

# Camera Overrides

This page provides information on the Camera overrides rollout in the Render Settings.

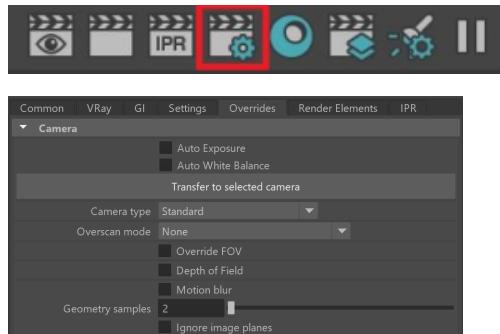
## Overview

The camera options control the way the scene geometry is projected onto the image, therefore changing how the render looks. These attributes override the following:

- The type of camera used for rendering
- Auto Exposure
- Auto White Balance
- Enable Depth of Field
- Enable motion blur effects for the standard cameras in Maya

If you use the VRayPhysicalCamera in your scene, the parameters in this section of the Render Settings are ignored. Exception applies for the Overscan, Geometry samples, Auto Exposure and Auto Balance.

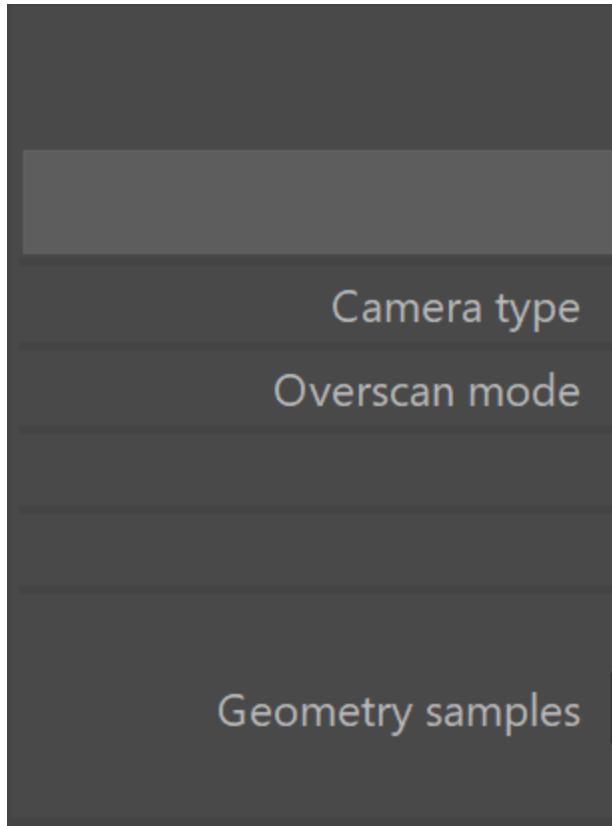
**UI Path:** ||Render Settings window|| > **Overrides tab** > **Camera** rollout



