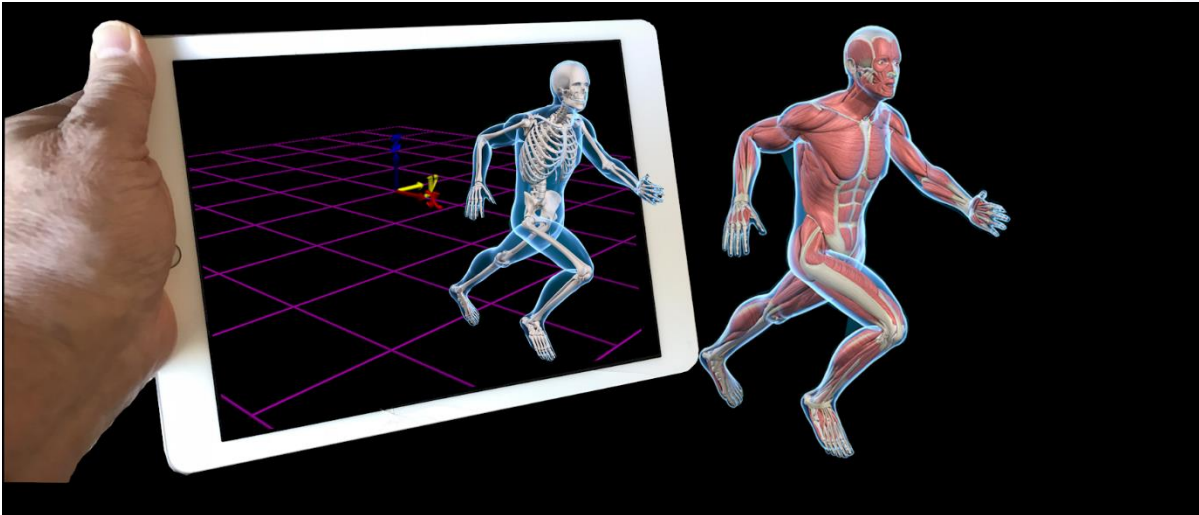


## **The MotionMonitor xGen Build Log**



This build log includes a description of significant changes to The MotionMonitor xGen software. Interim builds involving testing or steps in the creation of a significant update may be available but are not included here.

### **Version 3.42.5 Installer**

#### General Updates:

- Upgraded QT framework (QT 5.12.7)

#### Performance Updates:

- Added accelerated video processing support for improved video capture and playback.
- Minimized recording initiation delays involving biomechanical (Subject) data and video data.

#### Usability Updates:

- Added a back button to “re-do” Subject digitization for the last main segment and final hand detail digitization.
- Expanded support for dynamic electromagnetic distortion correction and hardware alignment using hybrid configurations.
- Improved robustness for stylus assignments with Subjects and hardware devices.
- Significantly improved time for closing Activity files, especially larger Activity files.
- Permanent script variables (String variable type) are now retained from the first file selected when performing data reduction.

#### New Hardware Updates:

- Support added for Smartabase athlete data management system.

#### Existing Hardware Updates:

- Added support for event marker data with Polhemus Fastrak devices.
- Updated Polhemus G4 measurement rate selection.
- Expanded support for Bertec PLC Treadmill controls and data analysis.
- Improved tracking of force plates and 6DoF force/torque transducers with rigid bodies.

- Expanded metal mapping functionalities and improved usability, including ability to load and save mapping files, an indication for the currently loaded mapping file and ability to reset mapping to none.
- Live window support for Subject calibration using Meskers' method for the shoulder joint center.
- Functional and Meskers' methods added to C3D import Subject shoulder joint center calibration.
- Video performance improvements including activation, playback robustness, video window sizing and video saving.

Analysis and Visualization Updates:

- Improved robustness and simplified variable definitions using the "Relative to" operator.
- Modified the definition for vector variables to include an assignment of position/non-position to ensure the proper, and automatic, handling in calculations.
- Added derivative drop-list selector for quick definition of linear and angular velocities and accelerations.
- Added a SetNormal script function for creating a normal (Gaussian) distribution of numbers.
- Updated SetRandom functionality to ensure a truly random generation of numbers across all conditions.
- Enabled availability of data from interpolated segments for analysis.
- Improved segment rendering in the Musculoskeletal Animation window.

Currently in Progress:

- Video capabilities, including calibration with Animation overlay and telestrator functionalities.

### **Version 3.33.0 Installer**

#### General Updates:

- Upgraded Qt framework (5.12.6)
- Upgraded GStreamer version for video processing/handling (1.16.2)

#### Performance Updates:

- Improved software robustness by modifying the timing for destruction of script variables and dependent variables
- Improved software robustness by modifying hardware alignment procedures
- Improved VR connection robustness
- Improved camera activation/deactivation robustness

#### Usability Updates:

- Expanded script function capabilities
- Updated Components parameter panel view settings within Activities

#### Existing Hardware Updates:

- Basler video performance and usability improvements
- Polhemus Fastrak, measurement rate drop-list based on the selected number of sensors

#### Currently in Progress:

- Improving Video performance, including during repeated activation/deactivations
- Availability of data from interpolated segments

## **Version 3.31.0 Installer**

### General Updates:

- Upgraded Basler video Pylon (6.0)
- Modified GStreamer version for video processing/handling (1.14.5)

### Usability Updates:

- New Activities open on top of other application windows
- Drop-lists have been de-cluttered. Disabled segments are no longer displayed in drop-lists and right-click menus
- “Relative to” fields for variable expression drop-lists are now hidden when a reference frame isn’t applicable for the preceding selections
- Modified the Stop and Cancel button icons to be red and black, respectively, based on Client feedback
- Proper window rendering when the application is maximized
- Expanded script function capabilities
- “Closing activity” message is displayed in front of the application when an activity is invisible but is still closing
- Updated Organization of Component parameter panels. Added Show/Hide buttons for Subjects and collapsible Default, Setup and Advanced sections for hardware devices.

