

Realistic motion blur simulation  
for CGI and car photography.

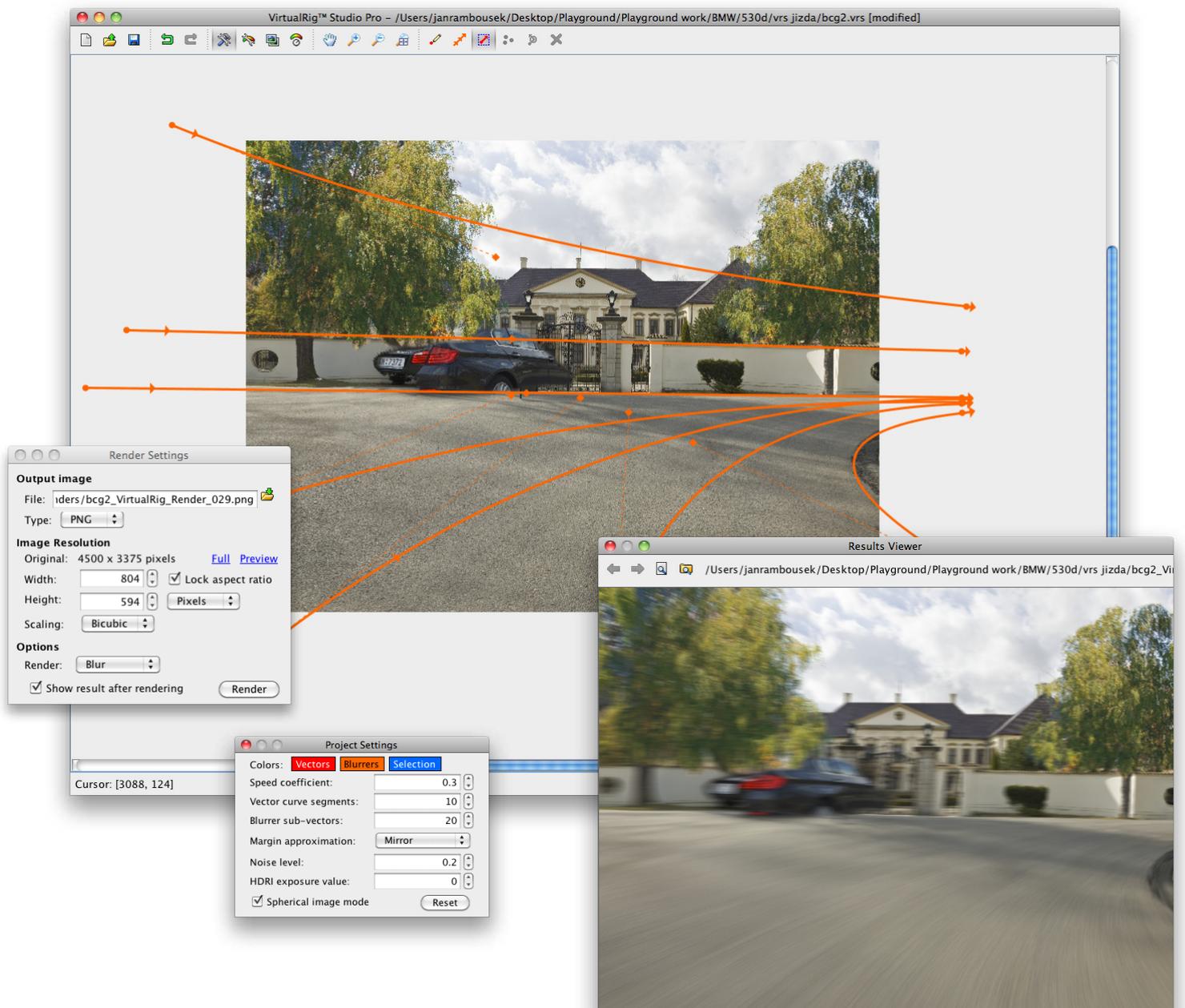


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## USER INTERFACE

A simple yet powerful user interface of VirtualRig™ Studio consists of a main window and few additional dialogs: Project settings, Render settings and Results viewer. The main window is a place where you define how the motion blur effect is applied to the picture; the toolbar on the top and keyboard shortcuts allow you to quickly access the most important features from the application menu.

