



Revolutionizing
Behavior Research



KinemaScan

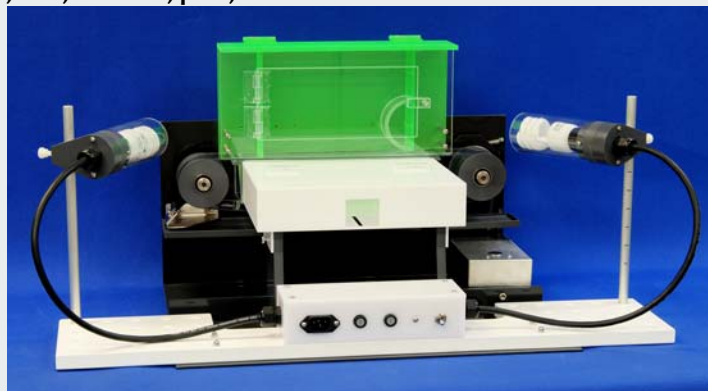
Features:

- **NEW for 2014: KinemaScan is TreadScan integrated with Side-View Kinematic Analysis!**
- **Multi-dimensional Gait and Kinematic Analysis system applicable on any treadmill providing clear ventral view and at least one clear side view**
- Provides a Graphic display of Marker Coordination, Angles and Distances
- Shows full animal body clearly at all times
- Operates in normal lighting environment of a lab
- Captures digital video at high-speed (up to 175 frames/sec) for 20 seconds or more per capture!
- Provides over 52 Different Measures of Gait and several Measures of Kinematic Analysis!
- Automatically discards unusable portions of videos!
- Displays a Paw Pressure Map for each foot
- Features Incline and Decline capability for animal
- Exports conveniently to Excel, formatted for input into Stats packages, as well as Group Export
- Lists raw data samples collected per animal and their statistics
- Automatic Graphing of Gait Patterns in Export
- Software is trainable to adapt to changing environs
- Result review, Visualization of Acquired Experiments and Experiment Database Management
- Batch-mode allows user to run multiple videos successively without human intervention

Measures KinemaScan can provide:

- | | |
|-------------------------|----------------------------|
| • Stride Time | • Print Length |
| • Stance & Swing | • Toe Spread |
| • Stride Length | • Intermediary Toe Spread |
| • Paw Pressure | • Print Angle |
| • Print Area | • Gait Angle |
| • Body-Foot Spacing | • Body Rotation |
| • Foot-Foot Spacing | • Body Shift |
| • Running Speed | • Stride Frequency |
| • Distance Walked | • Joint-Motion Tracks |
| • Coupling/Coordination | • Joint Angles |
| • Support Times | • Joint Movement distances |

KinemaScan is the newest addition to our *NeurodegenScan Suite* and provides a **multi-dimensional** ventral and side-view kinematic gait analysis of animals. Kinematic Gait analysis allows highly sensitive, noninvasive detection and evaluation of many pathophysiological conditions, such as those occurring in Spinal Cord Injury, Parkinson's disease, Alzheimer's disease, ALS, arthritis, pain, neuromuscular and skeletal muscle diseases.



KinemaScan is a multi-dimensional analysis system that takes video of animal (mouse/rat/guinea pig) running on a transparent belt treadmill as input from 2 different views: Ventral view for traditional TreadScan based video analysis and Side view for joint-motion Kinematic Analysis. The ventral and side-view videos of the animal are obtained using a pair of high-speed digital cameras and each video capture can be 20 seconds (or even more when used with specialized fast hard drive architecture) giving a multitude of stride samples in just one trial. The ventral view video essentially captures the foot prints of the animal as they walk/run on the treadmill. The side view video captures motion of the joints using reflectors or color markers affixed to the landmark points on the animals' limbs. Both views are synchronized during video capture.

KinemaScan can reliably analyze these multi-dimensional synchronized video, and determine various characteristic parameters that are related to the pathophysiological conditions. These parameters include all traditional ventral view gait parameters provided by TreadScan including stance time, swing time, total stride time, stride length, foot contact area size, foot pressure (measured using color intensity levels), body-foot spacing distance (distances between body and feet), foot spacing distances (distance between various feet), running speed, stride frequencies, foot coupling or coordination measures (in-phase or out-of-phase gait patterns of feet), and Foot Print Analysis related measures such as foot print placement rotation angle with body and toe spread factors (splay) among many others. However, KinemaScan also provides Side View kinematic Joint movement data using markers placed on joints that includes Joint Trajectories or Tracks over time and their patterns, Joint angles between surrounding joints and there variation over time among many others.



