3D Aircraft Evacuation Simulator User Manual

Installation

1. Download Unity3D version 4.3.4 from https://unity3d.com/unity/download
2. Download Blender version 2.68 from http://download.blender.org/release/Blender2.68/
3. Install Unity3D after download
4. Install Blender
5. Open Unity3D
6. Select Assets -> Import Package -> Custom Package
7. Select the unity package provided by the team from where it is stored
8. After a selection box appears, select All and then Import
9. After the package is imported, select Levels folder in Unity
10. Double click A320 Scene, to open it

Usability

This is a 3D aircraft evacuation simulator. It is primarily focussed as a learning tool that can be used to run customised or default evacuation simulations within different conditions in order to observe the factors that affect evacuation time. At the same time, the system will provide support for gathering data from each run and give flexibility and freedom to the user.

This aircraft evacuation simulator is aimed to be easy to use and relatively self-explanatory. It does not require any previous experience in order for the user to optimally use the system.

At the start of the simulator, the user is presented with the main menu with different options (Figure 1).

Figure 1: Main menu

Providing the user is familiar with the system, they can simply go straight to the actual simulation by choosing the option “Start Simulation”. Otherwise, the user can get familiarised with camera control keys which provide the functionality to switch between different cameras giving the user better flexibility to focus on particular positions of interest by choosing the “Camera Controls” menu. This is shown on Figure 2.

Figure 2: Camera switch control keys

The cameras support customised movement and adjustment of different positions. Information for the keys to control this can be found under the “Camera Movement” menu option shown on Figure 3.

Figure 3: Camera movement control keys

General information about the software can be found under the "About" option shown on Figure 4. The "Quit" option is used to exit the program.

