NEXGEN Ergonomics

HumanCAD®

CERTIFIED Solution Partner

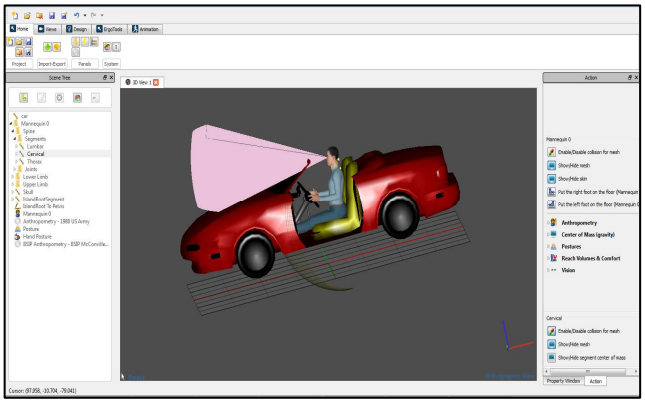
SOLIDWORKS

Bringing Simplicity to Human Modeling

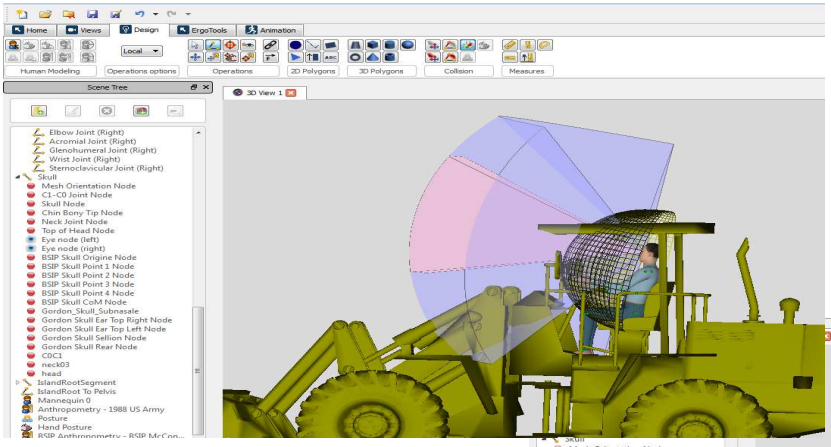
NexGen Ergonomics' HumanCAD® human modeling solution creates digital humans in a three-dimensional environment in which a variety of ergonomic and human factor analysis can be performed. HumanCAD aids users with the design of products and workplaces by determining what humans of different sizes can see, reach, or lift.

SOLIDWORKS users import their files into HumanCAD. If both products are installed on the same PC, then you can update the scene in HumanCAD to reflect any changes made in SOLIDWORKS.

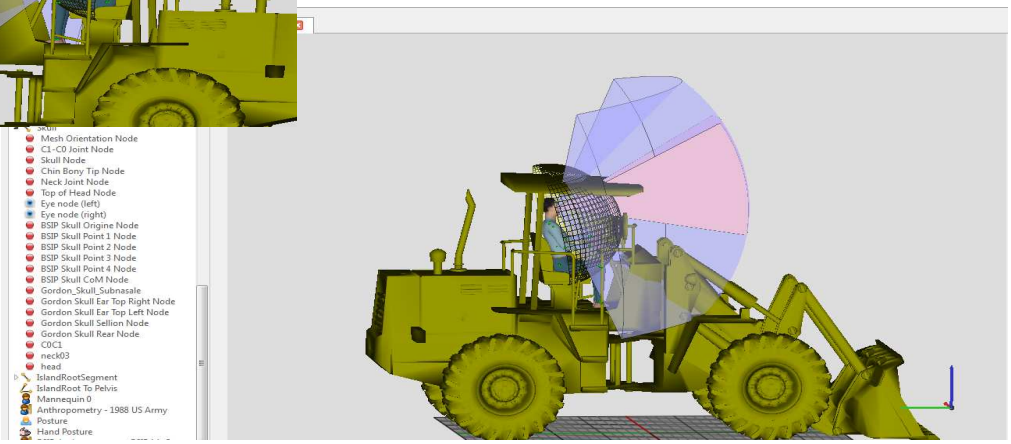
The new HumanCAD platform is our 5th generation and demonstrates our continued innovation that started in 1990 with ManneQuin, the world's first PC based human modeling solution and was followed by ManneQuinPRO and ManneQuinELITE. Thousands of users in various industries, government organizations, universities and consultants worldwide have acquired these human modeling solutions.



