

# Havok Behavior

Breathe Life into Your Game Characters



**Havok Behavior** is an innovative, cross-platform development system for creating dynamic event-driven character behaviors in a game. Havok Behavior accelerates the development of cutting-edge character performance by coupling an intuitive composition tool for artists and designers with a run-time software development kit (SDK) for game programmers. The tool is designed to sit between the proven Havok Physics game engine and the linear animation and modeling worlds of Autodesk® 3ds Max®, Autodesk® Maya® and Avid SOFTIMAGE®|XSI®.

Now available as Havok Behavior 5.5 with customer-driven enhancements, this highly flexible development solution combines the fidelity of traditional animation assets with powerful physical and procedural animation techniques in a single creative environment.

## Dynamic Behavior. Intuitive Control

With Havok Behavior in your production environment, you have the tools you need for intuitive, cutting-edge game character development:

### Creating Characters

Use the Havok Behavior tool to create as many characters as you like in a single project, and share assets among them. Assets include references to a rig, deformable skins, interchangeable mesh attachments, a ragdoll, a behavior and its raw animations, and an animation set.

### Creating Behaviors

Basic behaviors are composed of states containing simple animation clips that reference a raw animation file. Each clip typically loops continuously during simulation, but it can also play once, ping-pong or raise "events" that cause a transition to occur. Transitions between states represent the time-limited blending that occurs when a specific event is raised to cause a state transition. Havok Behavior hosts a range of transition effects, conditional logic and timing controls.

### Adding Hierarchy

With Havok Behavior, organization is the key to driving power, creativity and fun out of the Havok Behavior tool. Using hierarchical structure, you can achieve flexible behavioral controls that invoke a notion of AI. Also, randomization and alarm timers that raise transition events give characters a sense of emergent personality.

### Adding Procedural Animation

Keep your character's feet on the ground by adding a foot-IK modifier to adjust a character's feet and pelvis height based on uneven terrain, and you can navigate a wide class of terrains with a behavior that needs no more than four unique animations. The same behavior can easily be expanded or reused across characters via animations sets. Mirroring operators also make it easy to reuse directional animations, saving production time and run-time memory requirements.



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"Havok is an essential ingredient in what makes our games great. By consistently integrating the Behavior 5 tools across our projects, our teams are instantly empowered to take their creativity to the next level. Games like *Mercenaries 2: World in Flames™* and *Saboteur™* simply wouldn't pack the same punch without Havok under the hood."

– Josh Resnick, co-founder and general manager, Pandemic Studios

## HAVOK BEHAVIOR | Breathe Life into Your Game Characters

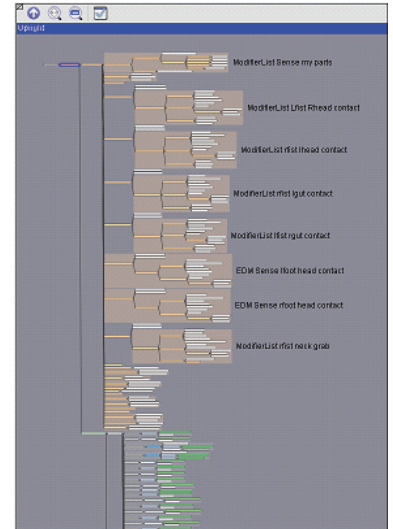
Procedural modifiers like Look-At and Twist enable a character to look at key targets at key times, to twist along its vertical spine, or “lean” by twisting along its lateral axis, and give you procedural upper-body controls for targeting – all controlled by variables that can be driven easily by AI at a higher level.

### Blending in Physics

The Havok Behavior tool brings physics into the character behavior authoring process by leveraging the product’s node graph and nested behaviors. By placing ragdoll controller nodes above standard animation clips, animations can go from driving a character’s absolute pose to informing the physics “desired pose” for a character in a physics world. By transitioning in and out of these physical controllers via states, Havok Behavior achieves total integration and variability between physics, animation and procedural controls.

### And More...

Havok Behavior makes it easy to incorporate additional simulation technology into its run-time simulation library. Global effects like clothing, facial animation and physical destruction can be showcased in the tool to put creative insight into the hands of artistic and technical authors.



FEATURES	BENEFITS
Hierarchical Finite State Machines and comprehensive transition logic	Structured authoring and run-time control of character behaviors, including upper and lower body, and bone-based facial animation
Real-time node-based motion graph	Seamlessly combine and transition between diverse motion types at run-time, including key-frame animation, procedurals like inverse kinematics, physics, and custom operators
Comprehensive behavior authoring tool	Requires less technical expertise than a C++ SDK, promoting ease of use for technical animators and designers
Out-of-the-box integration with Havok Physics, Animation, and Cloth	Intuitive access to proven Havok technology
Direct support for Autodesk® 3ds Max®, Autodesk® Maya® and Avid SOFTIMAGE® XSI® content preparation and export	Seamless integration of serialized animation and character assets generated in these modelers when using Havok content tools
Full support for industry’s leading game platforms	Compelling content creation for games designed to run on Nintendo® Wii™, Microsoft® Xbox 360®, Sony® PLAYSTATION®3 and the PC
Fully threaded for optimum scalability on multi-core architectures	Allows developers to make full use of the available hardware on all supported platforms

### Support

Havok’s first-class support, detailed help and support documentation, and online help are available for this product.

### For More Information

[www.havok.com/tryhavok](http://www.havok.com/tryhavok)