

# Physics Effects Viewer User's Guide

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# 1 Overview

The Physics Effects Viewer is a physics simulation viewer running on Windows. By reading snapshot files output by the Physics Effects library of an application's physical scene information, it allows you to visualize rigid body behavior, physical attributes and shapes on Windows. For this reason, it can be used when it is not possible to obtain the envisaged behavior on a retail unit, or to ascertain the cause of the occurrence of behavior whose cause is unknown.

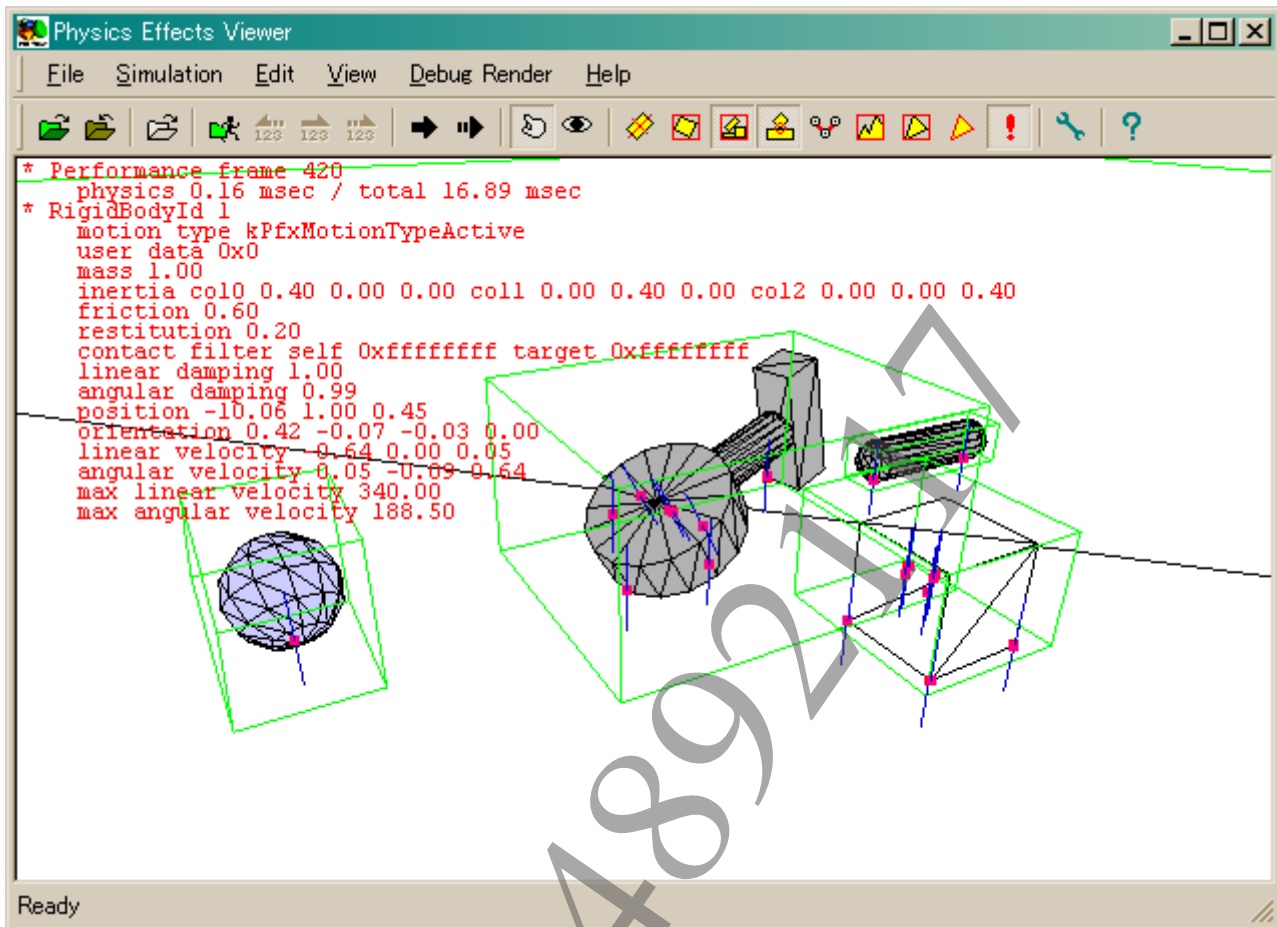
Regarding the procedure for the output of snapshot files, refer to the "Physics Effects Overview" and "Physics Effects Reference" documents.