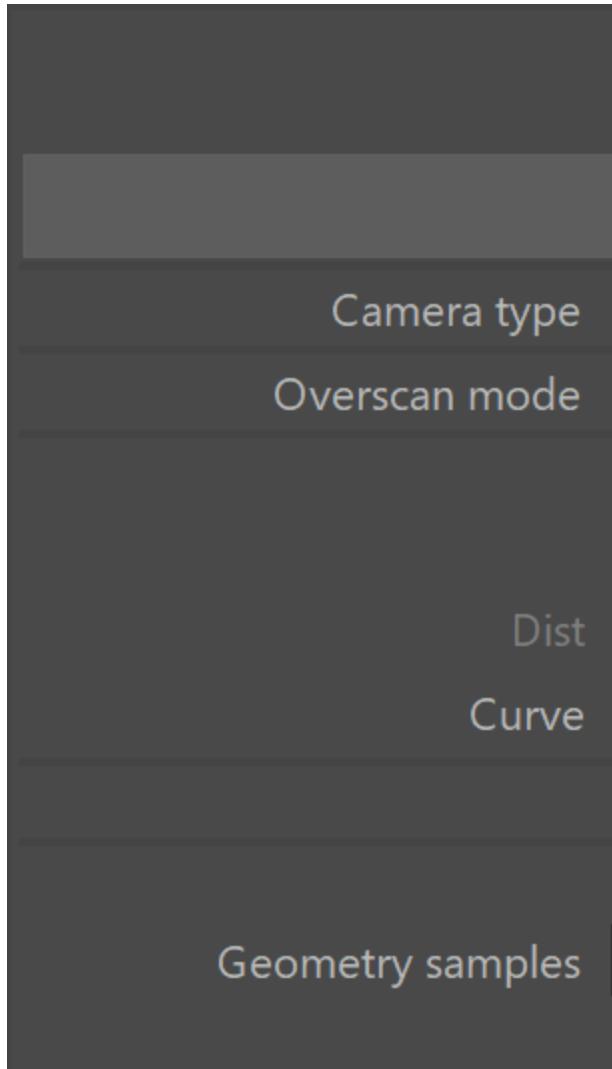
## Camera Overrides Parameters

The cameras in V-Ray generally define the rays that are cast into the scene, which essentially is how the scene is then projected onto the viewing screen. V-Ray supports several camera types described below with sample renders in the next section.

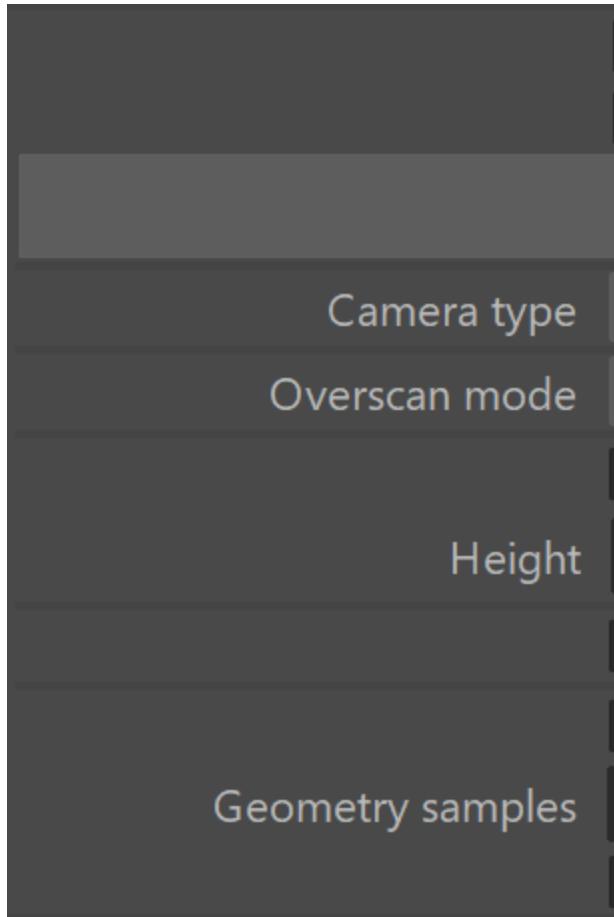
**Standard, Spherical, Box, Warped spherical, Cylindrical  
(point), Pinhole, and Cube Camera Types**