HumanCAD includes a modular architecture that allows customers to purchase the modules they need. Included in all configurations is inverse and forward kinematics, digital human creation using a variety of libraries and databases, vision and reach analysis and much more. You can save your custom postures or anthropometries in these libraries for reuse.



HumanCAD 's ergonomic evaluation tools provide data on potential injury risk and postural analysis. Other human factor tools aid in the determination of reach, vision, comfort and fit requirements.



Flexible anthropometry

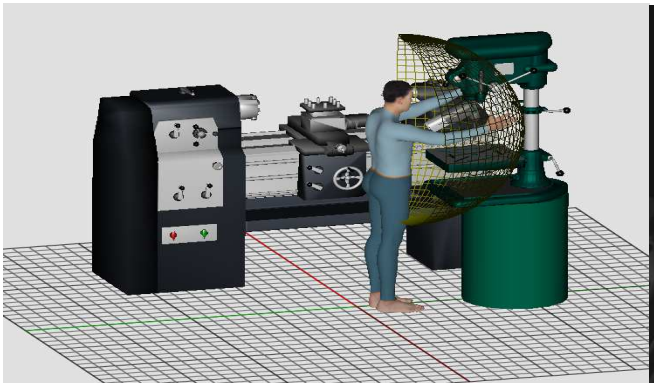
• Extensive anthropometric databases of men, women and children including 1988 Natick US Army and NASA-STD-3000
• Semi-auto control for anthropometry: The height and weight values for a model can be entered manually, while the remaining body segments are scaled accordingly
• Manual control for anthropometry: Individual body segment dimensions can be entered manually (by value or percentile) to generate a specific anthropometric model
• Anthropometry editor enables you to modify the somatotype of your virtual human model. Options include determining how much the digital human will be closer to an ectomorphic or more towards an endomorphic body style.

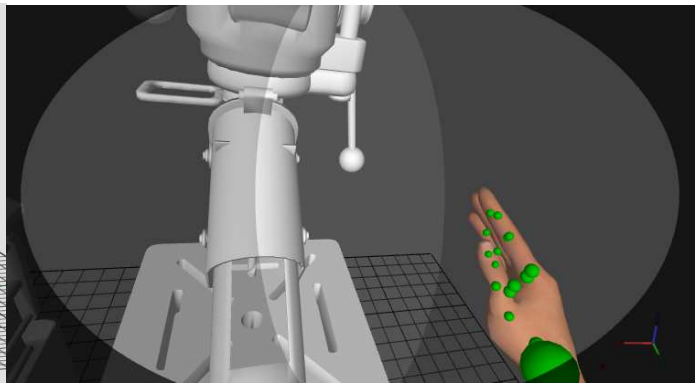
Easy mannequin positioning

• Completely articulated body within human ranges of motion
• Library of pre-defined mannequin body and hand postures
• Real-time Inverse kinematics (IK) and forward kinematics (FK)
• Mannequin reach point (can the mannequin or person reach the selected point)
• Mannequin see point (can the mannequin or person see the selected point)
• Digital floor with mannequin snap-to-floor feature
• Automated move which allows the user to move a mannequin to an object, or an object to an object.
• Attach objects

