |
| Presence | Simulator sickness from lag and rotating in FPV | Annoying | Use better optimized terrain simulation software, Do not let user rotate smoothly in FPV |
| Interaction | Could not grab terrain at all points, Dropped the pencil accidently. Accidently created wrong constraint type. No undo. | Severe | Make all points on the terrain grabbable. Have a setting to make the tool grab a toggle rather than a persistent grip. Add undo and delete features |
| Environmental features | Terrain did not scale in a 1-to-1 manner. No sense of scale or depth cues in terrain. Textures painted on the terrain did not match the paintbrush tool preview. | Annoying | Adjust scaling to be 1-to-1. Paint textures correctly within preview. |
| Controls | Text instructions too close to user. Circle menu rotation sometimes unreactive and not animated. | Annoying | Place instructions on a static surface further away from the user. Animate circle menu rotation |
| Hardware | N/A |  |  |