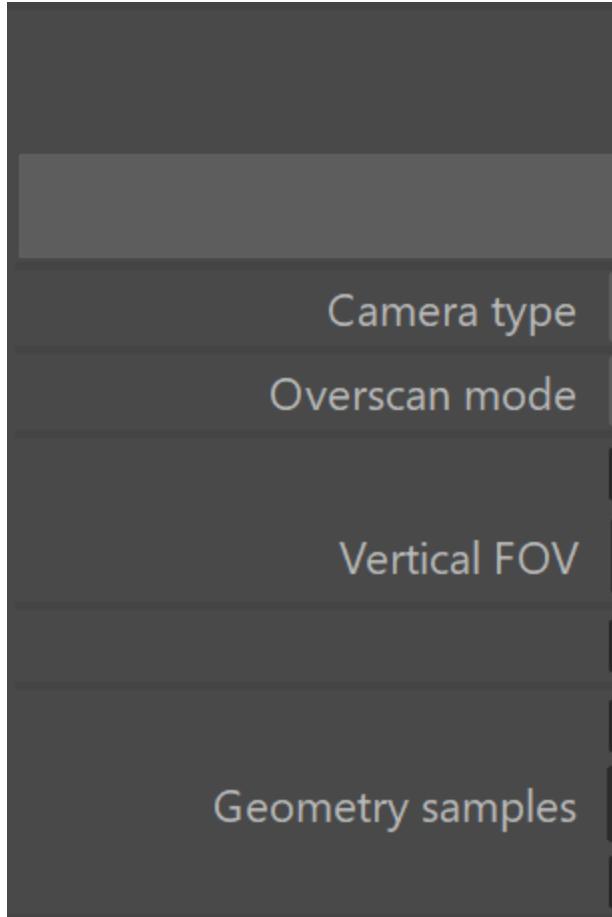
**Fish eye Camera Type**



**Cylindrical (ortho) Camera Type**



## Spherical panorama Camera Type



The parameters in this rollout are ignored if you are rendering using Physical camera Attributes. Exception applies for the Overscan, Geometry samples, Auto Exposure and Auto White Balance.

**Auto Exposure** – Automatically determines an appropriate exposure value for the render. This option requires Light Cache in Single frame mode.

**Auto White Balance** – Automatically determines a suitable white balance value for the image. This option requires Light Cache in Single frame mode.

**Auto Corrections Mode** – Specifies which camera and/or views to use the automatic exposure and white balance setting. This option is available only if Auto Exposure/Auto white balance are enabled.

**All cameras** – Applies Auto Exposure and Auto White Balance to all cameras, regardless of their local exposure settings.

**Cameras without exposure only** – Applies Auto Exposure and Auto White Balance only to cameras with no local exposure settings.

**Transfer to selected camera** button – This option is available only if Auto Exposure/Auto white balance are enabled. It lets you transfer the calculations to a selected camera as an ISO correction, keeping the options affecting Depth of Field and Motion Blur unchanged (e.g. shutter speed, f-number).

**Camera Type** – Types of cameras available in V-Ray. You may set your scene camera to be overridden by selecting one of the following: ( *For more information, see the [Camera Types example](#) or the [Camera Types Explained example](#) below* )

**Standard** – Allows for the current scene camera to be used (usually a pinhole camera).

**Spherical** – A camera with a spherically shaped lens.

**Cylindrical (point)** – This camera casts all rays from the center of a cylinder. In the vertical direction, the camera acts as a pinhole camera, and in the horizontal direction, the camera acts as a spherical camera.

**Cylindrical (ortho)** – This camera casts all rays from the center of a cylinder. In the vertical direction, the camera acts as an orthographic view, and in the horizontal direction, the camera acts as a spherical camera.

**Box** – Six standard cameras placed on the sides of a box. This type of camera is excellent for generation of environment maps for cube mapping and generates a vertical cross format image.

**Fish eye** – This special type of camera captures the scene as if it is a pinhole camera pointed at a 100% reflective sphere that reflects the scene back into the camera's shutter, as with using a light probe in HDRI photography. You can use the **Dist** and **FOV** settings to control which part of the sphere is captured by the camera. Note that the virtual reflective sphere has always a radius of 1.0.

**Warped spherical (old-style)** – A spherical camera with slightly different mapping formula than the **Spherical** camera.

**Orthogonal** – An orthographic camera enabling flat, non-perspective views.

**Pinhole** – Overrides the scene camera to force it to be a pinhole camera.

**Spherical panorama** – Spherical camera with independent horizontal and vertical FOV selection that is useful for generating lat-long images for spherical VR use.

**Cube6x1** – A variant of the **Box** camera with the cube sides arranged in a single row. Unlike the **Box** camera's output, **Cube6x1** does not produce an empty space in the output image and is quite useful in generating cubic VR output.

When rendering with V-Ray GPU engine, the supported Camera Types are **Standard**, **Orthogonal**, **Spherical panorama** and **Cube 6x1**.

**Overscan mode** – The ability to render an extra region beyond the specified image resolution.

**None** – Does not expand the image resolution area.

**Equal margin on all sides** – Renders an equal overscan area around the image as specified by the **Overscan values**.

**Horizontal and vertical margins** – Renders an overscan area along the top/bottom and sides of the image, as defined by the **Overscan values** which are expanded to two values by this setting. The first value defines the left/right edges overscan area and the second value defines the top/bottom areas of overscan in the render.

**Left, right, top and bottom margins** – Renders four user-defined overscan areas around the image. **Overscan values** are expanded to four independent values, ordered left, right, top, and bottom.

**Overscan values** – The numerical amount used for the **Overscan mode** setting.

**Overscan units** – Specifies the kind of units to be used by the **Overscan values** setting.

**Override FOV** – Overrides Maya's camera FOV (field-of-view) angle. Some V-Ray camera types can take FOV ranges from 0 to 360 degrees, whereas the cameras in Maya are limited to 180 degrees.

