



# Tackle Your Most Demanding, High-Volume Animation Projects

## Feature Summary

### Real-Time Environment

Autodesk® MotionBuilder™ software is built on a unique, real-time architecture that enables you to work unhindered by the need to create previews of your work. What you see is what you get.

### Animation Tools

MotionBuilder provides a comprehensive suite of real-time animation tools for advanced key frame animation, animation layering, and motion capture editing—so you can quickly generate unsurpassed animation.

### Character Performance Tools

A comprehensive suite of specialized character performance tools and workflows that address the need to quickly create and edit unsurpassed character performances and scene previews/pre-visualizations.

### Advanced Character Setups

Create a wider variety of character setups with inverse bending knees or elbows—dogs, birds, or unique creatures of your imagination. Support for inverse bending joints includes the ability to retarget animation from one character to another.

### Unified Nonlinear Editing Environment

The unique MotionBuilder Story Timeline provides an integrated non-linear editor in which to combine audio, video, 3D elements, and camera shot decisions, all in real time.

### Productivity Tools

MotionBuilder delivers key productivity-enhancing features such as file batching tools, support for multiple animation takes in a single scene, and a streamlined method for loading and saving character animation.

# AUTODESK® MOTION BUILDER®

7.5

## **Motion Capture Tools**

MotionBuilder simplifies the process of working with motion capture data and other dense datasets through an integrated suite of tools for solving, editing, and blending. Add to that the ability to stream and record live data from popular motion capture hardware into MotionBuilder and view the results on a full resolution, fully textured character in real time.

## **Live Device Support**

In addition to support for external motion capture systems, MotionBuilder supports an unlimited number of built-in or third-party devices, allowing each to be online and live simultaneously in the scene. Plus, you can also write your own custom device drivers to accommodate any number of specialized devices or inputs.

## **General 3D Tools**

Beyond the MotionBuilder animation specific tools, other general 3D functionality is supported, such as lights, cameras, materials, textures, and shaders.

## **Integration and I/O**

MotionBuilder integrates easily into new and existing production environments with support for third-party asset management systems, hardware rendering and support, as well as support for a wide variety of industry-standard file formats, including native support of Autodesk® FBX® format.

## **Autodesk FBX**

MotionBuilder natively supports Autodesk FBX, an OS-independent, high-end 3D interchange format. Widely used in the digital entertainment industry, the FBX file format—and free Software Development Kit (SDK)—lets you readily acquire and exchange 3D assets and media from a wide variety of sources.

## **Extensibility**

MotionBuilder functionality can easily be extended via Python scripting, as well through the software's C++ Open Reality SDK.

## **Facial Animation**

With real-time, language-independent phoneme extraction technology, MotionBuilder allows you to rapidly generate realistic lip-sync and facial animation.

## **User Interface**

MotionBuilder offers a task-based, productivity-enhancing user interface that makes the software easy to learn and use—even for non-technical animators.

## **Motion Builder 7.5 Detail Features Listing**

### **Real-Time Environment**

With a unique real-time architecture, in MotionBuilder, what you see is what you get.

#### **Speed**

- Animation, audio, and video tracks playback in real time and are never out of synch—regardless of scene size or complexity
- Highly detailed, fully textured characters deform in real time

#### **Live**

- Real-time constraints, deformations, volumetric lights, reflections, transparency, particles, and live devices

#### **Trigger Tool**

- Animation clips can be triggered in real time
- Conditional animation triggering, loops, and custom triggers
- Support for any in-scene element or character, cycling of animation clips, and unlimited branching

### **Character Performance Tools**

#### **Automated Rigging**

- Forward and inverse kinematic full body manipulation rigs are automatically created based on the size and proportions of a character
- “Smart” biped and quadruped character setups work with existing skeletal hierarchies
- Automatic control rig resizing creates a control rig that is sized proportionally to your character
- Forward and inverse knee and elbow support
- Transfer control rig between any two character, with the ability to retarget keyframed animation between two separate control rigs
- Characterization templates automate character setup

#### **Customizable Reusable Manipulation Rigs**

- Easy-to-create, custom, re-usable rigs
- Custom rigs can be saved with all of their setup dependencies—sliders setups, pivots, rotation limits, etc.—and then reconnected to another character, independent of the rig's size or proportions

#### **Visual Rig Feedback**

- Visual feedback on character manipulation rigs indicate the selected body part, manipulation/keying mode, and IK reach settings
- Highlighting of currently keyed objects on the character control rig and extensions
- Customizable transparency settings of the manipulation rig

