

# “Tooling Operations”

## 2<sup>nd</sup> Iteration

Clemson University/Boeing Capstone VR Project

**Step 1: Environment Loading** (Launch the application and put on the headset; Load into the staging/sandbox area and interact with main menu; change level to “Tooling Operations” to play)

- The operator will launch the application from their desktop to the headset or open the desktop application in a window on their machine.
- The user is loaded into the sandbox environment described and implemented in the 1<sup>st</sup> Iteration.
- The menu will now allow the user to select the option “Tooling Operations” under the “Select Level” button in the main menu.
- The user selects the “Tooling Operations” level and the level name is displayed/made known to the user they have selected this option.
- The menu then prompts the user if they wish to load into the level and the operator accepts to be loaded into the new environment.
- The user will be able to leave the environment at any time they wish with a potential completion percentage or fraction bar provided to let the user know how much Tooling Training they still have left to finish.

**Step 2: Tooling Environment Options** (User will be given options for different tooling practices; user will select desired tooling practice; the user will have a defined amount of time or prerequisite they must meet before the tooling practice is complete)

- When the user is loaded into the environment, they are met with an overworld screen/menu that gives them the tooling options of choice: “Hydraulic Aircraft Jack”; “Crimping Tools”/“Swaging Tools”; “Blow Gun Air Compressor”; “Air Chuck”; “Metal Shrinker Stretcher”; “O-Ring Tools”; etc.
- Behind the overworld screen/menu, there is going to be a line of storage containers with garage-like doors. There will be 1 compartment per tooling practice with a red light above each door. The user will select a Tooling Operation they wish to engage with and the corresponding garage door will slide up to reveal the operating room. The light above the garage door will turn yellow while the door is open/task has not been completed.
- The operator will navigate to the entrance of each garage door and there will be a low opacity white wall with a “Start” button that fades into view when the user walks close to the operating room.
- The user will press “Begin” and the wall will fade/slide down/some other gimmick.
- When the user navigates to the highlighted area in order to start working, a window will present itself to the user giving them more information on the tool they will be operating with. This window will provide the user with step-by-step instructions on how to use the tool within the VR environment, as well as how to perform the task within the operating room by a certain amount of time or by meeting a prerequisite.
- (Potential) The window could provide the user with certain skills this operation will help the operator train.

- The window with the information will provide the user with a “Start” button that they can press when they are ready to start the operation. When they click start, a countdown timer will replace the “Start” button and a timer will begin.
- The window will also have an “Exit” button if the user wishes to exit back to the original Tooling Operations Option menu to reselect their desired operation.
- A timer or prerequisite indicator will (possibly) lock itself to the user’s field of view in a HUD-like visualization so they understand how much time they have left or what other goals are needed to be completed before finishing the operation at hand.
- The user will perform each operation required by the training simulation and a progress bar will (possibly) also show their number of completed steps or percent complete.
- If the user finishes all the required tasks within the operating room before the time runs out or meets the prerequisites, a congratulations will be presented to the user and a summary of their efforts are provided. This summary can include the time needed to complete the task along with the average amount of time it takes users to complete, (possibly) the accuracy of the operators’ actions throughout the operation, etc.
- If the user does not finish the required tasks within the amount of time or cannot complete the prerequisites before moving on, they, the time bar will become red and show a negative (overage) time but will still allow the user to complete the task. A summary will still be presented to the user with a possible encouraging message or tip to help the user out.
- Regardless of if the user meets the goal, they will be prompted with whether they wish to try the operation again or return to the Tooling Operation Options menu. If they choose to return, the screen will fade out and fade back in after transporting the user back in front of the original environment window. If they wish to retry, the user will navigate back to the original placement if needed, and then press “Start” again when they are ready to begin the operation.
- When the user finishes an operation within the required time or completes all the prerequisites, the light outside above the door to the operating room will turn green.

**Step 3: Free-Play Mode** (The user will have completed all training operations to unlock free-play mode; The user will be able to restart a desired operation to attempt to beat their scores; The user can leave or go back to the Main Menu at any time)

- When the user has completed all of the operations, the lights will all be green above the operating room entry ways. The doors will be open for all of the operating rooms and the user will be able to navigate to any of them with the menu or simply by walking over to them.
- The same steps outlined in the previous step will apply to each operation in Free-Play Mode as the user can continue practicing their techniques and training within the environment.
- The user will be able to potentially switch the mode to “Challenge Mode” which will reduce the amount of time allowed to complete an operation but will also score the user based on their accuracy and safety practices as well.
- The user can return to the Main Menu and exit this environment from the menu presented for the Tooling Operation Options or through their tablet at any time with their completion or operation fraction bar completely filled in 100%.