Simply put, the motion blur effect is guided by vectors which are drawn to the source picture. The position and shape of a vector corresponds to the shape of blur in the particular location of the picture.



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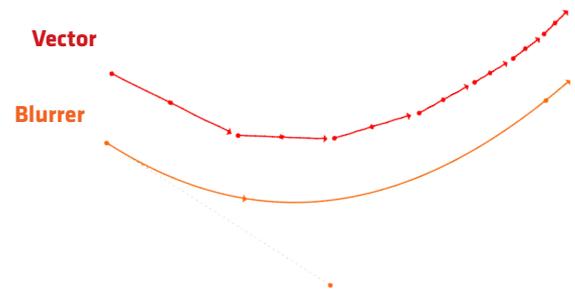
## VECTORS AND BLURRERS

### 1. Vector

Start of a vector (displayed as a small circle) defines location of the blur and the middle and end points define its shape. The overall motion blur of a picture is smoothly interpolated to match all vectors in their locations.

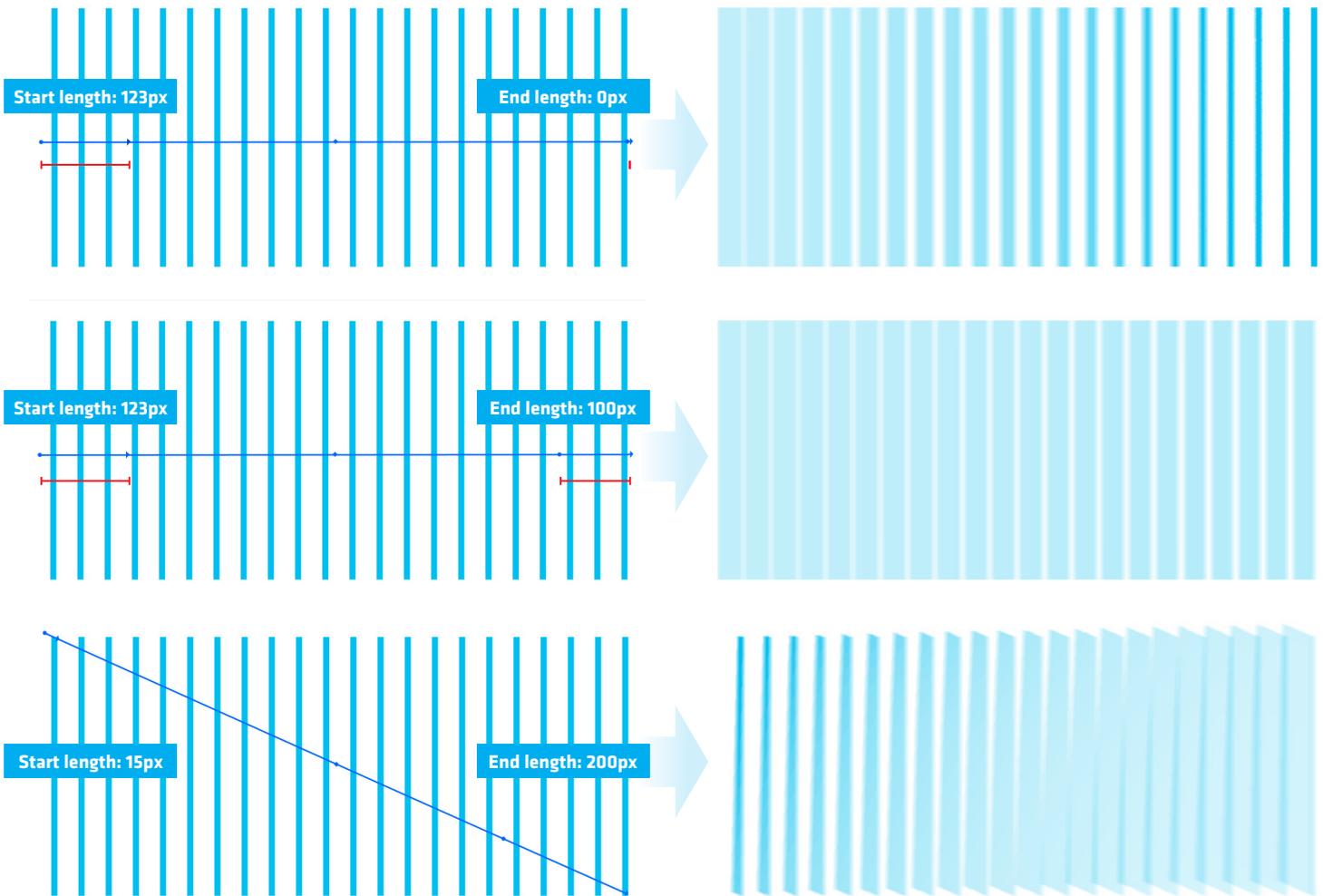
### 2. Blurrer

Even though a single vector is sufficient to blur a whole image, typically more than one vector is needed to non-uniformly blur different areas of the image. And this is where the blurrer tool comes in - it allows you to define a sequence of vectors, whose location and shape precisely matches the shape of the blurrer. Use the small circles at the start and the end of blurrer to set the lengths of corresponding vectors.



#### Blurrer layout:

#### Render



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## PROJECT SETTINGS

The project settings dialog controls several important properties of your project which have a direct effect on how your picture is blurred.

### Speed coefficient

This setting virtually changes the length of all vectors in the project, without moving a single vector - see the example below. The value 1.0 means that the length of vectors is as displayed.

### Vector curve segments

Each vector consists of number of straight line segments. The more segments the better impression of a smooth curve but also slower rendering.

### Blurrer sub-vectors

A blurrer represents a number of "standard" vectors; this setting specifies how many is that. The more segments the better quality but slower rendering, again.

