# 1 System Requirements

Due to the scope of the project it would be impossible to commence without a clear vision of how the end product should function. This also aids greatly in breaking down the system into seperate components allowing team members to work independently without repetition of work. These requirements were decided on during the early stages of the project. The reasoning behind them comes from a number of sources, primarily -

- Research into previous attempts at evacuation simulation. The teams behind these will have each conducted their own research. Rather than repeat their efforts examination of their choices and rationalisation provides a valuable and dense insight into what shall be required.

- Interviews with a target user (The fire warden at our initial site). Since target users are the potential customers for our product it would be naive not to consider what they would expect.

- Requirements derived from research into evacuation and human behaviour.

- Discussions amongst the team.

The Requirements have been split into several sections depending on their necessity, usefulness and difficulty in implementation.

## 1.1 Must Have

These are the bare minimum requirements for the system to be suitable for any kind of customer use. Without these the software would either be considered entirely non-working or faulty. Not managing to provide these would indicate complete failiure of the project.

- Representation of a 3D environment in a manner allowing the system knowledge of navigatable surfaces.

- Generation and representation of a population within the 3D environment.

- Ability to manipulate the population to allow movement towards a given location.

- Output to the user of time taken for the entire population to successfully move to a safe location.

- Basic behavioural and routing algorithms to generate paths of movement for the population.

## 1.2 Should Have

High priority requirements which should be satisfied where possible. Missing any of these would indicate the project as incomplete and failing to meet all of its objectives.

- Accurate behavioural models allowing realistic actions from individuals within the population.

- Interaction of members of the population to allow realistic crowd behaviour and collision control.

- Ability for the user to specify environmental and population variables (such as population size).

- Pseudo-random population generation including individual characteristics and behavioural patterns as well as initial position.

- Accurate Timescale for evacuation process

- Intuitive GUI allowing viewing of both environmental variables and a visual representation of the environment throughout the evacuation process.

- Ability for user to change perspective (camera location) within the visual representation.

- Ability to import alternative environmental models.

- Extensive Documentation and user help.

## 1.3   Could Have

Requirements considered desirable but not necessary. To be included if time and resources allow.

- Ability to pause and resume the simulation

- Representation of assurances and hazards within the environment such as exit signs and low ceilings.

- Variable run speed of simulation

- Ability to output information such as evauation time and path of each member of the population to file allowing further future analysis.

- Accurate modelling of advanced crowd interation, such as staff assisting the guest population.

- Unusual population traits such as disabled guests and the interaction and assistance required for their safe exit.

## 1.4   Would Like to Have

Features unlikely to be present in the initial release due to time and resource constraints.

- Accurate fire and smoke model.

- User control over fire start location.

- Environmental model support of different materials to allow further accuracy to the fire model.

- Advanced and highly realistic graphical representation of environment.