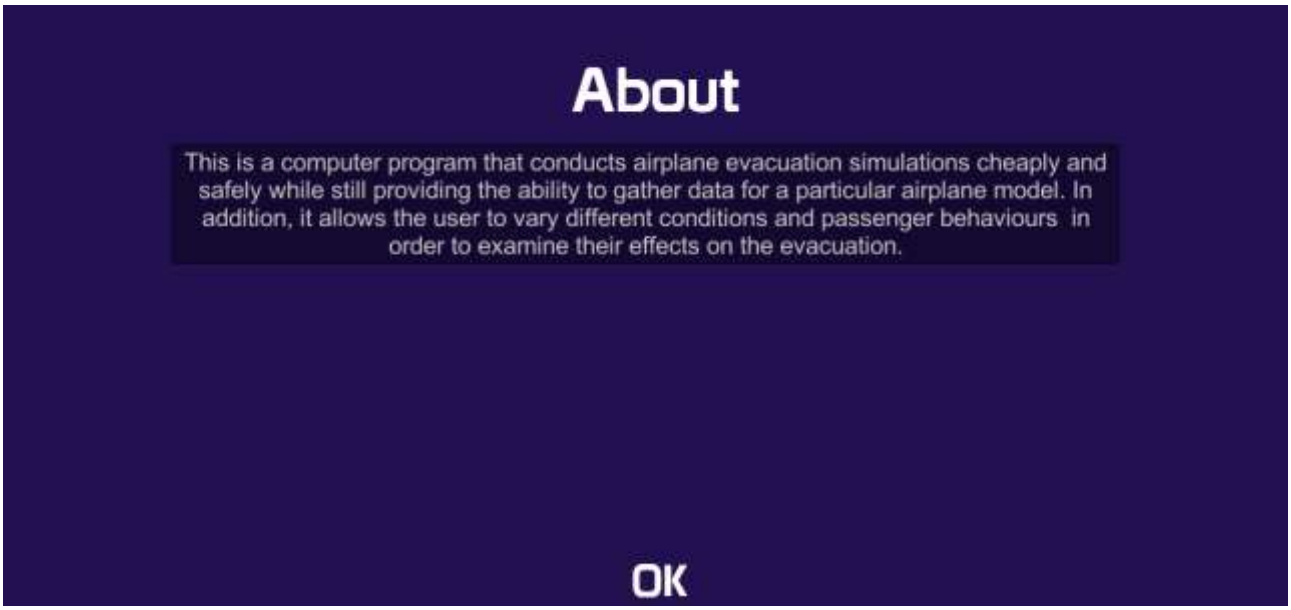

Figure 4: About section

The system supports 2 types of evacuations: a default version with passengers at full plane capacity and assigned to behaviours according to the FAA and ICAO criteria and a customised version where the user can choose the number of passengers to assign to a particular behaviour. The default simulation can be run by pressing the "Start" button without changing any values for the different behaviours as Figure 5 shows. A customised simulation can be run by inserting the desired values

in the text fields at the top left corner as shown on Figure 6.