### Contact Technology

- Unsurpassed contact technology for feet, toes, hands, and fingers that prevents them from penetrating through a defined floor object while manipulating or during scene playback
- Supports uneven contact points, following an object's orientation
- Speeds up the creation of character/floor contact (e.g., walking) or animation in relation to other objects (e.g., character leaning on a table)

### Pose Editor

- Character independent poses can be captured and recalled onto any character in the scene
- Supports pasting of a full body pose or a specific body part of the character, including character extensions
- Match the translation and rotation of a pose pasted onto any other in scene object, including non-character objects
- Editing tools include mirroring character poses and character extensions around a user defined plane

### Animation Retargeting

- Real-time retargeting of animation data from character to character regardless of size, proportion, or skeletal hierarchy
- Adjust retargeting parameters during real-time playback
- Seamless blending between proportional and direct retargeting
- Control reach settings on a per body part level
- Copy a source character's extensions directly to a target character without the need to save and load character animation

### Story Timeline

#### Workflow

- Real-time non-linear editor for multiple media types including 3D animation, audio, video, and camera shots
- Real-world production options include support for all scene properties/object types, real-time camera/audio cross fades, multiple audio tracks and volume animation, as well as multiple video tracks

#### Clips

- Include support for multi-track animation, track layer modes, variable track weighting, key support, editable clip curves, clip trajectories and temporary pivots manipulation, user-definable blending pivots, multiple blending algorithms and interpolation types, variable clip referential and multiple 3D objects or character ghosts per track, multiple clip scaling, and enhanced 3D animation clip matching with previous or subsequent clips

#### Track Types and Editing

- Media specific tracks—including standard animation, character animation, camera animation, digital video, digital audio, constraint, command, and camera shot tracks
- All tracks support fade, trim, loop, razor, cut, copy and paste, mute, solo, and snap-to-time-cursor editing functionality

### Shot Tracks

- Tracks for camera shots, storyboards, animatics, and final edits
- Can be built from any tracks-based project and can include time discontinuities, scaling, and lopping of camera shots

### Animation and Camera Track Features

- Support for multi-track animation, track layer modes, variable track weighting, key support, editable clip curves, clip trajectories, multiple blending algorithms, interpolation types, multiple clip scaling, and enhanced 3D animation clip matching with previous or subsequent clips

### Character Track

- Fully integrated with the MotionBuilder character technology
- Includes support for character retargeting; control rig keyframing within sub-tracks (similar to animation layers); body-part filtering
- Includes all of the functionality provided by animation and camera tracks (see above)

### Command and Constraint Track

- Constraint tracks include constraint clips blending and weighting options
- Includes all of the functionality provided by animation and camera tracks (see above)
- Command tracks includes show-hide model clips and application launch clips functionality

### Audio Editing Features

- Frame-accurate playback of multiple audio tracks/sources during both jog and shuttle
- Supports MP3, AAC, WAV, and AIFF files
- Selectable sampling rate for audio output

### Video Editing Features

- Supports real-time playback of video as texture maps or camera backplates
- Supported video formats include QuickTime, AVI, MPEG, MOV, MP2, and MP4
- Supported image formats include TIFF, TGA, PIC, BMP, JPG, DDS, IFF, RGB RGBA, SGI, and YUV

### Real-Time Device Input

- Supports real-time input from a keyboard, mouse, or joystick
- Supports SpaceBall and Wacom® tablets, JLCopper MCS-3800, MIDI devices, and Lantronix serial ports
- Support for third-party or custom devices
- User-selectable recording/playback mode and variable sampling rates

### Animation Tools

#### Keyframing Controls

- Includes time-saving features such as AutoKey, MoveKeys, Key at TimeX and Smart Plot, Copy Previous/Next Key, and drag-to-copy keys in the transport controls
- The Dynamic Editor provides a high-level tool to adjust the dynamics (e.g., Tension Continuity Bias) of animation keys on multiple objects

#### Dopesheet

- A vertical Dopesheet provides an editor for timing of key frame animation
- Specific body part tracks for character animation

#### Function Curve Editor

- Support for unlimited non-destructive animation layers
- Support for inserting keys without affecting the current curve
- Direct access to Zero Key behavior
- Customizable property views to filter animated channels
- Advanced key selection and manipulation controls such as: selected keys XY scaling, moving, and rippling
- Pre- and post-curve extrapolation
- Integrated curve time warping
- Includes weighted tangent controls and adjustable curve colors
- Filters include smoothing/noise reduction, key reducing, peak removal, gimbal killer, re-interpolate, unroll rotations, and Butterworth