**FOV** – The FOV (field-of-view) value to override the Maya camera's own FOV setting. This parameter appears only when **Override FOV** checkbox is enabled.

**Depth of Field** – Toggles on or off additional parameters to control depth of field. See [Depth of Field Parameters](#) below.

**Motion blur** – Toggles on or off additional parameters to control motion blur. See [Motion Blur Parameters](#) below.

**Height** – Specifies the height of a **Cylindrical (ortho)** camera. This setting is available only when the **Camera type** is set to **Cylindrical (ortho)**.

**Auto-fit** – Controls the auto-fit option of the Fish-eye camera. When enabled, V-Ray calculates the **Dist** value automatically so that the rendered image fits horizontally with the image's dimensions.

**Dist** – Applies only to the **Fish eye** camera. The **Fish eye** camera is simulated as a **Standard** camera pointed to an absolutely reflective sphere (with a radius of 1.0) that reflects the scene into the camera's shutter. The **Dist** value controls how far the camera is from the sphere's center (which is how much of the sphere will be captured by the camera). This setting has no effect when the **Auto-fit** option is enabled.

**Curve** – Controls the degree of warping for a Fish eye camera. A value of 1.0 corresponds to a real world fish-eye camera. Lower values increase warping, while higher values reduce warping. Technically, this value controls the angle at which rays are reflected by the virtual sphere of the camera.

**Vertical FOV** – Specifies the field-of-view angle in a vertical direction.

**Ignore image planes** – Enables/disables the rendering of all camera image planes in the scene. This option does not affect free image planes.

## Example: Renders of Camera Types

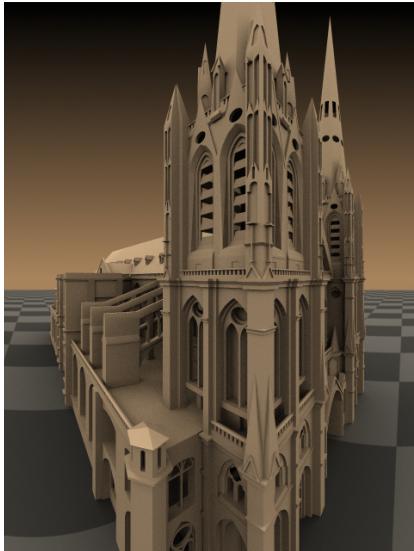
The images below show the difference between the different camera types used in rendering:



Standard camera



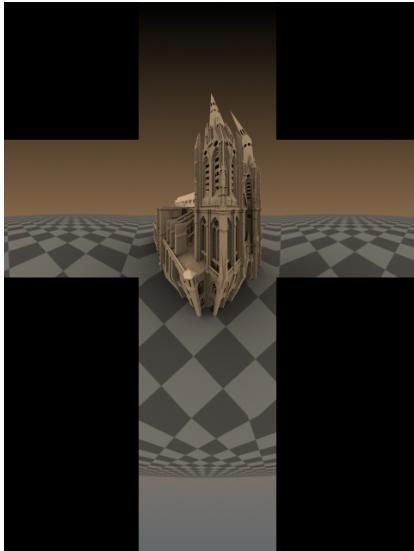
Spherical camera



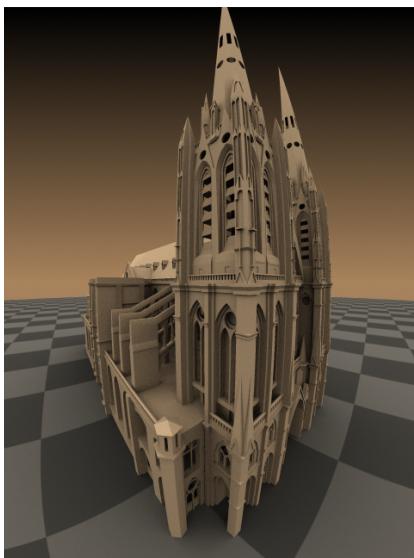
Cylindrical camera



Orthographic cylinder



Box camera

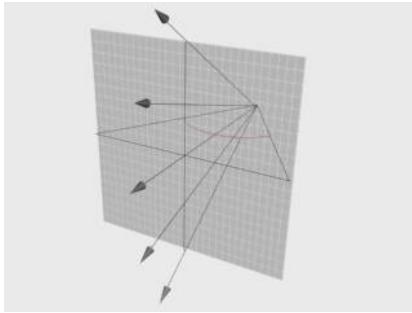


Fish eye camera

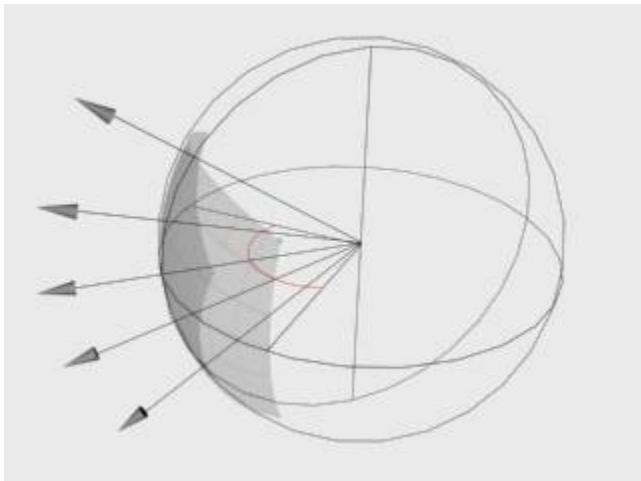
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### Example: Camera Types Explained

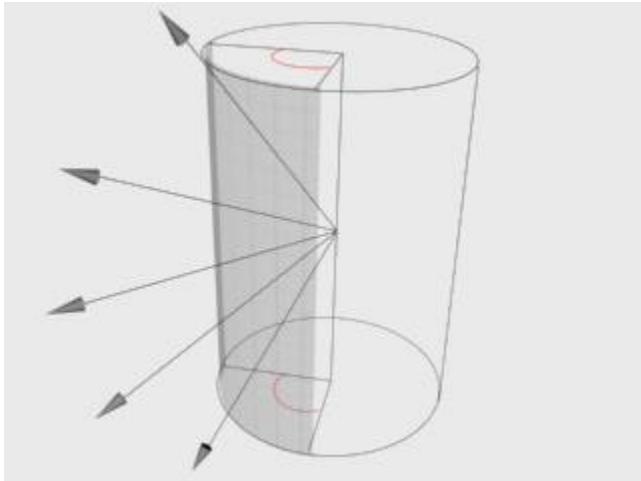
This example shows how the rays for different camera types are generated. The red arcs in the diagrams correspond to the FOV angles.