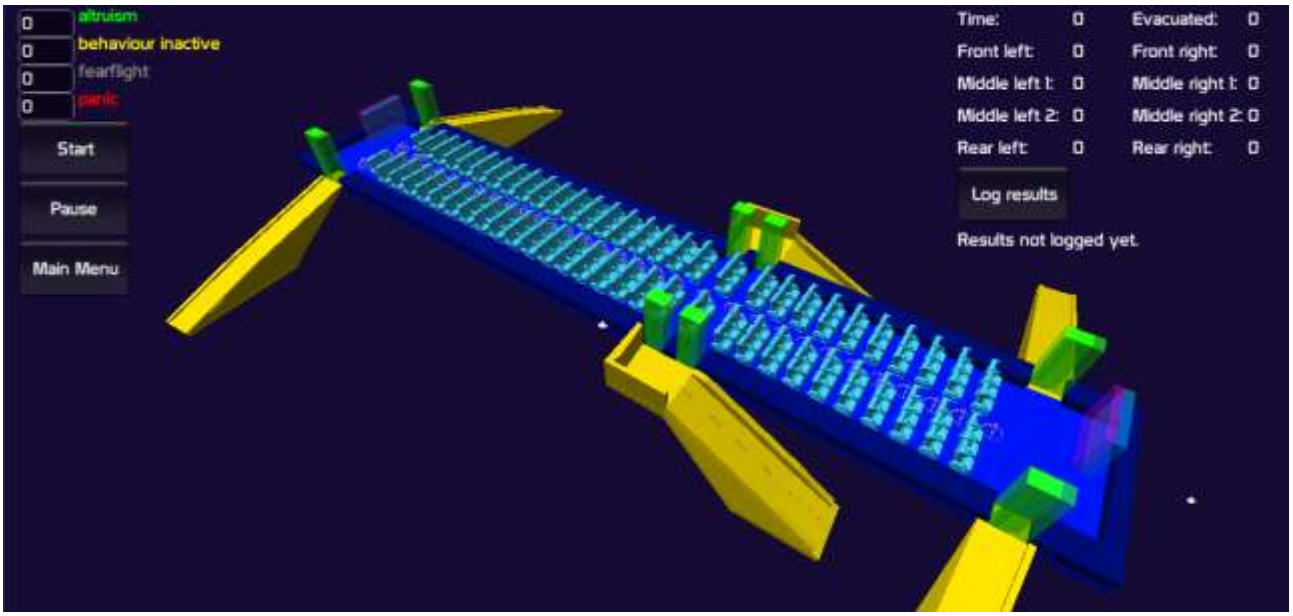

Figure 5: Initial simulation screen and condition to start a default simulation

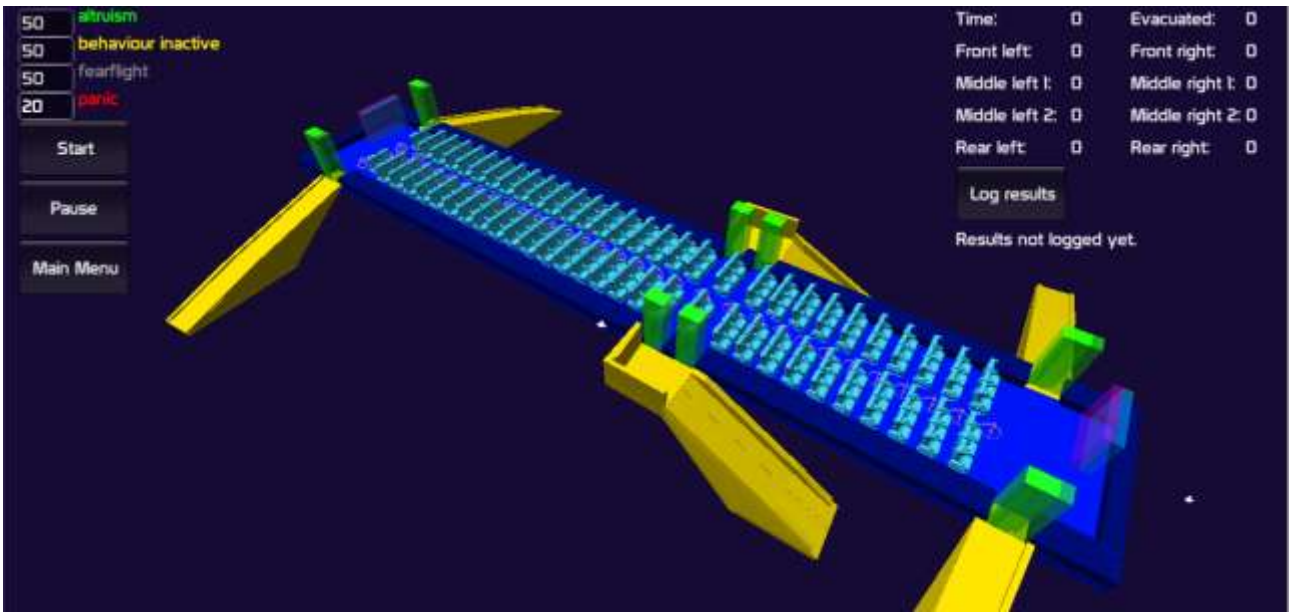

Figure 6: Customised simulation

If the user enters any invalid numbers (negative numbers or numbers that exceed the aircraft's capacity) or enters non-numeric values, a warning message appears on screen until these issues are resolved. The simulation can't be started before ensuring that all values entered are valid digits. An example of such a warning is shown on Figure 7.