#### Multi-Referential Animation

- Facilitates animating the referential (or Parent) of any object or object group, while retaining the existing relationship

#### 3D Paths

- Create 3D paths with editable control points that allow you to adjust the tangent and contour of the curve
- Path Constrain allows you to constrain objects to 3D paths to be animated over time—facilitating the animation of cameras and other objects

#### Other Animation Tools

- Other industry-standard animation tools include constraints, expressions, and a graphical relations editor

#### Degrees of Freedom and Rotation Orders

- User-defined “Degrees of Freedom” (limits) can be set for the transformation properties (TRS) of any 3D object
- The rotation order of any 3D objects (XYZ, XZY, YZX, etc.) can be changed, which helps to remove gimbal lock problems and improves cross-product information interchange

#### Transformation Pivots

- Can be positioned independently of the object’s geometry center

#### Auxiliary Pivots for the Character

- Multiple rotation pivot points for each IK Control rig effector

#### Other biomechanical solving controls

- Solving controls for seamless transition between IK/FK, effectors pull, body-parts stiffness, roll-bones, realistic shoulder solving, and degrees of freedom

#### Facial Animation

- With real-time, language-independent phoneme extraction technology MotionBuilder allows you to rapidly generate realistic lip-sync and facial animation.

#### Facial Input and Animation Tools

- Technology for audio phoneme extraction, using recorded audio tracks, live microphone input, live motion capture data, or traditional key framing
- Character Face tool allows for model-independent setup of facial expression channels
- Precision facial animation tools include bounding regions, vowel weighting, constraints, and custom expression shapes

#### Facial Workflow

- Facial expressions can be driven by any source: custom sliders, procedural animation, key framing, or the Voice Reality device
- Represent complex facial poses with high-level controls to facilitate facial animation
- Blend shapes and clusters can be combined
- Facial animation can be easily re-targeted between any two facial setups

### Cameras and Lights

#### Cameras

- Camera support options such as field of view, roll, interest, film back, aperture controls, and video back-plates
- Real-time camera effects such as motion blur, anti-aliasing, and depth of field
- Other features include optional up-vector objects, turntable controls, safe regions, and time-code display
- Includes full-screen viewer and 2D Pan/Zoom on perspective views

#### Lights

- Support for all standard lighting types—including point, infinite and spotlights with ambient, diffuse, and specular illumination
- Advanced lighting techniques include real-time volumetric effects, real-time shadows, and selective object lighting
- Spotlights allow for custom gobos and can be used in conjunction with a Look At interest and up-vector objects

#### User-Defined Templates

- Current light and/or camera setups can be saved as a default template

### Materials and Shaders

#### Particle Shader

- Real-time shader for creating particle effects, such as fire, smoke, glows, and weather phenomena
- Particle shaders can be accurately displayed behind transparent models with Z-ordering functionality

#### Materials and Shading

- Material editor supports RGB, YUV, and HSV color spaces
- Full control over bitmap textures—including translate, rotate, scale, and swap UV
- Support for multiple textures per object and per polygon
- Mapping capabilities include texture and environment mapping, real-time bump mapping, and real-time reflection mapping

#### Real-time Shaders

- Included real-time shaders: edge cartoon/multi-level cartoon, reflections, selective object lighting, bump mapping, wireframe, transparency, and a 3D matte shader.
- Shadow shader supports shadow baking
- Support for multiple shaders per object

#### Support for CgFX Shaders

- Support for Nvidia CgFX shaders—enables game developers to quickly recreate game engine per pixel/per vertex shader effects in MotionBuilder

### Assets and Asset Management

#### 3D Assets

- Extensive clip art and animation library includes many sophisticated characters, environments, textures, motions, and more
- Support for Namespaces

#### Asset Management

- Easy transfer of assets—including objects, deformations, shapes, textures, cameras, and lights through the software's native FBX file format
- Easy transfer of animation into, or from, a 3D authoring package. Autodesk® Maya® Namespaces are supported so you can transfer assets while respecting their naming
- Import and export of additional industry-standard files supported, including Biovision (.BVH), Acclaim (.ASF/.AMC), and Motion Analysis (.HTR) skeletal data formats and Motion Analysis (.TRC) or Vicon (.C3D) motion capture data formats
- Direct support offered for multiple takes of animation in a single FBX file
- Direct support for asset management systems such as Alienbrain and Microsoft VSS (Windows only)
- Support for custom asset management systems via the Open Reality SDK

#### Asset Delivery

- Support for hardware rendering with advanced anti-aliasing, depth of field, and motion blur in addition to off-screen rendering
- Independent alpha channel output
- Supported resolutions include NTSC, PAL, film, or custom resolutions
- Supported output formats include QuickTime®, Macromedia Flash®, AVI, and TIFF sequences

### Workflow and User Interface

Out of the box, MotionBuilder offers a comprehensive user interface that is geared for animation focused projects.