Ergonomics and space analysis

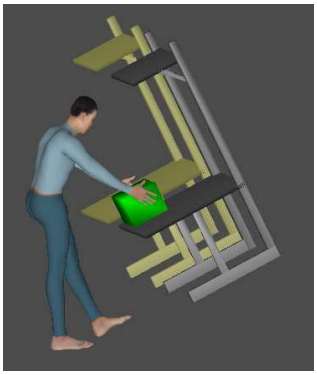
• Reach-envelopes for hands and feet
• Mannequin's vision analysis with vision view windows, 3D representations for field of view, vision cones
• Basic 2D and 3D drawing/modeling tools including annotation and markup
• Dynamic distances and angles: Measurements are updated automatically when the 3D scene changes, for example as parts move or mannequins are resized.
• Optional ErgoTools includes the revised NIOSH Lifting Equation and multiple biomechanical model options (including an interface to the University of Michigan 3D SSPP model)
• BSIP (Body Segment Inertial Parameters) as defined by McConville et al. (1980) (on male US Air force soldiers) and Young et al. (1983) (on female US Air force soldiers). These methods elaborate more realistically segments' masses, centers of mass and matrices of inertia.



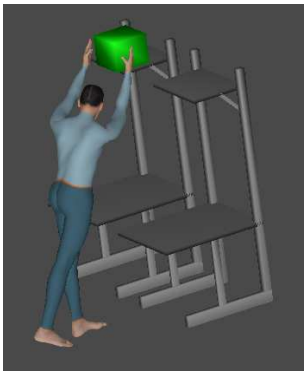


ErgoTools

ErgoTools is an optional HumanCAD module and includes:
• Three-dimensional biomechanical model with predictions
• Interface with University of Michigan's 3D SSPP model
• Revised NIOSH Lifting Equation
• AFF (Arm Force Field) methods



• MAE (Maximum Acceptable Efforts)
• Energy Expenditure • Energy Expenditure
• OWAS & RULA
• Snook and Mital tables



Versatile environment and 3D Navigation

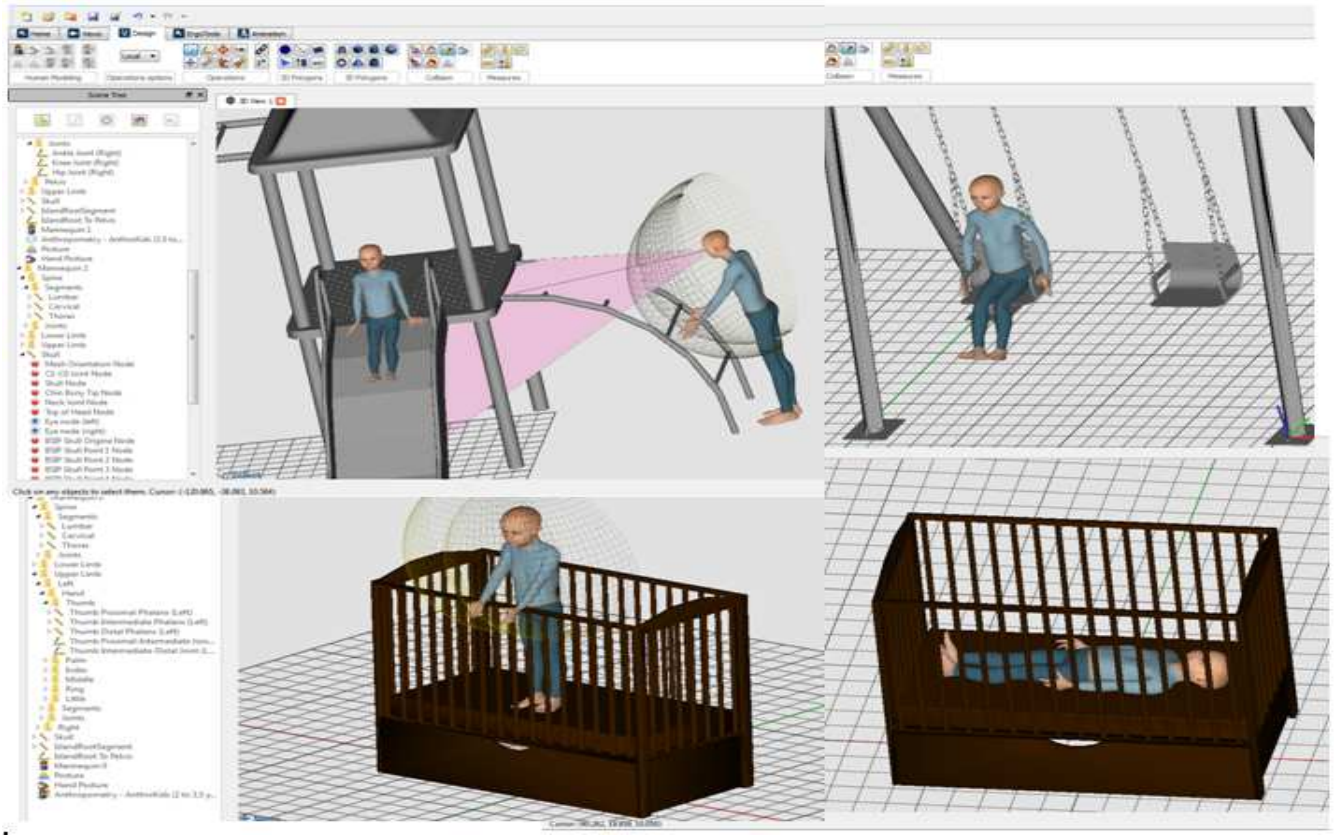
• Interactive Dragger: Allows easy repositioning of parts or mannequins
• The Properties View allows quick view and editing of all properties of selected parts, mannequins and measurements, including position and orientation, color
• The 3D renderer supports transparency and highlights and allows dynamic navigation through 3d scene.
• OpenGL rendering
• Grouping of objects
• Multiple independent 3D views
• Quick and user-friendly manipulation of 3D objects
• The panels can be docked or floating, providing a more flexible interface.
• The object hierarchy is graphically represented, with drag'n'drop support.
• Transformable geometries are supported natively to simplify the user workflow.

