Computer Models
For
Fire and Smoke

Model Name: SIMULEX

Version: 2.0

Classification: Evacuation model

Very Short Description: A coordinate-based model which calculates the evacuation movement of individual people, through a multi-story building.

Modeler(s), Organization(s): Dr. Peter Thompson, IES Ltd, Scotland.

User's Guide: "Simulex: Evacuation modeling software" supplied with the software.

Technical References: Thompson, P.A. and Marchant, E.W., Computer and Fluid Modelling of Evacuation, Journal of Safety Science, 18 (1995), pp 277-289.

Thompson, P.A. and Marchant, E.W., A Computer Model for the Evacuation of Large Building Populations, Fire Safety Journal 24 (1995), pp 131-148.

Thompson, P.A., Wu, J., and Marchant, E.W. Modelling Evacuation in Multi-storey Buildings with Simulex, Fire Engineers Journal (vol. 56, no. 185), November 1996, pp 6-11

Validation References: Olsson, P.A. & Regan, M.A., A Comparison between actual and predicted evacuation times, 1st International Symposium on Human Behaviour in Fire, University of Ulster, August 1998.

Thompson, P.A. and Marchant, E.W. Testing and Application of the Computer Model 'Simulex', Fire Safety Journal 24 (1995), pp 149-166.

| *Availability*:	Available from Integrated Environmental Solutions Ltd, 141 St. James Road, Glasgow, G4 0LT: www.ies4d.com
Price:	£1000 for an annual licence, £2600 for a perpetual licence.
Necessary Hardware:	Any intel-based PC running a modern 32-bit Microsoft operating system (Windows 95, 98, 2000, Windows M.E.)
Computer Language:	C/C++
Size:	6Mb hard disk space for installation. Minimum 64Mb RAM required for large simulations.
Contact Information:	Peter Thompson, pete@ies4d.com , +44 (0)141 2263662

Detailed Description:

Simulex allows the user to create a 3-D model of a building by using a number of CAD-designed floor plans, connected by staircases. Occupants are 'placed' into the building either one-by-one or as groups. The user defines a number of 'final' exits just outside the building, and Simulex will automatically calculate all travel distances throughout the building space. When the building population has been defined, and travel distances calculated, a simulation can be carried out. The user can view an 'evacuation' on-screen and 'zoom' in on areas of interest. It is also possible to record a simulation onto hard disk for later 'real-time' playback. Simulation and animation occurs in time-steps of 0.1 seconds.
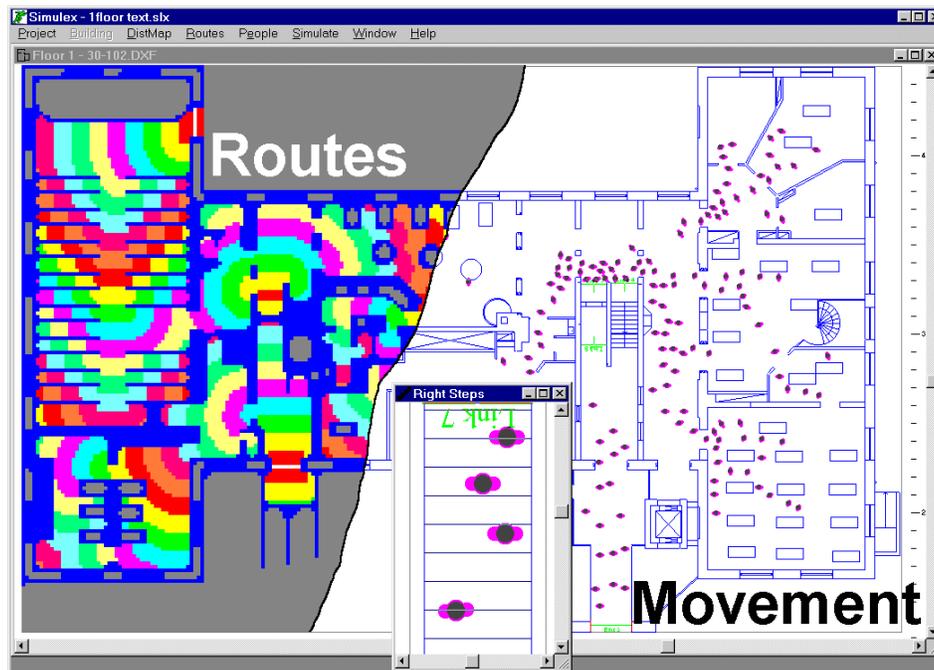
The algorithms for the movement of individuals are based on real-life data, collected by using computer-based techniques for the analysis of human movement, observed in real-life footage. These algorithms have produced realistic parameters of motion for individual people moving through different types and geometries of door exits. Simulex accurately models the physical shape and motion of each individual person; side-stepping and overtaking patterns; speed fluctuations; queuing behaviour; body-twisting, and a choice of different exits using the automatic route-assessment functions.

The fluctuations in walking speed of each individual are modeled, using the relationship between inter-person distance and walking speed. Validation tests have been carried out which demonstrate that Simulex produces realistic flow rates at complex corridor junctions, and also that realistic evacuation times are produced. It is used both in Fire Engineering Consultancies and as a teaching aid at a number of universities.