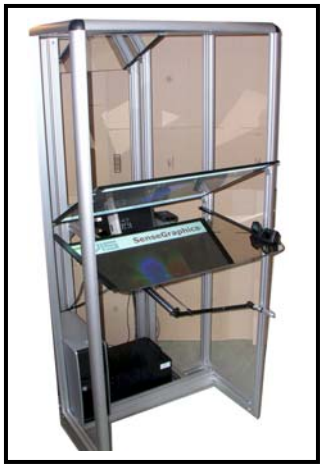
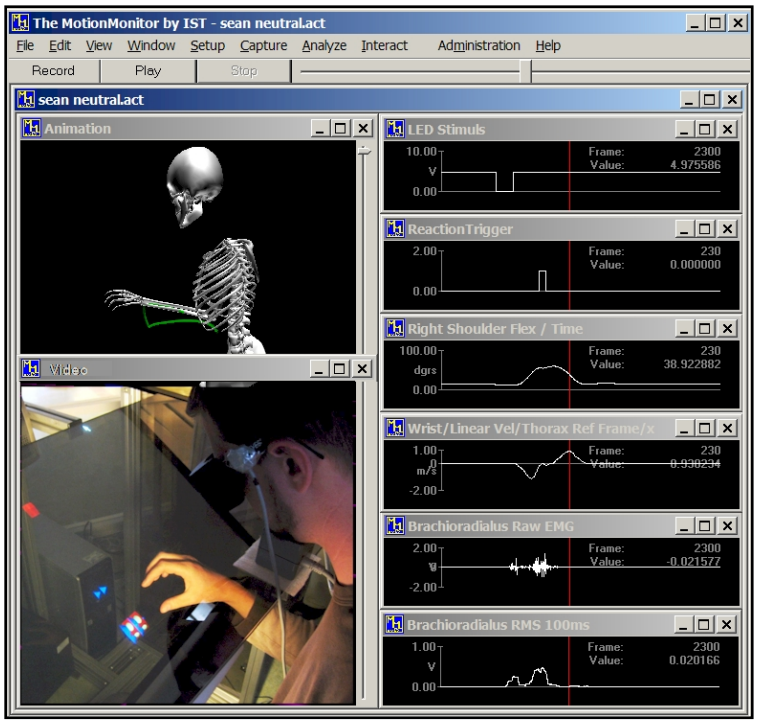


the most advanced data acquisition and analysis system in the marketplace offers precise measurement of human motion for applications in…

Neuroscience & Rehabilitation

The MotionMonitor *for Neuroscience & Rehabilitation* was designed with two purposes in mind:

- To provide tools that simplify neurological studies of reaching with emphasis on subject's adaptation to perturbation of visual stimuli and sensorimotor feedback using stereoscopic visualization with haptic devices.
- To provide tools to evaluate the effectiveness of motor learning rehabilitative techniques including interactive robotic therapy and augmented VR.



Here the subject is shown reaching for a series of stereoscopic targets generated by ***The MotionMonitor*** *and displayed on SenseGraphic's 3D-LIW display.*

Presentation & Analysis Software…

- Present multiple targets in a virtual 3D space specifying color, size, and location using simple drop-down menus. Targets can be persistent in fixed locations or transition from location to location at fixed or random speeds. Targets can transition conditionally based on user specifications.
- Synchronously collect kinematic and kinetic data such as positions, orientations, velocities, and forces.
- Apply any combination of raw or processed data to drive a tracking or "chase" cursor. For example, the position of a hand or finger might be used in motor control studies while a combination of EMG signals or joint angles could be used for rehabilitation purposes.
- Present perturbated images of target and/or cursor locations using user-defined equations that modify any raw or processed data.
- Use haptic devices to provide assistive forces during motor learning rehabilitation exercises. Generate resistive forces to arm and hand movements during neurological studies of adaptation to perturbated sensorimotor feedback. Support for dual haptics allows for two finger grasping.
- Normalize, average, and compute standard deviations with a single mouse click. Export all raw or processed data for use in other software.
- No programming is required with ***The MotionMonitor's*** extensive system of intuitive drop down data menus. Users may also define their own data using standard math notation and a complete set of math, trigonometric, vector, and Boolean operators.

The Motion Monitor

...The Total Solution in Motion Capture

Hardware Features….

- ***The MotionMonitor*** base unit eases co-location of immersive display, head tracker and haptic device through easy to follow drop down menus. Integrated head trackers provide head compensation to the immersive display for unrestricted head motion during viewing.
- Add any of the family of Phantom haptic devices to provide assistive and/or resistive forces to the subject's experience. The full family of Sensable haptic devices from the Omni for hand motions to the Phantom 3.0 for full arm movement are supported by ***The MotionMonitor***.
- Large stereoscopic workspaces with half-silvered mirrors permit control over the display of actual hand and arm motion. Measuring 800 by 600 millimeters with 800x600 resolution and 120Hz refresh rates from DLP projectors ensure bright sharp images.
- Optional kinematic trackers from Ascension, Polhemus, Motion Analysis Corp, Qualisys, and Optotrak are easily integrated to monitor subject hand, arm, trunk, and head positions.
- The A/D Option provides 16 channels of analog input from EMG, EEG, and force transducers.

The MotionMonitor is a totally integrated 3D data collection system for use in clinical, biomechanical, neuro-control, and sports medicine applications involving the analysis of complex motion. Data from Ascension magnetic trackers, NDI Optotrak optical sensors, Polhemus Fastrak / Liberty, SR Research's EyeLink© II, Motion Analysis Corp & Qualysis passive video sensors, EMG, forceplates, video, and other analogue devices are collected by The MotionMonitor, fully synchronized, and presented in real time with state-of-the-art computer renderings and graphic displays. Data output includes all kinematic and kinetic data including joint forces and moments computed with either a top-down or bottom-up inverse dynamics model. Angle data is available as quaternions, cosine matrices, Euler angles, Grood & Suntay angles or projection angles. The user can specify the reference frame, rotation sequence, and axes layout in post-processing. User-defined data can be generated using standard math notation. Data can be reported in either the time or frequency domains and includes filtering functionality. Full body biomechanical computer renderings include stick figures, skeletons, and humanoids. Detail renderings include high resolution images of hand, foot, and spine as well as user-generated mesh files.

The MotionMonitor *base unit shown here with Ascension magnetic trackers, Extended Range Transmitter and Bertec non-conductive forceplates.*

The MotionMonitor support team offers a comprehensive package of services designed to meet the unique requirements of each client's research. Services include turn-key systems design, integration of existing client hardware, maintenance, warranty protection, training, and support following installation. Worldwide, IST has built a dedicated following among university researchers.

The Motion Monitor
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