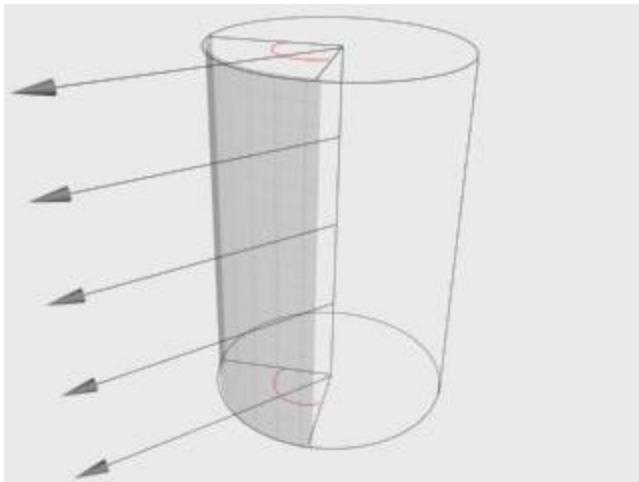
Standard



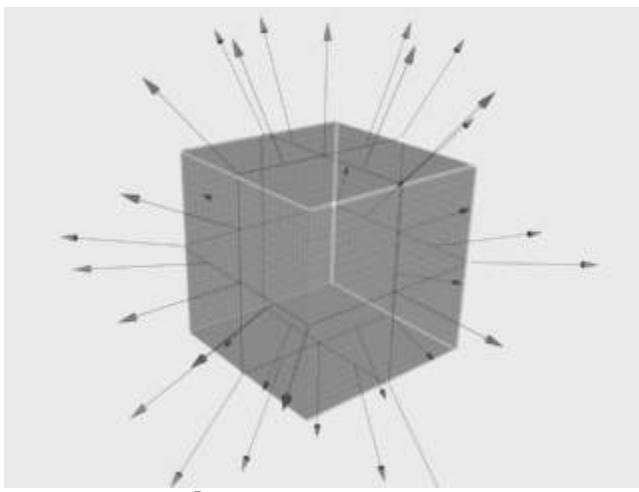
Spherical



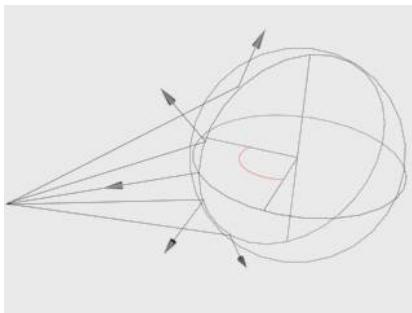
Cylindrical (point)



Cylindrical (ortho)



Box



Fish eye

## Depth of Field Parameters

These parameters, which appear when the **Depth of Field** option is enabled, control the depth of field effect when rendering with a standard Maya camera. The parameters are ignored if you render with [Physical camera Attributes](#).

**Depth of field** is supported only for the **Standard** camera type. Other camera types do not produce the depth of field effect at this time.

**Aperture** – The size of the virtual camera aperture, in world units. Small aperture sizes reduce the DOF effect.

**Center bias** – Determines the uniformity of the DOF effect. A value of 0.0 means that light passes uniformly through the aperture. Positive values mean that light is concentrated towards the rim of the aperture, while negative values concentrate light at the center.

**Get focal distance from camera** – When enabled, the **focal distance** is determined from the camera target. This setting works only with Maya camera types *Camera and Aim* or *Camera, Aim and Up*.

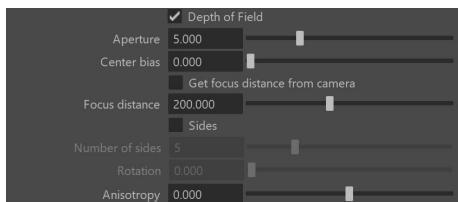
**Focus distance** – Determines the distance from the camera at which objects will be in perfect focus. Objects closer or farther than this distance will be blurred.

**Sides** – Enables simulation of the polygonal shape of the aperture of real-world cameras. When disabled, the shape used in calculations is perfectly circular.

**Number of sides** – Sets the number of sides for the polygonal shape of the aperture.

**Rotation** – Specifies the orientation of the aperture shape.

**Anisotropy** – Stretches the bokeh effect horizontally or vertically. If you want the ratio of height to width of the bokeh to be **k:1**, then the value for anisotropy should be  $\sqrt{1/k}-1$ . For example, for anamorphic bokeh, which is 2.39:1, the anisotropy value should be -0.353.



## Motion Blur Parameters

These parameters, which appear when the **Motion Blur** option is enabled, set values for calculations of the Motion Blur effect. For more information, see the [Motion Blur example](#) below.

**Camera motion blur** – Enables the calculation of motion blur caused by the movement of the camera.

**Duration (frames)** – Specifies the duration, in frames, during which the camera shutter is open.

**Interval center** – Specifies the middle of the motion blur interval with respect to the Maya frame. The default value of 0.5 means that the middle of the motion blur interval is halfway between the frames. A value of 0.0 means that the middle of the interval is at the exact frame position. You can also enter an arbitrary value for the interval center. For more information, see the [Interval Center example](#) below.

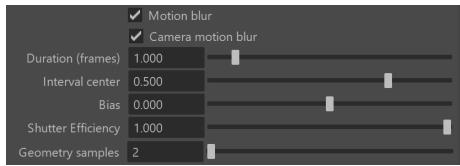
**Bias** – Controls the bias of light for the motion blur effect. A value of 0.0 means that the light passes uniformly during the whole motion blur interval. Positive values mean that light is concentrated towards the end of the interval, while negative values concentrate light towards the beginning.

## General Motion Blur Parameters

These parameters are used whether you are rendering from a standard camera or from a VRayPhysicalCamera with motion blur enabled.

**Shutter Efficiency** – In real world cameras, the shutter requires some time to open and close which in turn affects the way motion blur looks. This is especially true for lenses with large apertures. To simulate this effect, this parameter controls how the motion blur samples are distributed in the time interval of the shot. A value of 1.000 means that the samples are evenly distributed as if the shutter opens and closes instantly. Lower values produce more realistic results by placing more samples toward the middle of the time interval.