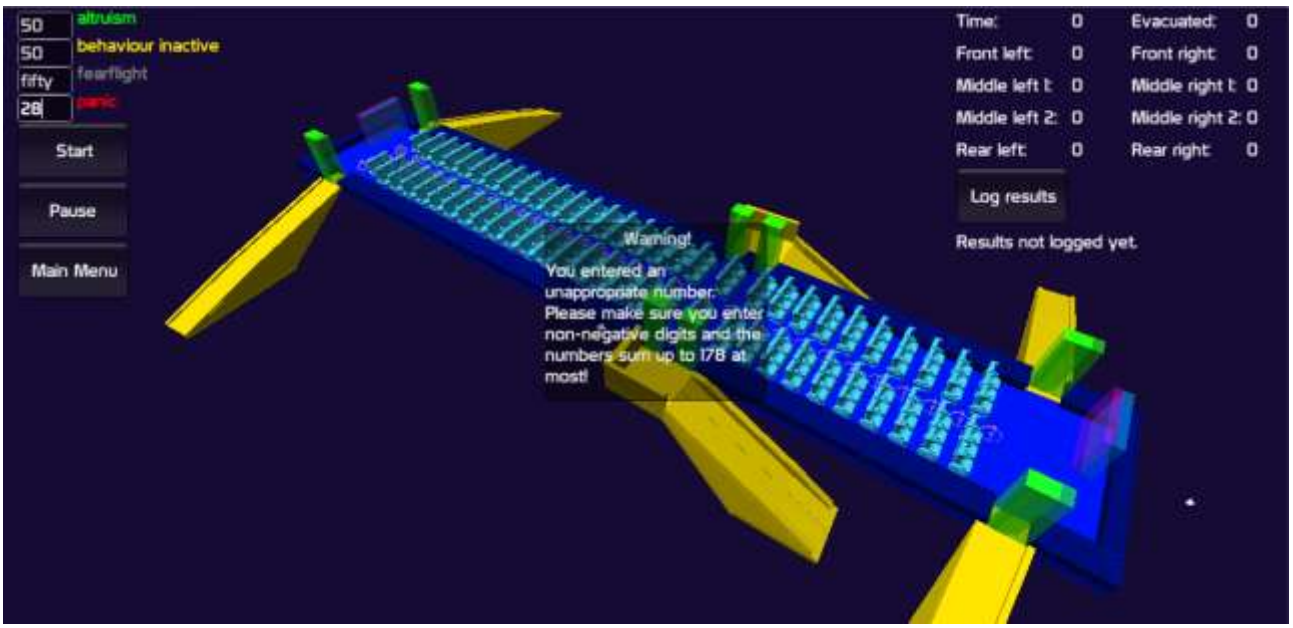

Figure 7: Invalid number warning

After the start of the simulation, the user is not allowed to change the entered numbers but they are still displayed on-screen. In addition to the visualisation of the evacuation, a results area at the top right corner is provided to ensure complete awareness of the events and provide useful data for analysis. The information can be stored in text files by pressing the “Log results” button while information about the last log time and where the results are stored is updated appropriately and displayed below that button (see Figure 8).

The user can disable and enable evacuation doors by clicking on them. Enabled doors are shown to be green, while disabled ones are red. If the user tries to disable all doors, a warning message will appear to alert the user that this is not a legal operation. The evacuation will not proceed in this instance as it is clear that no evacuation can be done with all doors closed when no passenger can leave the plane. Such a warning message is shown on Figure 8.