KinemaScan

(Continued from front)

Applications:

- Spinal Cord Injury
- Parkinson's Disease
- Alzheimer's Disease
- ALS
- Arthritis
- Pain
- Neuromuscular diseases
- Skeletal muscle diseases
- Ataxia

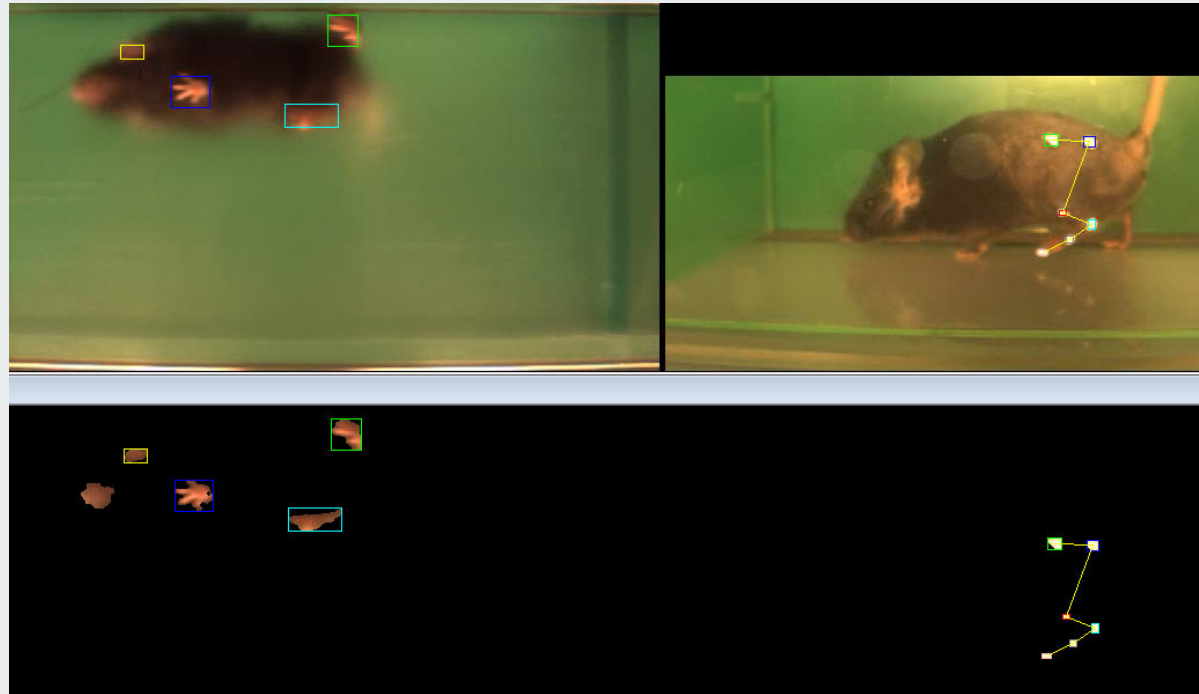
Results:

- Objective Kinematic Gait Analysis Results
- Ability to Review collected strides before exporting
- Automatic highlighting of sample outliers for error detection and correction
- Automatic Export to MS Excel
- Complete Experiment Database Management
- Full-list of all samples collected per animal, as well as, summary data for each set of measures output clearly to a separate sheet in an Excel file.
- Group Export available that allows multiple animals' data to be exported to a single Excel sheet allowing easy Group or sub-group analysis

Requirements:

- Windows-based PC
- Intel available high-speed Processor
- 4 GB RAM
- 2 High-speed area scan digital cameras
- Large HDD space for storing video data
- Good environment lighting conditions

KinemaScan outputs the detailed results of these parameters from analysis into Microsoft Excel files and gives statistical results to meet requirements in the research. Advanced functionalities such as batch mode analysis, group export, direct analysis of AVI captured files, and post-hoc conversion to compressed MPEG videos to save disk-space are available. A sample screenshot of the TreadScan software is shown below. The stride data is shown on the right for each foot individually. The results are updated as the analysis takes place.



Unique Capabilities:

- Complete GLP-compliant System
- Analyzes video at speeds of up to 175 fps and video resolution up to 656x480 in each view
- Detects feet in animals with almost similar coat color like Agouti and White mice!
- Works with rodents of all colors/sizes
- Stores video in MPEG with high-compression for optimal use of disk space
- Provides a Comprehensive set of gait measures
- Export Stance Graph (a timing diagram of the foot stances and the foot contact size information) and the Ink-Pad image showing the foot placement positions
- Ability to automatically flag outliers for further review and discard unusable portions of video