## Physics Effects Viewer System Requirements

Pursuant to the SDK system requirements (VGA must support OpenGL)

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## 2 Basic Operation



From the top of the window the menu, the toolbar, the drawing screen and the status bar are displayed in this order. Frequently used features are located on the toolbar, in correspondence with items on the menu. You can call the features by pressing the corresponding button.

When the simulation is started, each rigid body will begin physical motion in accordance with the physical attributes they were given. The results of the motion will be displayed on the drawing screen. While in Pick mode, you can choose a rigid body by left-clicking on it with the mouse, and move it by dragging it.

You can rotate the point of view by right-clicking with the mouse on an appropriate spot on the drawing screen and dragging while keeping the right button clicked. At this time, the point of view will rotate around its target. To change the target, switch to View mode and left-click on an appropriate rigid body.

Mouse operation	Description
Left click (while in Pick mode)	Selects a rigid body. Move the rigid body by clicking and dragging
Left click (while in View mode)	Sets a rigid body as the target of the point of view
Right click	Rotates the point of view around the target
Wheel rotation	Moves the point of view closer/farther from the target

**Sequential Snapshot Files**

Save snapshot files sequentially. When reading the first file with **Open Sequence of Files**, the files can be played back sequentially. Make sure to specify the number of the filename as "filename+number.txt". Make numbers have the same digits and fill open spaces with 0s.

snapshot0001.txt

snapshot0002.txt

snapshot0003.txt

snapshot0004.txt

and so forth...

The playback of sequential files and simulation cannot be executed at the same time. Stop playback and then execute simulation.

## 3 Menu Items

The contents of each menu are as follows.

### File

#### Open Snapshot File

Opens snapshot files.

#### Save Snapshot File

Saves the current scene as a snapshot file.

#### Open JFtPfx File

Reads the XML format file output from 3ds Max or Maya.

#### Open Sequence of Files

Opens the sequential snapshot files.

#### Exit

Exits the Physics Effects Viewer.

### Simulation

#### Play

Begins/interrupts the simulation.

#### Step

Executes the simulation step by step.

#### Play Sequence

Sequentially plays back sequential snapshot files.

#### Step Sequence

Plays back the sequential snapshot files one by one.

#### Back Sequence

Returns playback of the sequential snapshot files by one step.

### Edit

#### Mode -> Pick

You can select a rigid body by left-clicking on it with the mouse, and move it by dragging. The Pick mode and the View mode are mutually exclusive, and cannot be used at the same time.

#### Mode -> View

Changes the point of view, placing the rigid body that is left-clicked on with the mouse at the center.

#### Hide

Hides the selected rigid body.

**Show All**

Re-displays all hidden rigid bodies.

**Object**

Specifies the selected rigid body with its index.

**Configuration**

Opens the settings dialog.

**View****Toolbar**

Displays/hides the toolbar.

**Status Bar**

Displays/hides the status bar.

**Debug Render****Local Axis**

Displays/hides the local axis of a rigid body.

**Bounding Volume**

Displays/hides the Axis Aligned Bounding Box of a rigid body.

**Simulation Island**

Displays/hides the simulation island.

**Contact**

Displays/hides contact information.

**Joint**

Displays/hides joint information.

**Large Mesh -> Island**

Displays/hides the Axis Aligned Bounding Box of the mesh islands constituting large meshes.

The island including the triangle selected by clicking with the mouse will be displayed.

**Large Mesh -> Facet**

Displays/hides the Axis Aligned Bounding Box of the selected triangle.

**Large Mesh -> Edge**

Displays/hides the edge of the selected triangle.