#### General UI

- New Undo system allows for predictable undos across the application including operations like selections, manipulations, and deleting
- Comprehensive user interface includes scene browser, asset settings, properties editor, function curve editor, timeline transport control, dopesheet, and 2D/3D manipulators
- Industry standard and custom frame playback speeds

#### Navigational Toolbars

- Camera View toolbar for easy camera navigation
- Pick/selection filtering options

#### Keyboard Shortcut System

- Keyboard shortcut system replicates the behavior of other 3D software packages—including support for direct picking of a 3D object
- Low level access to keyboard layouts for custom shortcuts

#### 3D Viewer Window

- Includes support for 3D real-time motion trajectories, transformation planes, and handles
- Split view into two, three, or four panes
- Element visibility filtering
- Normal, x-ray, and models only mode
- Display and invert normals
- Display frame rate, memory usage, and timecode
- Customize playback by setting frame rate to any value
- 3D manipulators for translation, rotation, and scaling
- Rotation angle snapping

#### Properties Editor

- View and edit object properties
- Group multiple object selection by type or per object
- The ability to toggle a properties ability to be animated
- User-defined property views

#### Custom Properties

- Create user-defined animatable properties such as boolean, integer, real, vector, action, and list
- Create property reverences from one object to another

#### Save Reminder

- Visual cue to remind operator to save work based upon time or number of operations
- Non-obtrusive to the user
- Allows for incremental backup of files

#### Groups and Sets

- Allows for the creation of user-defined groups that contain any item in the scene browser—including 3D objects, lights, materials, shaders, models, textures, constraints, and even other groups
- Sets allow for animated visibility of contained objects

### Save/Load Character Animation

- Animation can be saved directly to an FBX file, including all character extensions together with their animations
- Save and load multiple character animation files automatically
- Reset control rig degrees of freedom (DOF) and hierarchy when you save and load animation
- Load animation files onto any character file regardless of the character size, proportion, or skeletal hierarchy
- Provides multiple load methods, including copy animation, retarget, and plotting of dense data onto a target character

### Batch Tools

- Ability to import/export multiple files, supporting all major motion file types
- Animator can Batch Load or Save motion files directly to, or from, a character

### Multiple Animation Takes

- Enables users to have multiple animations in one scene, using the same object or character
- Unlimited number of takes per scene

### Motion Capture Data Editing

MotionBuilder simplifies the process of working with motion capture and other dense datasets.

- Powerful, built-in optical cleanup tools for addressing gaps, marker swapping, and occlusions
- Editing features include blending, interpolating, peak removal, smoothing, curve fitting, and more
- A batch tool makes the processing and re-processing of multiple files quick and easy
- Reading and writing of any skeletal data in popular file formats
- Stream live animation data from motion capture hardware

### Scripting

Powerful scripting helps you automate repetitive tasks and expand the functionality of MotionBuilder.

- Python-based scripting interpreter
- Ability to script scene/character setups
- Ability to trigger scripts in real time

### Open Reality SDK

MotionBuilder comes with a C++ software development kit that enables programmers to create custom plug-ins and more.

- Supports Microsoft Visual Studio .NET 2003 (for Windows) and GCC 4.0.1 (OS X)
- May be used to create custom plug-ins, device drivers, custom importers/exporters, custom UI elements and custom filers, shaders, and constraints
- Create and apply shaders and filters to custom plug-ins

### Abstraction Layer

- Gives programmers access to every object and property created within MotionBuilder

### Callbacks

- A callback system which allows programmers to integrate the software seamlessly into their existing production pipeline

MotionBuilder is available for Windows and Mac® operating systems and natively support the Autodesk FBX platform-independent, 3D authoring and interchange format that enables MotionBuilder to work seamlessly with other 3D software packages in a production pipeline.

For more information on Autodesk MotionBuilder 7.5 or other Autodesk software products, contact your local Autodesk reseller or visit [www.autodesk.com/motionbuilder](http://www.autodesk.com/motionbuilder).