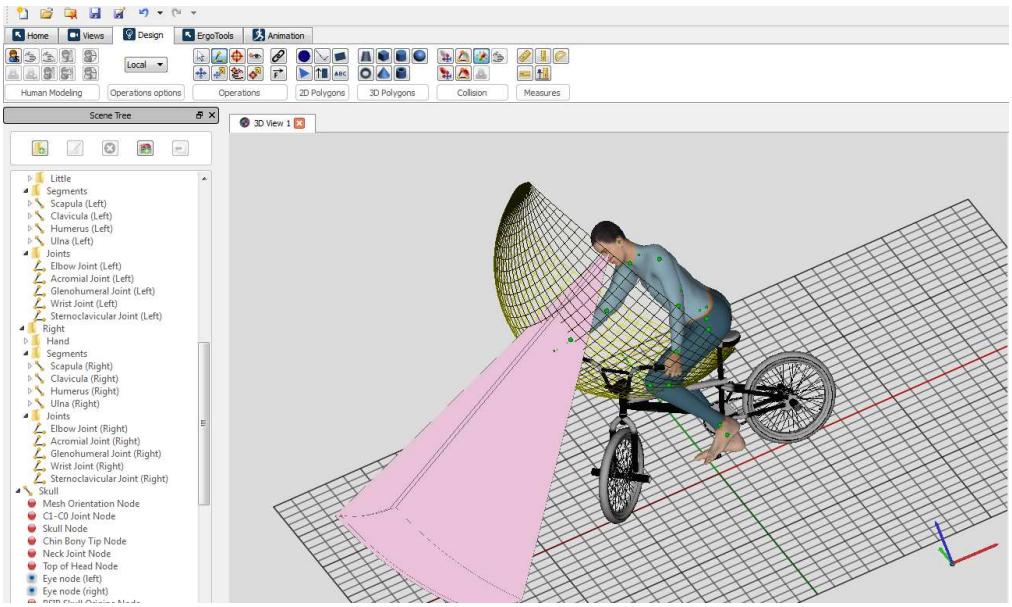
Extensive Import-export files support

• File Import/Export support for DXF, FBX, OBJ, OSG, OSGB, OSGT, OSGX, IVE, and 3DS file formats included. IGES, STEP, STL and DWF (DWF file format only available for exporting) formats are available with the optional CADExchange module. The IGES v5.3 and STEP (AP203 and AP214) formats are supported.
• Files from .mqp format need to be converted to .osg prior to being imported into HumanCAD
• Function to reload an imported CAD file which was modified in any CAD software allowing you to perform quicker human factor analysis of your 3D file.