### Colors

Allows you to change colors of vectors and blurrers in case you are working on a picture with a similar background color.

### Margin approximation

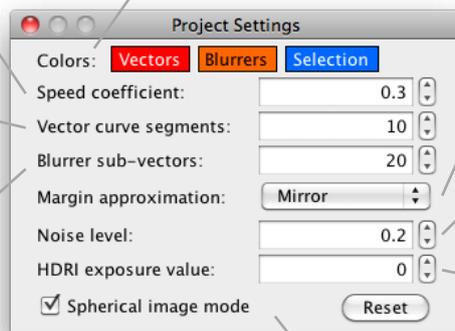
Near the image edges there is not enough pixels to generate a proper blur effect. This setting specifies how the missing pixels are approximated.

### Noise level

Sometimes the blur effect creates periodic artifacts in the rendered image. Noise level setting adds a random noise to the blur to avoid these artifacts. The value specifies a number of pixels, the higher the value the more noise is added.

### HDRI exposure value

Sets the brightness of a high-dynamic range image in workspace.



### Spherical image mode

Enables smooth blurring of 360-degree horizontal panoramic pictures. Please find more information in the following pages.

### SPEED COEFFICIENT EFFECT:



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## RENDER SETTINGS

The render settings dialog controls parameters that affect quality and speed of the motion blur render.

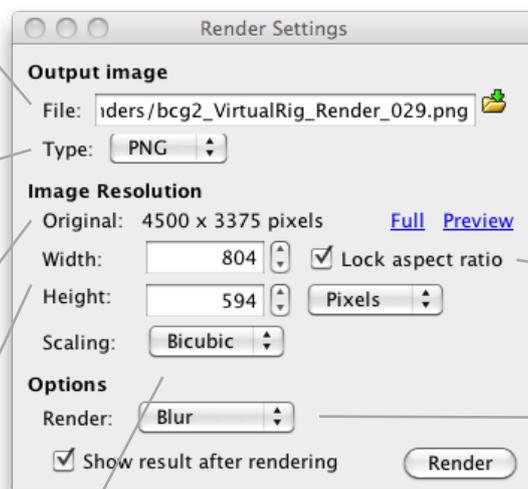
**File**  
Specifies the output image file of the render. By default, VirtualRig™ Studio saves rendered images in the XXX\_VirtualRig\_Renders directory, where XXX is the name of your project.

**Type**  
The output image format. In Trial and Lite version only JPEG is available, the Pro version features JPEG, TIFF, PNG, GIF, BMP and HDR1 formats.

**Image resolution**  
sets the resolution of the output image. Click Full or Preview links for a high quality or quick rendering pre-sets, respectively.

**Width/Height**  
Width and height of the output image.

**Scaling**  
Sets the algorithm used for image resizing. Bicubic offers the best quality but is slowest. Nearest neighbor has a lower quality but is fast.



