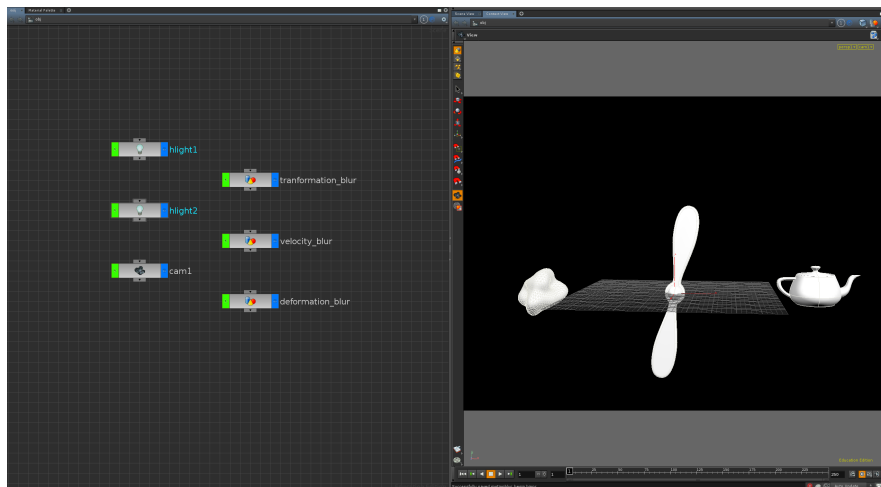


MOTION BLUR

There are three types of motion blur in Houdini. **Transformation Blur**, **Deformation Blur** and **Velocity Blur**. These are defined by the type and level of animation assigned to geometry.

Transformation Blur	for geometry animated at Object Level
Deformation Blur	for geometry animated at Geometry Level
Velocity Blur	for geometry that has a Velocity attribute assigned to it

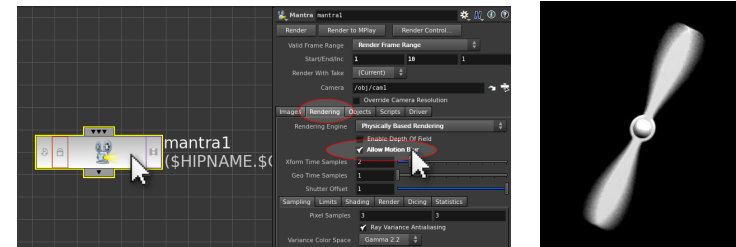
Open the scene **motionblur_begin.hipnc**



This scene contains three objects animated in the ways required for demonstrating the different types of motion blur.

GLOBALLY DECLARING MOTION BLUR

It is possible to declare motion blur on a per object basis; however motion blur has to be declared globally first. This will tell Mantra to expect motion blur assigned to the scene. Declaring global motion blur takes place on the Mantra ROP.



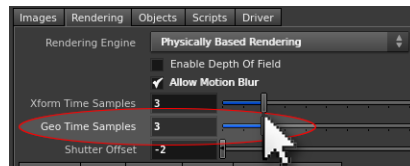
In the **Mantra ROP**, locate the **Rendering >** section of the **parameters**, and activate the option **Allow Motion Blur**. When the scene is rendered, the propeller will appear blurred. **The propeller is animated at Object Level**. This is where the motion blur by default is calculated. This is known as **Transformation Motion Blur**.

Setting the **Xform Time Samples** to a value of **3** will push the motion blur slightly more in front of the propeller's leading edge rather than a centralised blur. The position of the blur can then be adjusted by setting the **Shutter Offset** parameter to **-2** so that the blur takes place behind the leading edge.

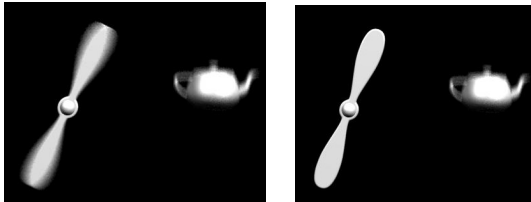
GLOBALLY ACTIVATING DEFORMATION BLUR

Geometry animated at Geometry Level can have **Deformation Motion Blur** assigned to it. Globally this is done by increasing the **Geo Time Samples** parameter in the **Rendering >** section of the **Mantra ROP parameters**.