Child module

Create digital mannequins of children from a variety of age groups from 2 to 19 years of age.





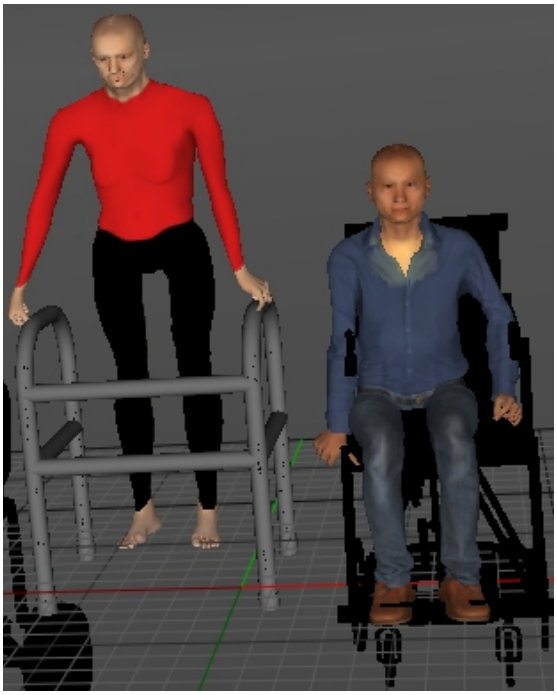
Teenage mannequin

Elderly module

The following databases are included:

- Japan Elderly 1992 male and female
- DTI UK Elderly 1998 (four age groups: 65+, 65-74, 75+ and 85+) male and female

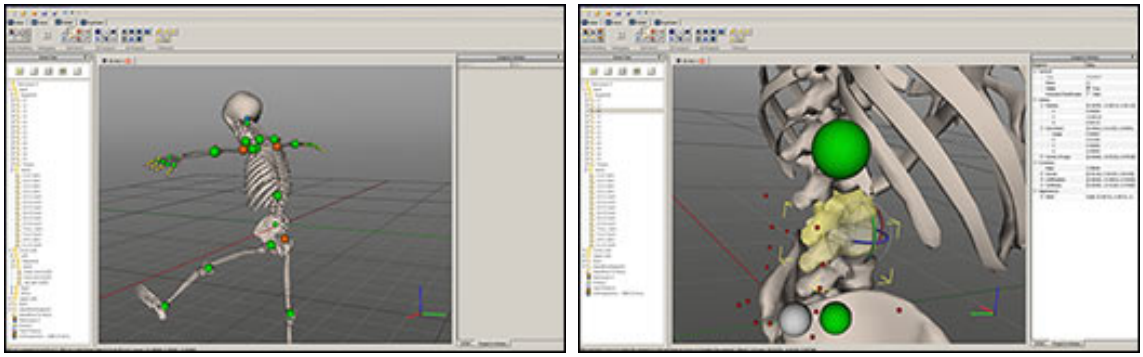
Ranges of Motion (ROMs) are available (for each age group, gender and ethnicity of the added elderly databases) as well as BSIPs databases were added for Elderly populations.



