



Visual3D is the #1 rated research software product for 3D Motion Capture data analysis and modelling. It is used by researchers and other professionals world-wide for assessments, rehabilitation, neuroscience, engineering, robotics, sports (performance, injury prevention, equipment manufacture), orthopaedics, prosthetic research, animal studies, disability assessments, and more.

Visual3D is the one product that will let you take full advantage of your motion capture system's capabilities by removing the limitations of predetermined marker sets, analysis rules, or other restrictions. It removes the need for custom software development, or trying to integrate and maintain custom applications using third party products like Matlab.

Visual3D exceeds the functionality of the software developed by motion capture systems manufacturers, and provides a single commercially supported platform for 3D motion capture data management and analysis - often at a considerably lower price.

Because Visual3D is hardware independent, it enables labs around the world to collaborate and share data and analysis results in a consistent manner, regardless of the motion capture system used. This hardware independence also enables a lab to modify, enhance, update, or even replace underlying motion capture systems without affecting any existing data or studies in progress.

Processing Motion Capture Data

Visual3D is all about managing your motion capture data and key concepts are documented throughout this wiki. Processing motion capture data takes several important steps: **Data collection, Modelling, Analysis, and Reporting**. See [the Visual3D documentation](#) for specific discussions about each of these steps as well as detailed descriptions of the application's features and capabilities. See also our [Visual3D Tutorials](#) Page for detailed examples of these features.

- **Data Collection:** Visual3D lets you use your motion capture system more effectively because the analysis techniques will lead you to optimal marker locations and definitions. Read about [the Visual3D philosophy](#) to learn more.
- **Modelling:** Motion capture data is just a big collection of signal inputs, usually in C3D file format. A biomechanical model must be applied to give these signal inputs meaning and for analysis to be possible. Read our [key concepts](#) and [overview](#) for building a model as well as our overviews for [pose estimation](#) and [mapping motion to models](#).
- **Analysis:** Visual3D includes the mathematical libraries necessary to model and calculate joint angles, powers, moments, forces, velocities, accelerations, custom pose estimations, filtering, signal processing, and much more. [Citations](#) exist for all routines and approaches - there are no proprietary calculations in Visual3D. Create [custom math expressions](#) and automate your analysis via the [pipeline tool](#) for total control.
- **Reporting:** Visual3D includes a full graphing and reporting module. Data can also be exported in a variety of text formats. See [the report creation tutorial](#) for more information.

Visual3D Releases

Visual3D is a research tool, which means that there are several releases every year. See the [Visual3D Release Notes](#) for full details about what's new in each release.

Visual3D Hardware Requirements

Visual3D runs on 64-bit operating systems Windows Vista and above (Vista/Win7/Win8/Win10). It has no specific minimal hardware requirements but naturally, more powerful and advanced hardware will result in better performance. We recommend having a minimum 4GB or more of memory (more is better).

Visual3D also runs on a Mac under Parallels or VMWare (or dual boot to Windows with Bootcamp). There is no iPad, MAC, or Linux version.

Feature Overview

Here is a small list of some of the features that Visual3D provides.

Comprehensive Research Platform

- Motion capture hardware-independent solution, with real-time interfaces for many systems
- Supports synchronized Analog data (force plates, EMG, EEG, load cells, gyros, MEMS, etc.)
- Force Structures for instrumented stairs, treadmills, ramps, and multi-force plate configurations
- Data management for models, movement trials, and indexing
- Automation support via pipeline (scripting, meta-commands, and script controller)
- Template support for models and reports with template appending capabilities
- Scientific literature citations for all internal calculations
- Imports data from C3D, ASCII, and older motion capture formats
- Export .mot files to OpenSim for forward modelling
- Results stored as single data file with original and processed signals, model, and reports
- Free viewer available for download that allows anyone to view (not edit) the data file

Advanced Modelling

- Automatic model building for Markerless Systems
- Advanced Modelling with no marker set limitations and support for classical gait and Six-Degree-of-Freedom approaches
- Allows for custom, customer-defined marker sets
- Graphical approach for creating models
- Unlimited kinematic chains allow child to parent segments of 1 to 6 degrees of freedom joints
- Virtual markers (landmarks), segments, and labs to simplify, improve, and enhance analysis
- Digitizing pointer support for creating virtual markers
- Functional joint centre calculations
- Linked-model based calculations for joint angles, powers, moments, etc.
- Virtual labs and VRML backgrounds supported

Signal Processing and Analysis

- Kinematics and Inverse Dynamics (Kinetics)

- Six-Degree-of-Freedom Modelling and Inverse Kinematics/Global Optimization Modelling approaches
- Complex Signal Processing, Filtering, and C3D import/export (includes export to Polygon)
- Custom metrics, mathematical expressions and calculations (and integrates with Matlab)
- Real-time analysis and biofeedback functionality
- Induced Acceleration and Induced Power analysis

Integrated Reporting

- Integrated Report Generator
- Historical audit trail tracking of all changes to raw data
- Exporting graphs and reports in various formats (.jpg, .bmp, .avi, .svg, .png, etc.)
- Consolidated reporting of similar/tagged data
- Support for normative data collection across subjects

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