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If the **Geo Time Samples** is increased to above 1, the teapot which is animated at Geometry Level appears blurred. This is known as Deformation Blur. Setting both the Xform Time Samples and the Geo Time Samples to a value above 1 will activate both global Transformation Motion Blur and global Deformation Blur simultaneously.



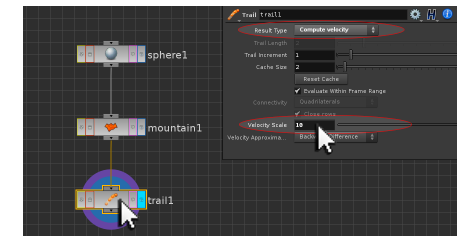
Transformation Motion Blur can be **deactivated** if required by reducing the **Xform Time Samples** parameter to 1 or less, **without affecting Deformation Blur**.

Note: The deforming sphere is also blurring however its presence is less discernable.

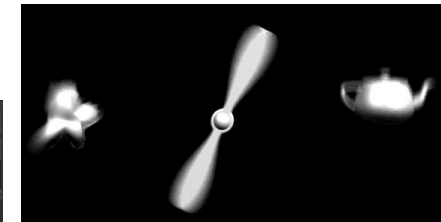
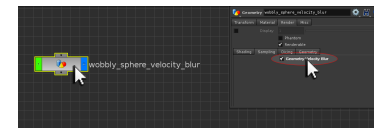
ACTIVATING VELOCITY BLUR

Any **object animated at Geometry Level**, which has a **Velocity Attribute** assigned to it, can override regular Deformation Motion Blur.

Go inside the deforming **wobbly_sphere_velocity_blur** object, and append a **Trail SOP** to the **Mountain SOP**. This node can be used to compute velocity on geometry. In the **parameters** for the **Trail SOP** specify the **Result Type** as **Compute Velocity** and set the **Velocity Scale** to 10.



Return back to **Object Level** and in the **parameters** for the **wobbly_sphere_velocity_blur** object, locate the **Render > Sampling** section, and activate the **Geometry Velocity Blur** option. This will tell Mantra to expect a Velocity Attribute for this object.

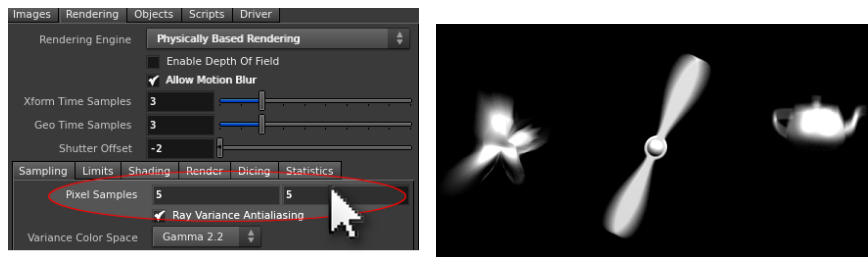


When the scene is rendered, the deforming sphere has its own velocity based blur which can be amplified further by increasing the Velocity Scale parameter associated with the Trail SOP.

INCREASING THE MOTION BLUR QUALITY

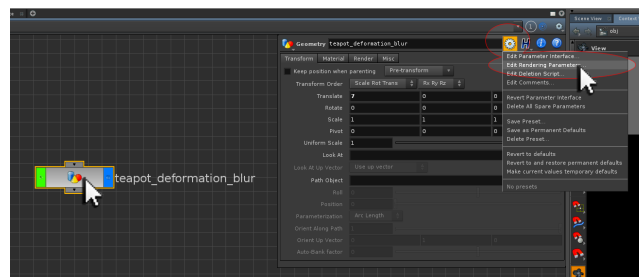
The blur rendering can be improved by increasing the **Pixel Samples** parameter located in the **Rendering > Sampling** section of the **Mantra ROP's** parameters. Increasing this parameter to a higher value will improve the blur quality but can increase render times.