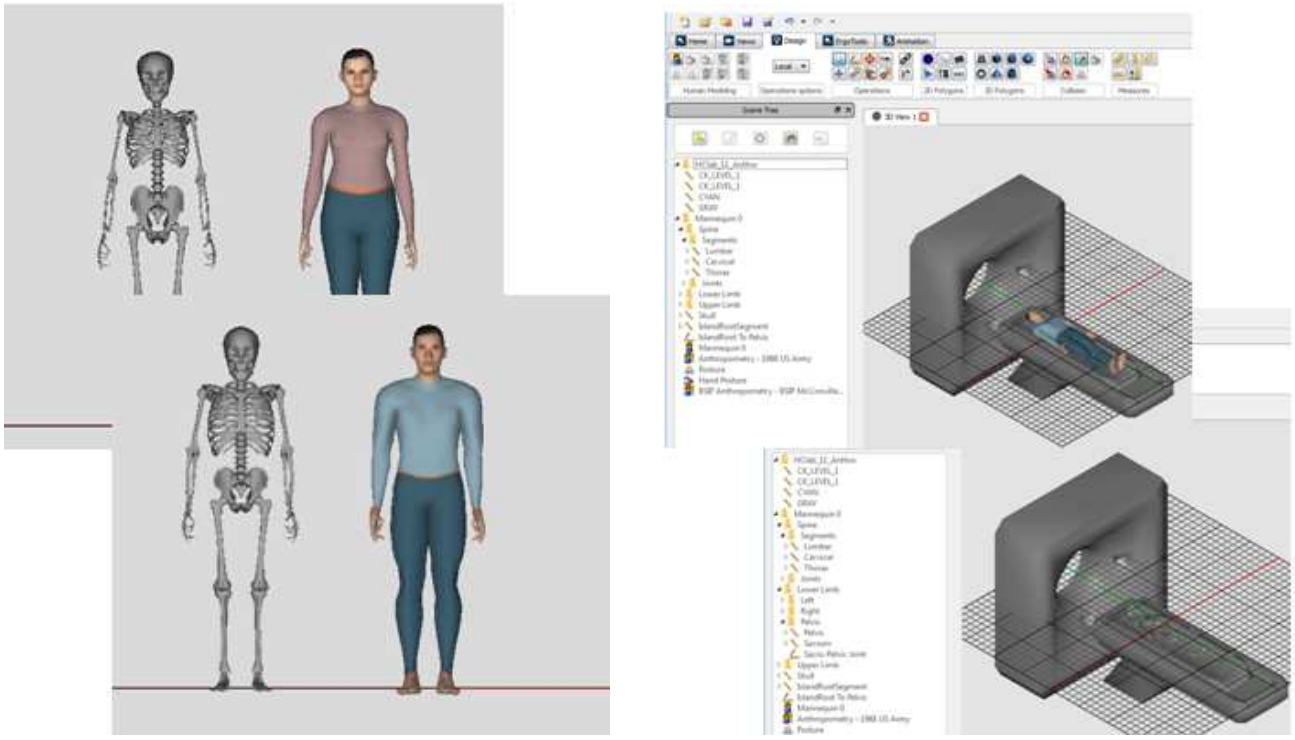
Advanced Functions Set (AFS)

AFS is an optional HumanCAD module and includes:

- Advanced mannequin representation with more realistic degree of freedom and more segments which include detailed spine model (18 versus 3), ulna-radius rotation
- Mannequin with customizable head variable using US Army 1988 and Canadian military database of 1997
- Mannequin skeleton representation
- More detailed shoulder model
- Collision Detection
- Comfort Zones
- Animation capability which includes collision detection and attached objects support