**Lock aspect ratio:**  
If checked the ratio between original width and height will be preserved in the output image.

**Render options**  
The type of the render: Blur or Curvature. Please see the next page for details.

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## RENDER TYPE

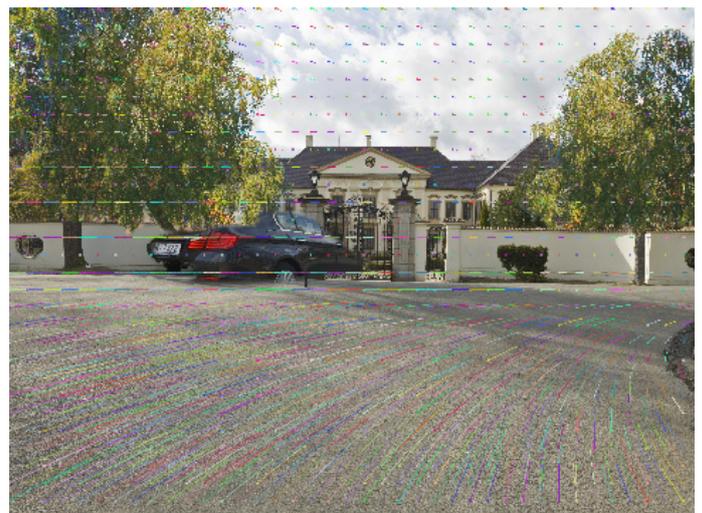
VirtualRig™ Studio offers two types of render output: Blur and Curvature. The Blur option is used to generate the motion blur. The Curvature option draws curves to the original image that show the shape and intensity of the blur - you will find this feature very useful to fine-tune the motion blur in every area of the image for an exceptional quality.



Render type: Blur



Render type: Curvature / Grid size 10x10 px in preview render 1000x740 px



