

# Motion Capture Toolkit for Tecnomatix human applications

## Merging true human motion with virtual product and process data

### Benefits

- Avoid errors when creating complex postures by using motion capture to understand how real humans interact with your product or environment
- Identify issues that may only become apparent when attempting the activity in person through virtual reality immersion
- Evaluate the user experience early in the design phase without the need for physical prototypes
- Quickly create full-motion scenarios without having to manually author a simulation
- Use motion capture together with Classic Jack's ergonomic analysis tools to evaluate what-if scenarios as well as physical stresses as they occur over time
- Record and use complex postures and movements for later analysis, training and communication

### Summary

Tecnomatix® software's Motion Capture Toolkit, which is available for the Classic Jack™ and Process Simulate solutions, allows you to generate accurate motion in an instant and create real-time visualization of human activities. This technology is an ideal way to improve the way you review manufacturing processes and product designs.



By coupling motion capture technology with human modeling, engineers are able to interact directly with their virtual environments and quickly develop the most human-friendly designs and procedures. Tecnomatix software's Motion Capture Toolkit is one of the most comprehensive virtual reality solutions available for performing human modeling in a PLM environment. The toolkit supports multiple full body tracking systems and includes gloves that can track intricate hand and finger motions.

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## Motion Capture Toolkit for Tecnomatix human applications

### Benefits *continued*

- Check first-person interactions to facilitate issue resolution and improve communication
- Rapidly evaluate design alternatives
- Assess tasks involving complex postures
- Research behavioral movement strategies
- Evaluate multi-person operations/interactions

### Features

#### *Supported hardware and virtual reality capabilities*

- EVaRT & Cortex (Motion Analysis Corporation)
- Blade (Vicon Motion System)
- Flock of Birds (Ascension-Tech)
- MotionSTAR (Ascension-Tech)
- CyberGlove: (Cyberglove Inc.)
- 5DT Data Glove 5 and 14 Ultra (Fifth Dimension Technologies)
- C3d data playback
- Dual channel and quad buffer first-person stereo views for head-mounted displays (HMD)
- Multi-actor tracking capability for motion analysis and vicon

### Business challenges

At times, designers may want to model complex human motions, as well as nuanced movements that are difficult to predict (such as the differences in behavior between short and tall people who perform the same task). As design teams increasingly make decisions solely on the basis of simulation, it is important to model conditions as accurately as possible.

The Motion Capture Toolkit, which is provided as an add-on to Classic Jack and Process Simulate, delivers this vital analytical functionality.

### What is motion capture?

Generically speaking, motion capture is a sophisticated bundle of technologies used to track the movement of objects in 3D space. It uses special hardware devices, such as cameras, magnetic sensors and gloves. Full body motion can be captured by positioning sensors or markers on a human to trace his or her actions.

Typically, sensors are placed on bony "landmarks", such as the knees, elbows and shoulders.

As a person's motion is captured in real-time, motion data is streamed to human simulation software, where Jack and Jill digital figures replicate human motion. These avatars can automatically be scaled to represent the same height, weight and proportions of the person being tracked; alternatively, they can be sized to match specific human design criteria.

As the human moves, the virtual replica (avatar) moves in tandem, allowing real-time interaction with virtual product data and environments. You can further augment the virtual reality experience by using a head-mounted display (HMD), which is worn by the real human to facilitate a first-person view of what is going on in the virtual environment. The view from Jack's eyes is output to the HMD so that the subject sees what Jack sees, thereby enabling a first-hand evaluation of visibility, reachability or injury risk. Since the user actually interacts with the design, usability issues can be discovered quickly and corrected without building costly prototypes.



### Motion capture use case

The following scenario represents a typical way to use the Motion Capture Toolkit in conjunction with Classic Jack or Process Simulate:

1. Determine one or more target subjects and recruit them for motion capture data collection.



2. Prepare your motion tracking hardware for data capture.

3. Select a digital figure to represent each subject and scale the figure appropriately.



4. Begin streaming your data to the Classic Jack or Process Simulate environment using the motion capture interface.
5. Assign your motion capture data to the appropriate figures.
6. Begin streaming data to your HMD (if applicable).

7. Instruct your subject to perform the desired tasks. Test what-if scenarios by rearranging the scene or scaling the figure size.
8. Use the task analysis or occupant packaging tools to evaluate your design proposal. The human performance tools can be run in real-time during a motion capture session for truly interactive evaluations.
9. Record data for use at a later date, if desired.

### Packaging and availability

The Motion Capture Toolkit is available for the following Tecnomatix applications:

- Classic Jack
- Process Simulate Human

Note: A dual head graphics card is required for Stereo HMD.



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