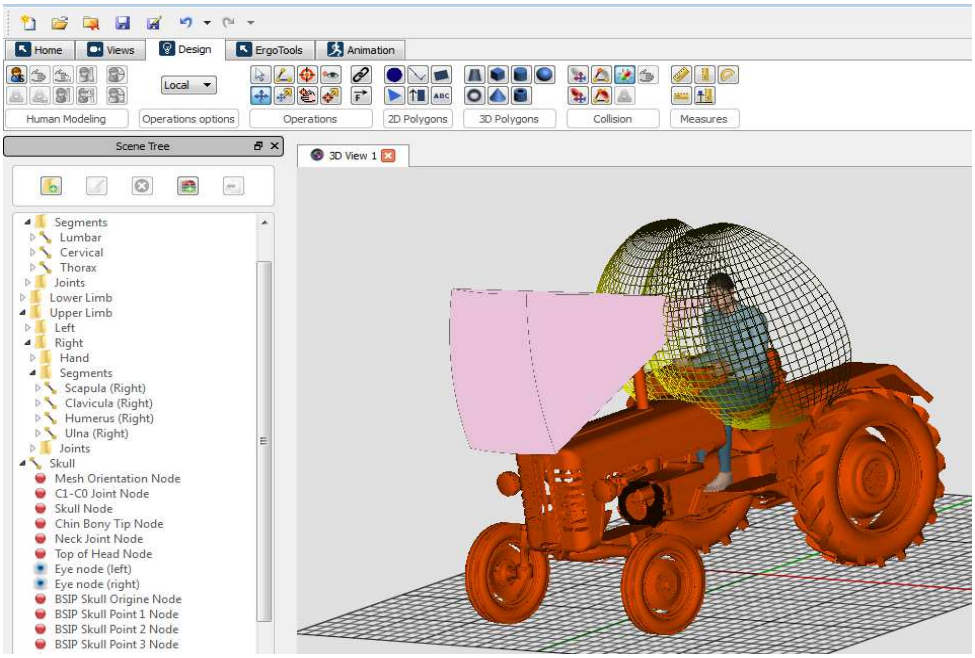


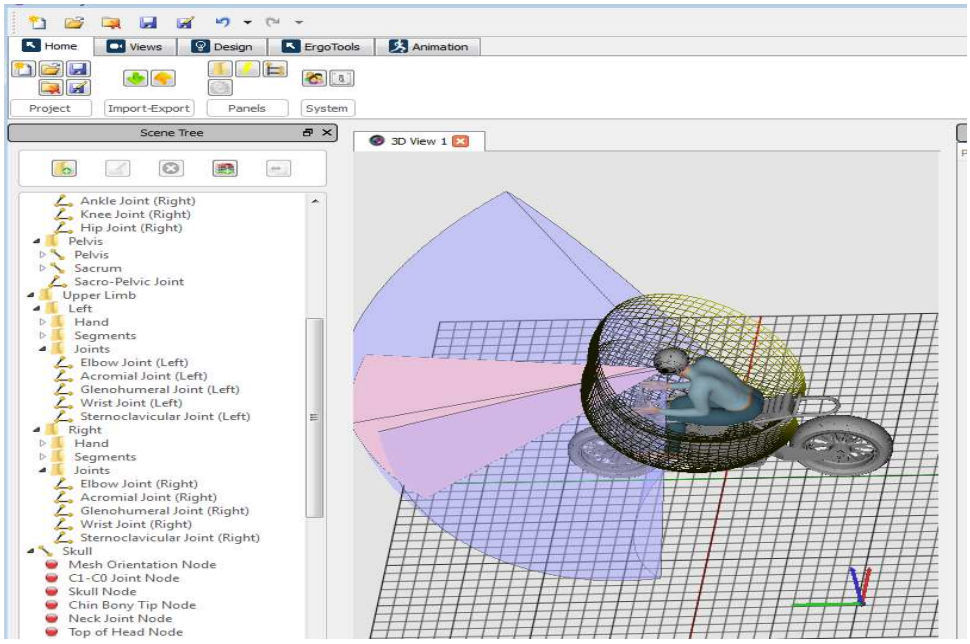
Selections of nodes even at the vertebrae level for inverse kinematics