Render type: Curvature / Grid size 25x25 px in preview render 1000x740 px

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## CREATING NEW SCENE

In the following tutorial we will show how to create motion blur of a real-world image, step by step. The first step of a new project is to prepare the source image. If the car is in the image, we need to remove it, or at least remove those parts which would be visibly blurred in the final image. Standard tools in Adobe Photoshop or any other graphical software will do. If your picture is a pure background with no car, you will be spared of this step.

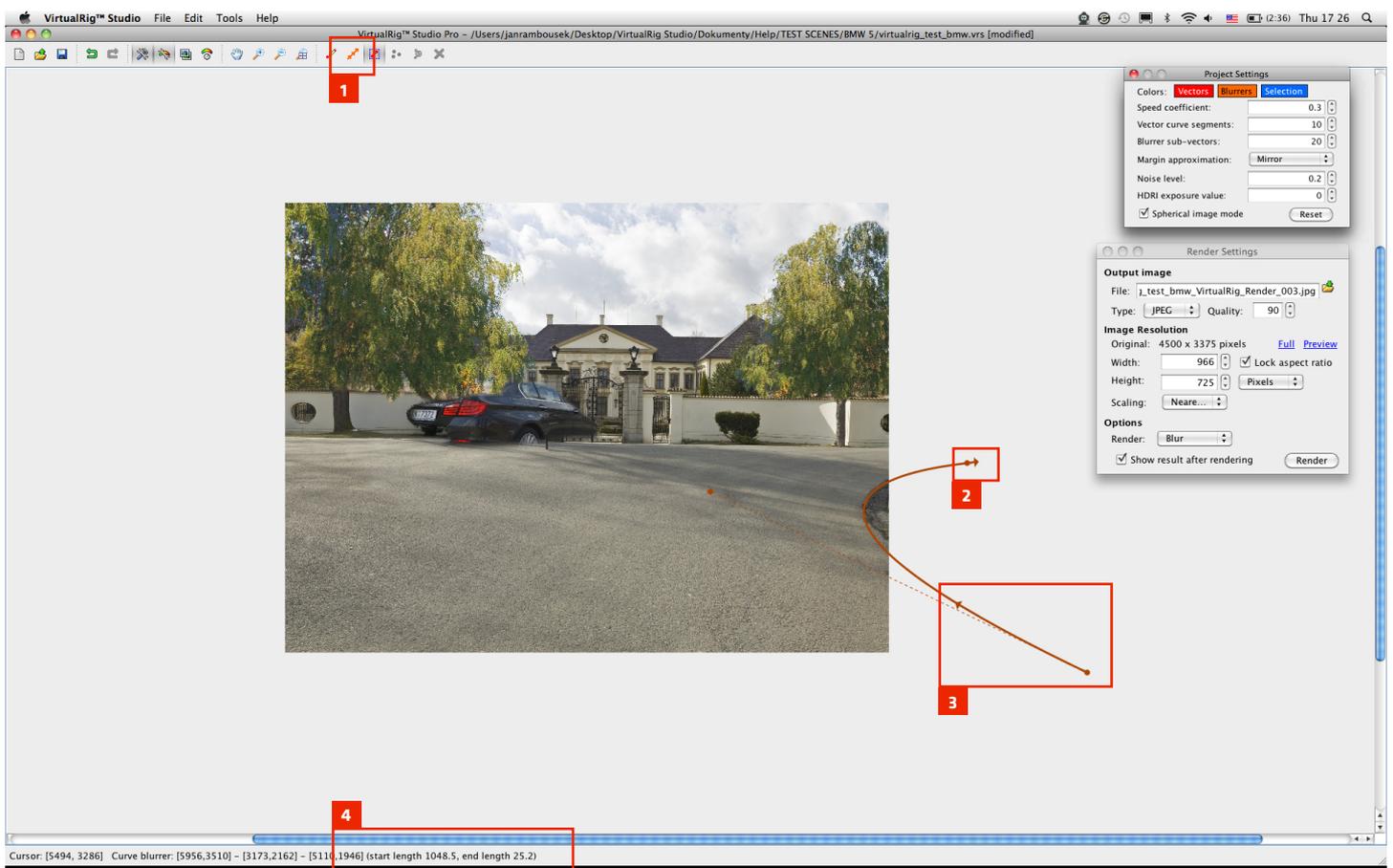
The project and all necessary materials are available in the example projects installed with the application (in the “BMW 5 - Blurrers” directory).