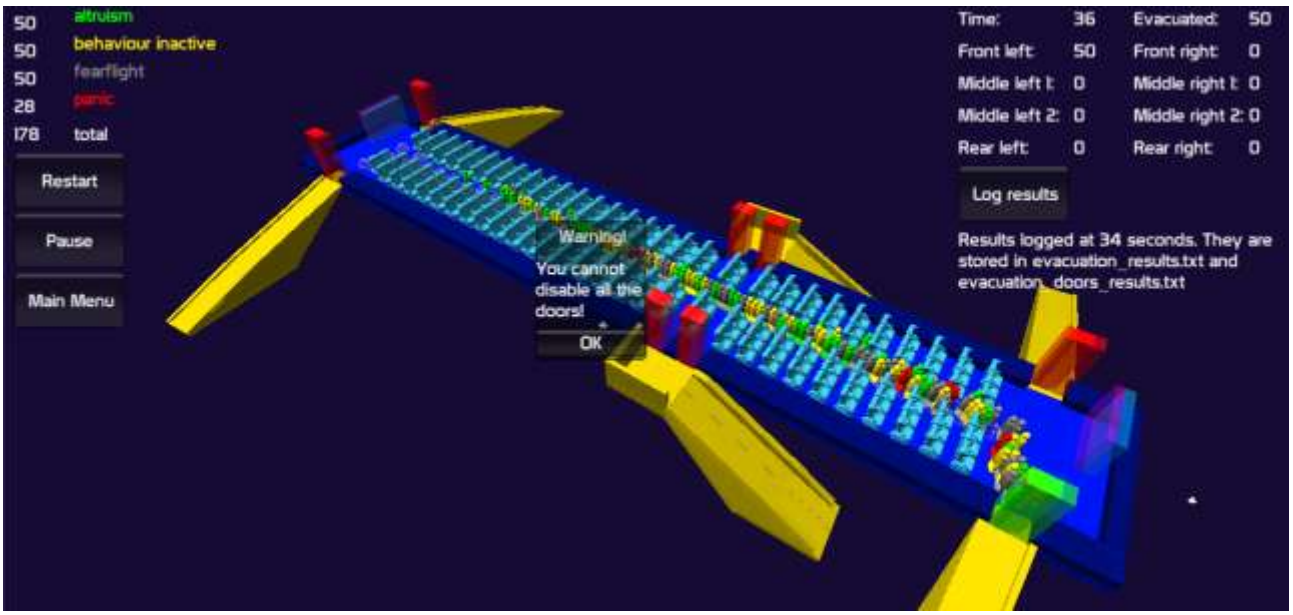

Figure 8: Warning that the user can't disable all the doors

Finally, when either 90 seconds (it is an official requirement posed by the FAA and ICAO that every airplane must be evacuated in the first 90 seconds of the evacuation) from the start of the simulation have passed or all the passengers evacuated successfully, an alert giving information about the evacuation time and number of successfully evacuated is shown (Figure 9).

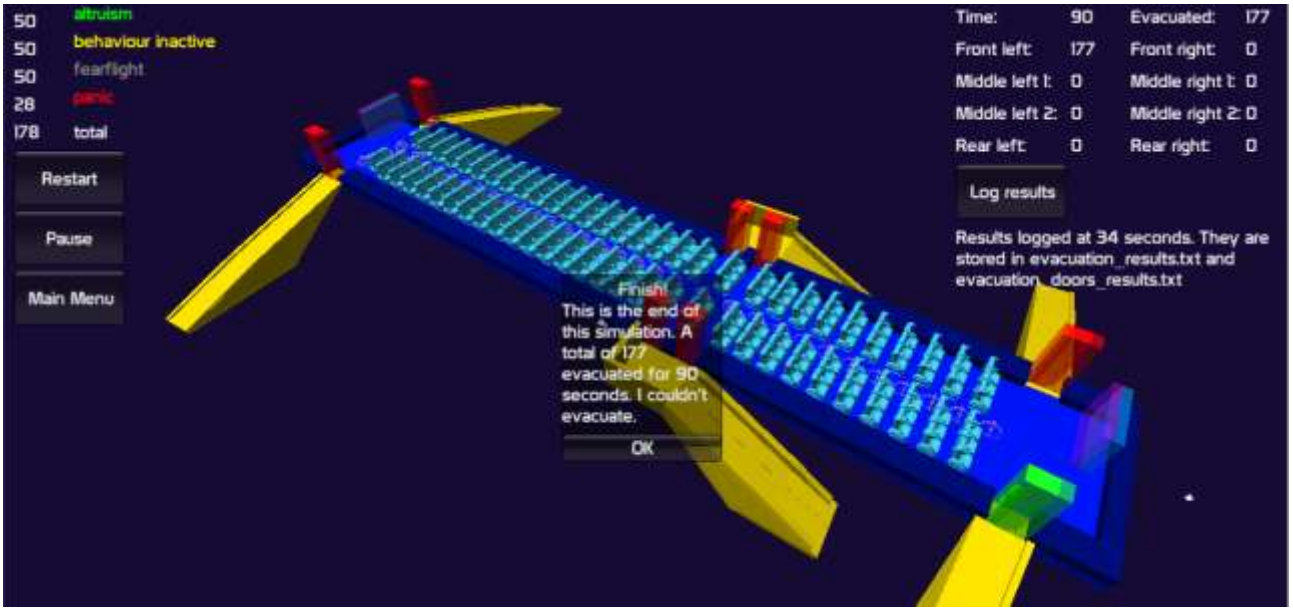

Figure 9: The end of the simulation and results logged at 34 seconds.