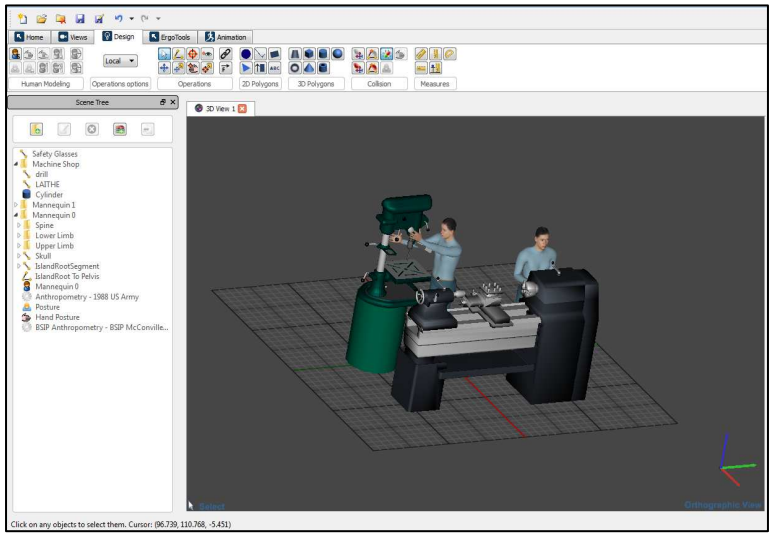


Skeleton representations of both standard and advanced mannequins

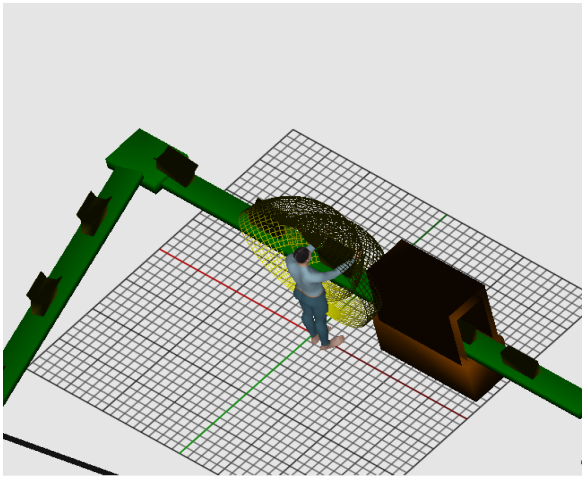
HumanCAD can assist in the design of a variety of transportation vehicles. You can easily create mannequins of various anthropometries to test your designs for reach, vision and more.



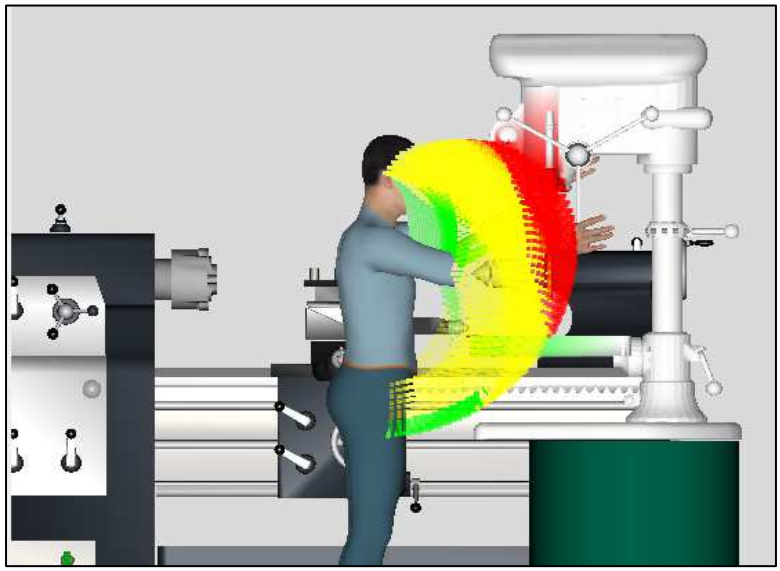




HumanCAD digital human modeling technology is an important tool in determining the human fit of products and workplaces before they are built.



This includes looking at comfort zones for certain tasks.



Additional methods for analyzing comfort and discomfort are available.

Minimum System Requirements

- Windows 10 or 11 (64 bit)
- Intel/AMD CPU, dual-core 1.8GHz or more
- 4 GB of RAM
- 3D hardware accelerated GPU (AMD, nVidia or Intel HD Graphics)
- 3 Button mouse is recommended

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