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## CREATING NEW SCENE / FIRST VECTOR

Now that we have prepared the source image, we can create a new project in VirtualRig™ Studio and start drawing vectors. In the sample scene we want the motion blur to follow the curved road, so we use the Blurrer tool [1] instead of many hand-drawn vectors. In drawing mode you can press and hold Alt key to quickly switch to the Select & move mode which enables you to move the control points of the Blurrer - we need it to change the length of blur in the area [2 and 3]. In general, objects close to the camera move faster than objects in the background, that's why the start length is much longer than the end length. If you hover the mouse over the blurrer you will see all the information about it on the status bar [4], including corresponding vector lengths.



### OUTPUT FROM CURRENT VECTOR LAYOUT



Render type: Blur

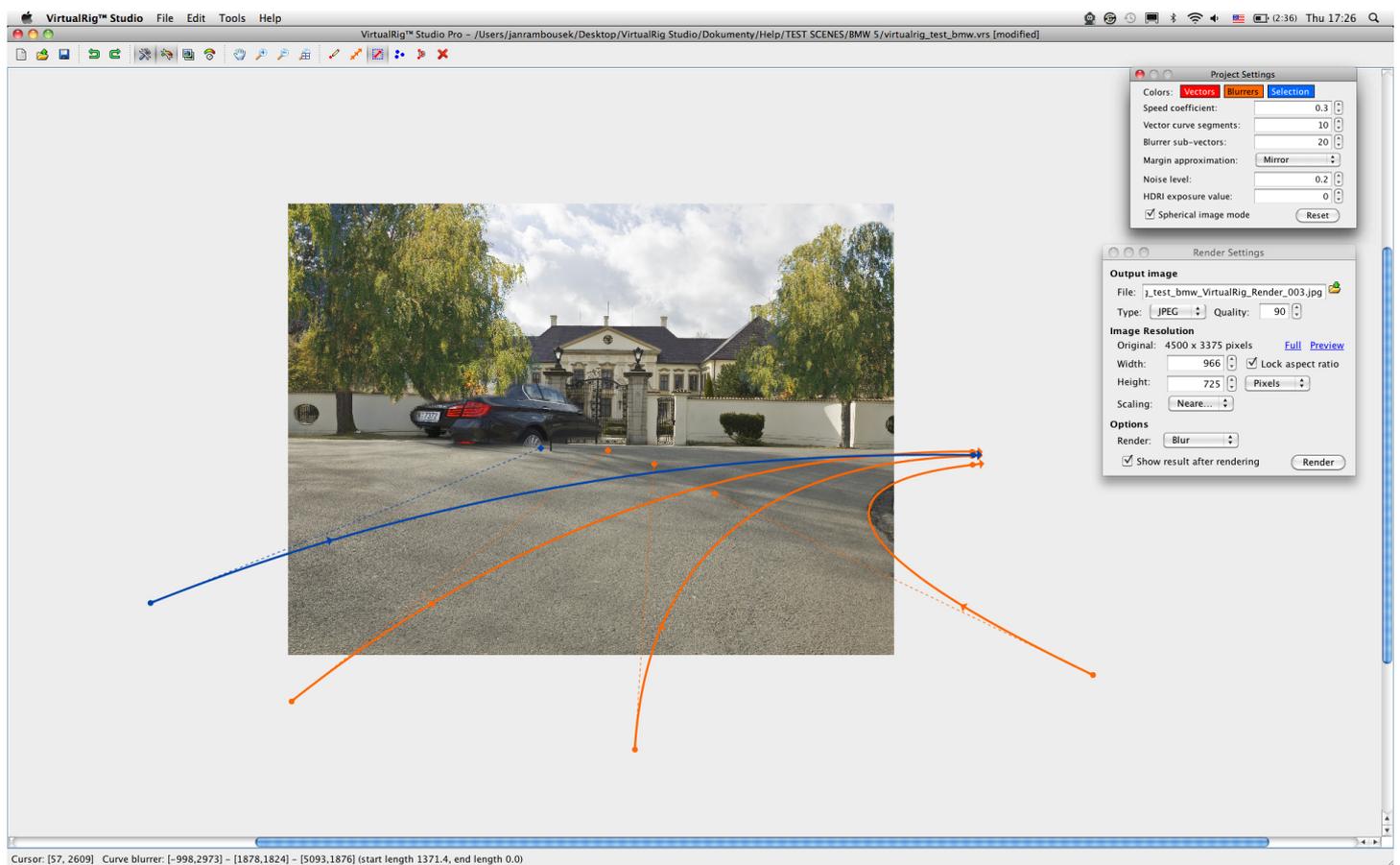


Render type: Curvature

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## CREATING NEW SCENE / MORE VECTORS

We keep adding more blurrers. The general rule is the more vectors the better accuracy. It is important to shape the blurrers to follow direction of the desired car movement, and set the “speed” of vectors appropriately. The drawing is very intuitive and it doesn’t take much time to get a good feeling for it.