### New Hardware Updates:

- Muscle Modeling (Force and Activation Optimizations)

### Existing Hardware Updates:

- Video truncation and alignment. Alignment options are immediately, when saving, or upon request, including batch processing when upon request is used.
- Implementation of video transformations (for all video types)
- Tobii HMD calibration through Unity (including Unity script and mmserver updates)
- Basler video speed presets drop-lists. Presets weigh the tradeoff between frame rate and resolution during recording
- Digital video (webcams), performance and user interface updates, including drop-list for supported resolutions and frame rates
- Playback of The MotionMonitor Classic \*.wmv and \*.avi files
- Delsys Trigno, support for legacy streaming mode and Quattro sensors, selectable accelerometer ranges and improvements to the hardware activation process
- Expanded error reporting for VR when sockets are disconnected and for Noraxon digital devices during activation
- Improved robustness for Biofeedback target rendering in real time

### Analysis and Visualization Updates:

- Average and Moving Average operators now accept an argument for the time at which to evaluate the function
- IMU devices no longer display as “Axes” data. Redefined as “Ori” only and replaced with “axes(vec(0, 0, 0), <IMU name>.Ori)” where currently defined in the software as an “Axes”.
- Expanded features and improved performance of the Musculoskeletal Animation window
- Display of foot segments (Talus, Calcaneus and Phalanges) in the animation window

### Currently in Progress:

- Improving Video performance, including during repeated activation/deactivations
- Support for Basler devices
- Availability of data from interpolated segments
- Accessibility to view Component settings within recorded Activities

## **Version 3.25.2 Installer**

### General Updates:

- Upgraded Qt framework (5.12.3)
- Upgraded Visual Studio (2017)
- Upgraded Basler video Pylon (5.1)
- Implemented video processing/handling with GStreamer (1.16.0)

### Performance Updates:

- Reduced usage of computer resources and improved performance for high-speed “analog” data type hardware devices (i.e. Measurement Computing, Delsys, Noraxon, BioSemi, etc.) by revising the handling of their data streams
- Significantly reduced usage of computer resources by implementing data decimation factors for Live window data for high-speed “analog” data type hardware devices (i.e. Measurement Computing, Delsys, Noraxon, BioSemi, etc.)
- Improved software responsiveness via the addition of a spline fit calculation that can be specified for Subject joint force and moment calculations

### Usability Updates:

- Search feature added (Ctrl+F and F3 (find next)) for searching within Setup and Analysis expression edit fields or within a script
- Vertical and horizontal scroll bars added within all component windows
- Improved responsiveness through optimization of the variable-evaluation code and reduction of RMS operator processing impact
- Orthopaedic angles grouped together at the top level of the subject-segment hierarchy for quicker access
- Expanded script function capabilities

### New Hardware Updates:

- ANT Neuro Eego devices (*Windows 10 Operating Systems only*)
- Streaming data out to TCP/IP clients
- Tobii HMD (Vive)
- Uploading (exporting) data to Kinduct athlete management software systems

### Existing Hardware Updates:

- Biosemi EEG supports up to 273 channels
- Delsys Trigno Avanti sensors support, including orientation/acceleration and EMG data
- Metal Mapping – Grid based metal mapping option implemented for Ascension and Polhemus hardware types
- PhaseSpace support for SDK version 5.2.420.0
- Polhemus G4 event marker data accessible as a data type
- Qualisys SDK update. SDK version can now be specified, allowing for support of current and previous SDK versions.
- VR – Immersive display collocation routines and head tracking/compensation added, including Unity and WorldViz (Vizard) mmserver updates
- VR – Activation/Deactivation timing updates applied for more robust VR connectivity

### Analysis and Visualization Updates:

- Subject ‘segment’ and ‘entire body’ data types including momentum, energetics and anthropometrics added
- ‘Magnitude’ option added for all vector data types
- Operator for calculating displacement from a specified Time
- Report (export) optimization and expanded controls for applying analyses to exported data
- Bar graphs added, including overlay and transparency settings

- Frequency domain (PSD) analyses added, including Frequency domain graphs, frequency domain exporting and mean/median frequency operators
- Single-segment interpolation for most major body segments. When a segment is disabled/not instrumented and both proximal and distal segments have valid data, the segment is rendered in the Animation window and data from the segment are available for analysis. Interpolation is not applied to the head, thorax, and sacrum segments.
- Hand and feet segments are rendered in the Animation window when these segments are disabled/not instrumented. Interpolated data from these segments are also available for analysis.
- Hand detail added to the Musculoskeletal Animation window
- Object and plane intersection detection
- Object axes position and orientation data are available for analysis
- Anthropometric and Segment Axes data are now saved with Analysis files

Currently in Progress:

- Playback for MotionMonitor Classic \*.wmv and \*.avi files
- Video truncation and alignment
- Video rendering while Activities are maximized
- Support for Basler devices
- Video transformations

**Version 3.03.9 (Initial Release)**