

Jack human modeling and simulation

Virtual people, virtual places, real solutions

fact sheet

Siemens PLM Software

www.siemens.com/plm

► Summary

The Jack human modeling and simulation tool helps organizations in various industries improve the ergonomics of product designs and refine workplace tasks. Jack and its optional toolkits bring human-centered design tools to your virtual environments for comprehensive analysis of the human factors of your new designs – before any physical prototypes are built. The Jack (and Jill) human models can be sized to represent your user populations, and allow engineers to evaluate their concept designs in terms of human performance, including reach, vision, injury risk, fatigue, comfort and other important ergonomics information.

Features

Create and visualize digital mockups

Jack gives you all the advanced graphical tools for importing design data to the virtual world or creating simple concept models. Use texture mapping, lighting and other graphical tools to give your environments visual realism.

Analyze human factors in designs

Jack's bio-fidelic kinematics and advanced anthropometric scaling give you virtual humans that can accurately predict reach, vision, comfort and fit requirements.

Study humans in the simulated workplace

Jack enables you to design the safest most efficient and most productive workplaces. Jack's real-time posturing and animation capabilities help you quickly assign Jack to perform tasks to evaluate your designs.

Evaluate manual handling operations

Lifting heavy objects, performing tasks with awkward postures, and working while fatigued all place workers at increased risk of injury. Jack's comprehensive collection of human performance tools provide quantitative feedback on injury risk, strength capability, posture analysis, fatigue and task timing.

The Jack advantage

Countless organizations in a variety of industries are facing the same problem: the human element is not being considered early or thoroughly enough in the design, assembly and maintenance of products. More importantly, this is having a devastating impact on cost, time to market, quality and safety. For a growing number of organizations, however, factoring the human element into design, manufacturing and maintenance is no longer a problem; it's a competitive advantage. These organizations are using Jack to realize benefits such as:

- Shorter design time
- Lower development costs
- Improved quality
- Increased productivity
- Enhanced safety
- Heightened morale

Jack's business value

Jack is an ergonomics and human factors product that helps enterprises in various industries to improve the ergonomics of product designs and workplace tasks. This software enables users to position biomechanically accurate digital humans in virtual environments, assign them tasks and analyze their performance. Jack (and Jill) digital humans can tell engineers what they can see and reach, how comfortable they are, when and why they're getting hurt, when they're getting tired and other important ergonomics information. The information you obtain from Jack can help you design safer, more ergonomically sound products, workplaces and processes faster and for less cost.



System requirements

Windows XP and 2000

Minimum:

300 MHz
128 MB RAM
175 MB free disk space

Recommended:

2.2 GHz
512 MB RAM
175 MB free disk space
128 MB dedicated Video RAM

HPUX v11

Minimum:

C180 level machine
256 MB RAM
200 MB disk space

Recommended:

B2600
1 GB RAM
200 MB disk space

IRIX 6.5.x

Minimum:

O2 level machine
200 MB free disk space
256 byte RAM

Recommended:

Octane level machine
1 GB RAM
200 MB free disk space

Using Jack

Step 1: Build a virtual environment. In addition to its strength as a human modeler, Jack is a powerful interactive, real-time visual simulation solution. Jack's kinematic modeling capability allows you to easily joint figures to create complex mechanisms. Real time inverse kinematics and constraint solvers automatically can be applied to your mechanisms.

Step 2: Create a virtual human. Jack provides the industry's most biomechanically accurate human models based on body dimension measurements taken from the most up-to-date anthropometric databases including ANSUR 88, NHANES, and CAESAR. Boundary manikin methods can be used to create a family of sized manikins to efficiently test your designs for accommodation.

Step 3: Position the human in your environment. Jack allows you to posture the figure using advanced empirical models, inverse kinematics or direct joint manipulation. In all cases, the manipulation of the complex figure is quick and the postures are physiologically realistic.

Step 4: Assign your human tasks. Jack's full animation capabilities allow human tasks and mechanism motions to be defined and played back for review or analysis. In addition, a wide range of VR hardware is supported for real-time capture of complex human movements. Simulations can be easily exported to .mpg movies.

Step 5: Analyze how your human performs. Jack features the industry's leading collection of tools to help you evaluate the performance of your virtual humans. Many of the functionalities are assembled in add-on modules including the Occupant Packaging and Task Analysis toolkits. Functionalities include:

- Vehicle accommodation tools – posture prediction, SAE J standards
- Vision analysis including 3D vision obscuration, refraction or target visibility zones
- Analysis of human performance capability including strength, posture, injury risk, fatigue and task timing



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