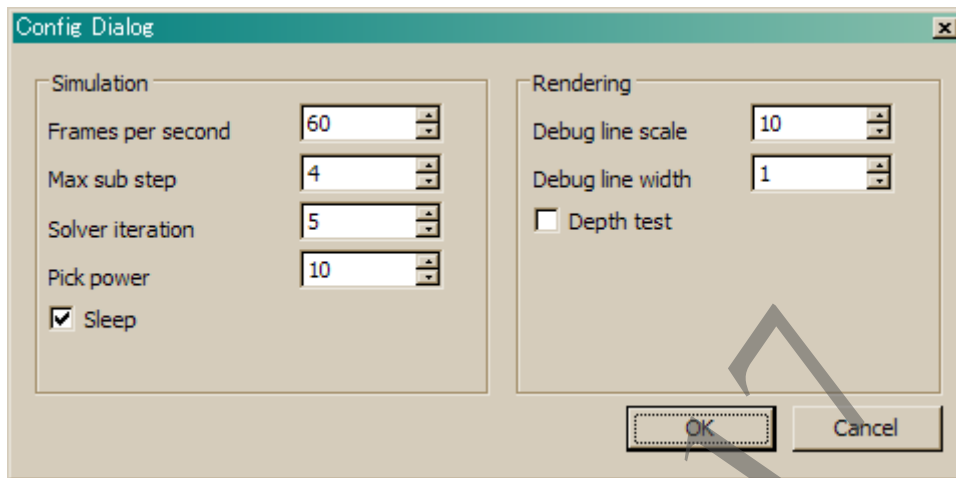
**Information**

Displays/hides the physical attributes of the selected rigid body.

**Help****About Physics Effects Viewer**

Opens the version information dialog of the Physics Effects Viewer.

## 4 Config Dialog



### Frames per second

Specify the number of simulations executed in 1 second.

When this value is 60, a time step  $1/60 \approx 0.01666$  value will be passed to the physical simulation.

### Max sub step

Specify the maximum number of simulations executed in 1 frame.

### Solver iteration

Specify the number of solver iterations.

### Pick power

Adjusts the power exerted when moving rigid bodies by mouse picking.

### Sleep

Enables/disables the sleep feature.

### Debug line scale

Adjusts the scale of drawing objects for debug.

### Debug line width

Adjusts debug drawing line width.

### Depth test

Enables/disables depth test during debug drawing.



## 5 Operation Procedure

Below is an explanation of the basic operation procedure of the Physics Effects Viewer.


### (1) Output snapshot files

Output physics scenes as snapshot files using the serialization feature of the Physics Effects library. Refer to the "Physics Effects Reference" document for details on serialization.

### (2) Load snapshot files on the Physics Effects Viewer



Load the outputted snapshot files on the Physics Effects Viewer. When loading is completed, the contents of the physics scene will be displayed on the drawing screen.

### (3) Start the physics simulation


Start the physics simulation by pushing the Play button .

### (4) Verify the presence of problems with the parameters and behavior of the rigid bodies to be checked

#### Verify the behavior of rigid bodies

Check behavior by moving rigid bodies in Pick mode . Executing the simulation frame by frame by pressing the Step button  is also an effective method of verification.


#### Check the state and attributes of rigid bodies

Display the information on the selected rigid body on screen by pressing the  button. You can verify, in the form of numerical values, the current physical attributes of the rigid body, such as mass and inertia tensor, and states such as position and speed.

#### Check the structure of large meshes

Left-click on a large mesh and select a triangle. You can de-select a triangle by left-clicking on it again.


Execute the following debug drawings by pressing the corresponding buttons while a triangle is selected.

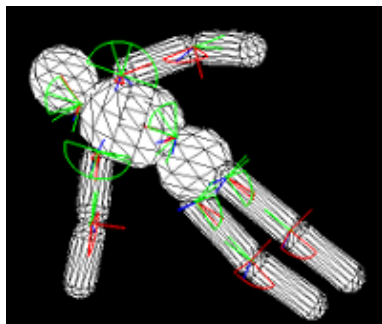
Island button : displays the bounding box of the mesh island that contains the selected triangle.

Facet button : displays the bounding box of the selected triangle.



Edge button : displays the edge of the selected triangle.

#### Check the joint status

Visualize joint status by pressing the joint button . You can check whether a joint is connected at the correct position, and whether rotation/position moveable range is set correctly. Adjust the scale of the displayed joint with Debug line scale in the settings dialog.



**Check whether contact is obtained correctly**

Visualize contact coordinates and the vector of the restitution direction by pressing the contact button . Simultaneously move rigid bodies in the Pick mode , and verify that contact coordinates have been updated appropriately.