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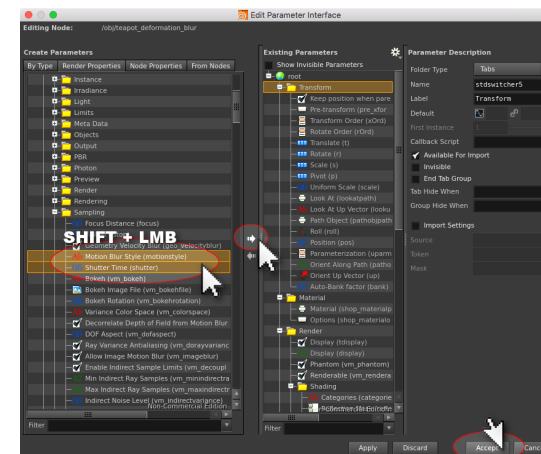
CONTROLLING MOTION BLUR ON A PER OBJECT BASIS

At present, the motion blur in the scene is being assigned globally to every object in the scene. If an object does not require motion blur after global motion blur has been assigned, it can be deactivated for that object alone. This is done by **Editing the Interface** of the object not requiring motion blur.



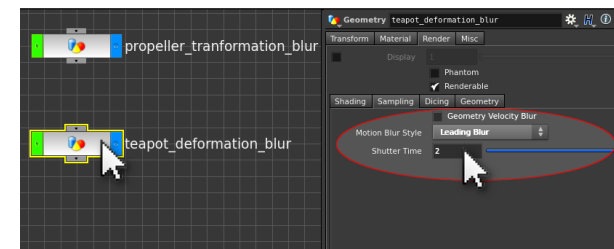
In the parameters for the **teapot_deformation_blur** object, activate the **Edit Rendering Parameters...** window by going to the **Cog** button and selecting it from the resulting menu.

The **Edit Parameter Interface** window contains a list of parameters not normally displayed or activated on objects, allowing them to be called on a per object basis.

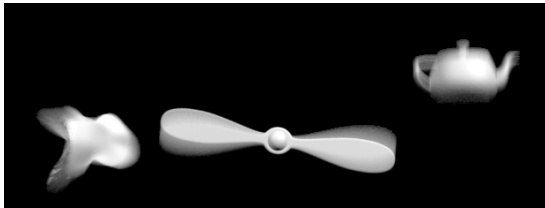


In the **Mantra > Sampling** section of the **Rendering Properties** Parameters, **SHIFT + LMB** select the **Motion Blur Style** and **Shutter Time** parameters and **LMB** the right facing arrow to activate it as a parameter on the **teapot_deformation_blur** object. Press the **Accept** button to confirm this action.

The **teapot_deformation_blur** object now has its own **Motion Blur** options. This will override whatever has been specified on the **Mantra ROP**.



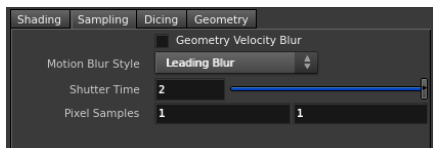
If for example the **Motion Blur Style** is set to **Leading Edge** with a **Shutter Time** value of **2**, now the **teapot's motion blur** will be **ahead of its movement** rather than behind it as with the propeller.



NOTE: deactivating the global Allow Motion Blur option located in the Mantra ROP's Rendering > parameters will deactivate motion blur for the entire scene, ignoring any per object settings that might be present.

FURTHER PER OBJECT CUSTOMISATION

Other parameters specific to creating motion blur can also be activated in an object's parameters. This again is done by activating **the Edit Rendering Parameters... window** by going to the **Cog button** and selecting it from the resulting menu.



The **Edit Rendering Parameters list** also allows **Pixel Samples for example** to be **activated** on a **per object basis**.

See file **motionblur_end.hipnc**