**Geometry samples** – Determines the number of geometry segments used to approximate motion blur. Objects are assumed to move linearly between geometry samples. For objects rotating at high speed, increase this parameter to get correct motion blur. Note that higher values increase memory consumption since more geometry copies are kept in memory. *For more information, see the [Geometry Samples example](#) below.*



## Example: Motion Blur

This example demonstrates how motion blur works.



Motion blur is Off

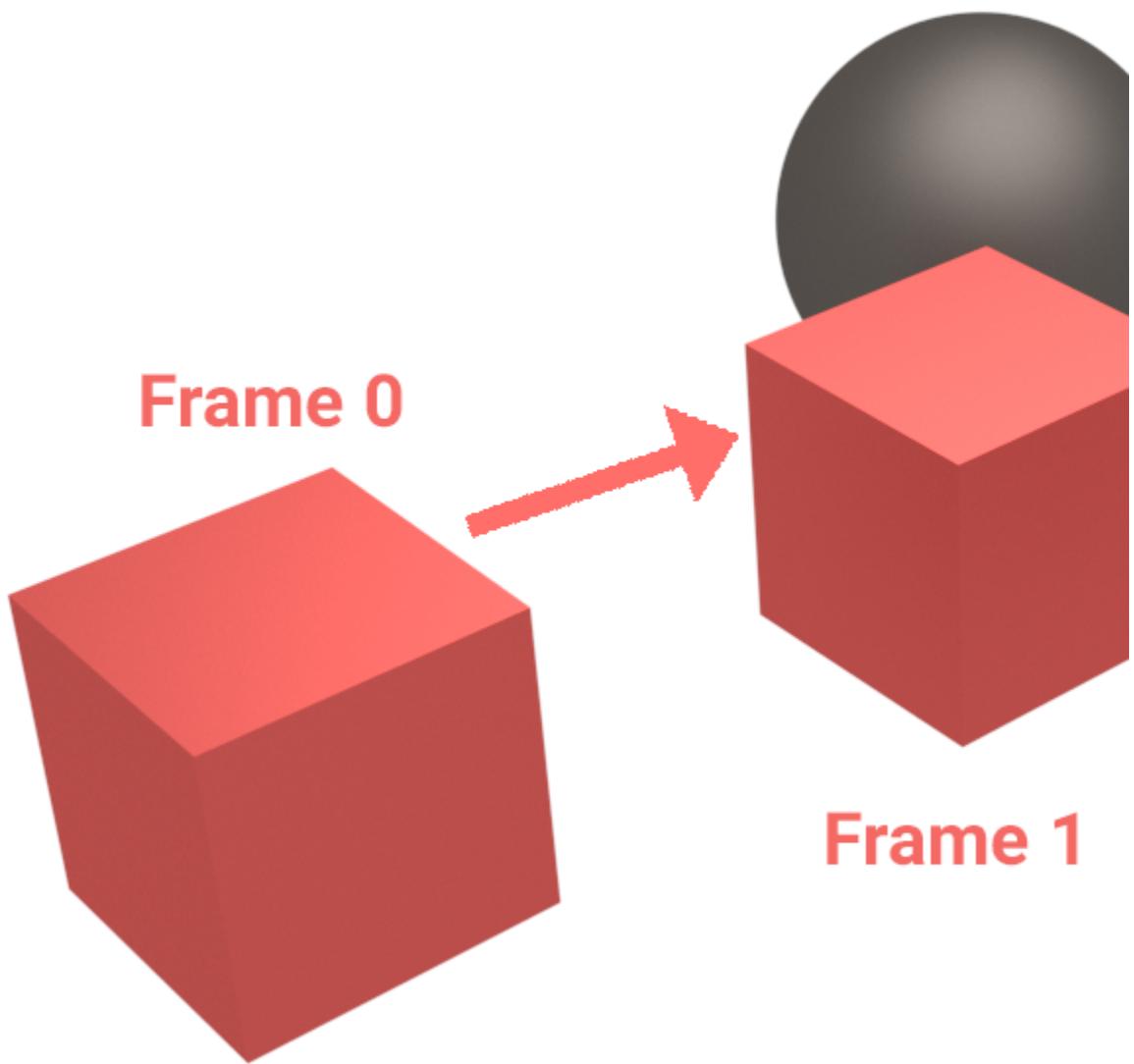


Motion blur is On

## Example: Duration

The following scene consists of three-frame animation of a moving cube. The cube's position on each frame:

Frame 0: Left side  
Frame 1: Near box  
Frame 2: Right side



The following images show frame 1 rendered with different duration values:



Duration 0.5 (frames)



Duration 2.0 (frames)

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### Example: Interval Center

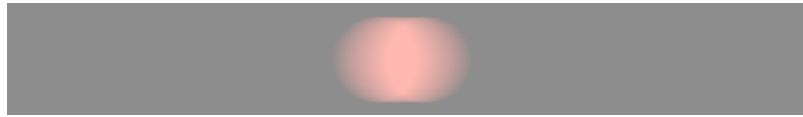
This example demonstrates the effect of the interval center parameter. The scene is a moving sphere. Here are three sequential frames without motion blur:



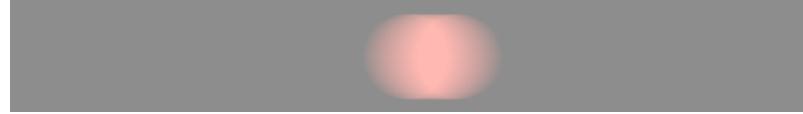
Here is the middle frame, rendered with motion blur and three different values for the interval center; the motion blur duration is one frame.



Interval center = 0.0; the middle of the motion blur interval matches the sphere position at the second frame



Interval center = 0.5; the middle of the interval is halfway between the second and the third frame



Interval center = 1.0; the middle of the interval matches the sphere position at the third frame



Interval center = 4; the middle of the interval matches the sphere position at the sixth frame



Interval center = 8; the middle of the interval matches the sphere position at the twelfth frame

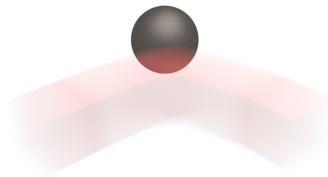
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### Example: Geometry Samples

The following images demonstrate the Geometry samples parameter using the scene from the [Duration example](#). In all the following renderings, the **Duration (frames)** parameter is set to **2**. All other parameters are the same as for the previous images. The higher the value for **Geometry samples**, the more accurate the estimated object motion. However, excessive increase of this value will result in long rendering times.

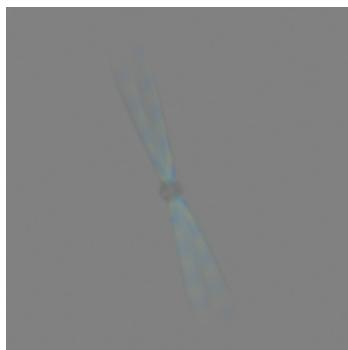


Geometry samples = 2



Geometry samples = 8

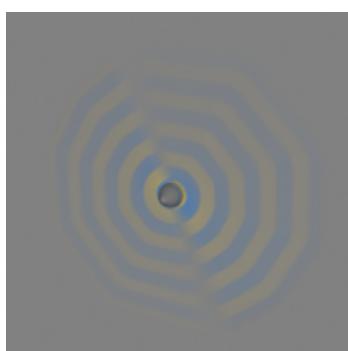
The geometry samples parameter is useful when creating motion blur for complex motions, for example, fast-rotating objects. Here is an example with an accelerating airplane propeller with a blue and yellow pattern:



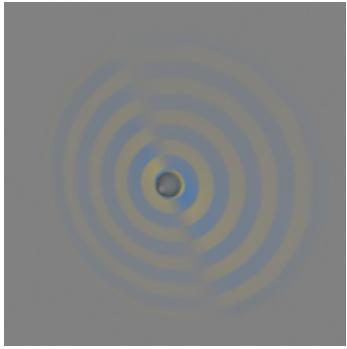
Geometry samples = 2



Geometry samples = 3



Geometry samples = 6



Geometry samples = 10

## Notes

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The number of geometry samples can be controlled on a per-object basis on the [Object Properties](#) dialog. This is useful if you need a lot of samples for some objects in the scene (for example, the wheels of a moving car) while other objects can do with fewer samples (such as the car body). Using more samples only where needed saves memory and speeds rendering.