### OUTPUT FROM CURRENT VECTOR LAYOUT



Render type: Blur

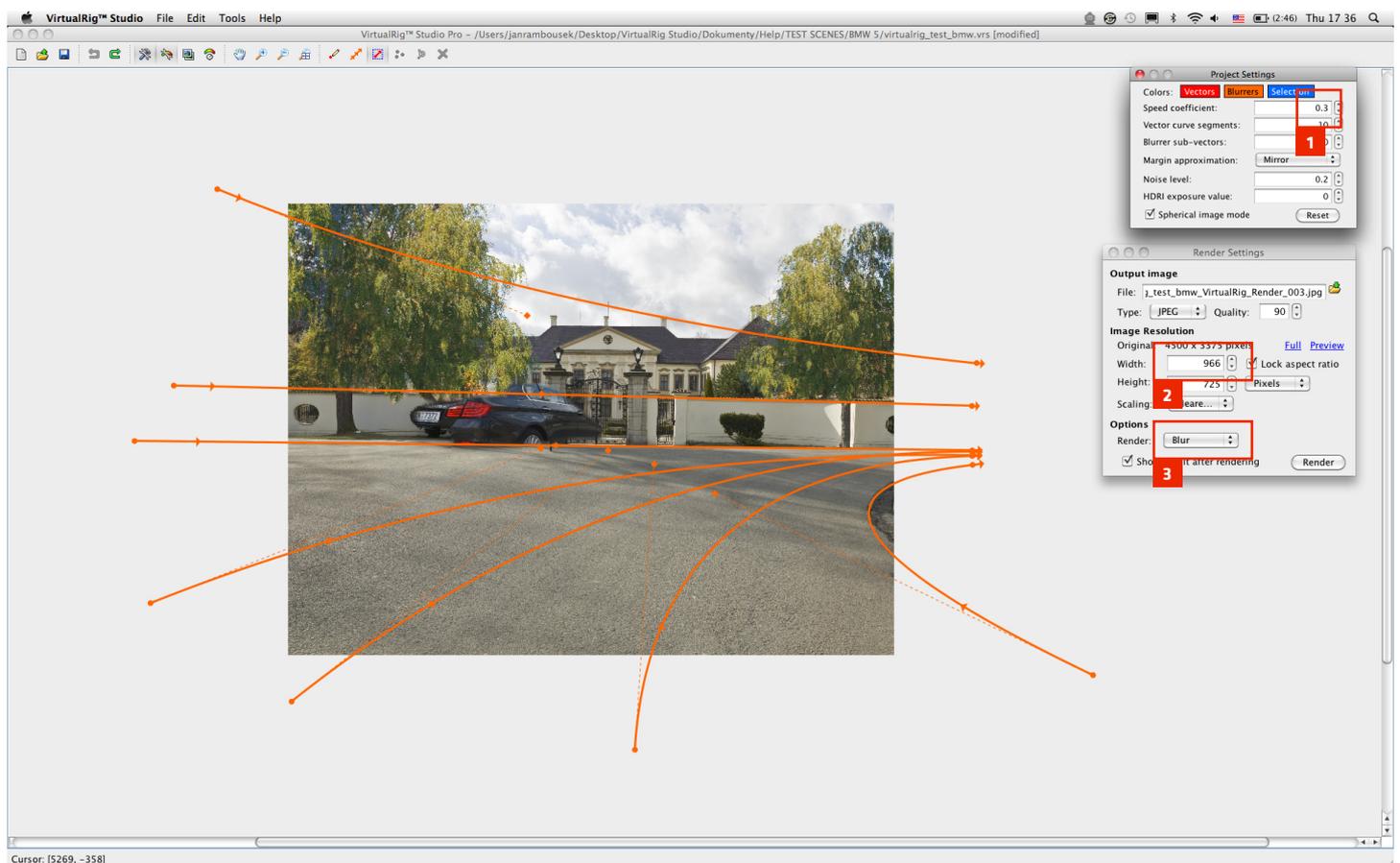


Render type: Curvature

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## CREATING NEW SCENE / RENDERING

It is a good idea to check the render output during work on your project, the preview quality preset is handy for that [2]. After the composition is finished, you might want to experiment with the speed coefficient setting [1] to fine-tune the virtual length of all vectors. In the render settings dialog you can also switch between Blur and Curvature render type [3].



### OUTPUT FROM CURRENT VECTOR LAYOUT



Render type: Blur



Render type: Curvature

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## CREATING NEW SCENE / FINAL COMPOSITION

When the blurred background is ready, it is a time to do the final composition and post-production of the image. When talking about classical photography of cars you will usually face two issues: wheels and reflections. From our experience, the best and easiest way how to “spin” the wheels of a stationary car is to use real pictures of spinning wheels and superimpose them to the image of the car using Adobe Photoshop or any other graphical software. The results look absolutely realistic.

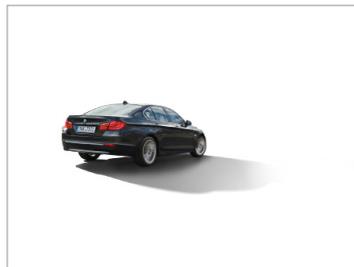
It is possible to use VirtualRig™ Studio to blur the reflections - essentially you need to use another graphical software to extract the reflections, blur them as a separate project in VirtualRig™ Studio and superimpose them back to the car image. The details of this procedure are however behind the scope of this tutorial. In the case of computer-generated imagery (CGI) handling of reflections is easier - you can create a 360-degree blurred panoramic image and use it as a background for the render of your 3D car model - please see below for details on spherical image mode.



### BASIC COMPOSITION ELEMENTS



Background



Car



Wheels

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## TRANSPARENT IMAGES

VirtualRig™ Studio Pro version supports transparent images with alpha channel up to 8-bit (available with TIFF and PNG file formats). The transparency feature is necessary if you need to blur different plans with different speeds. In the example below the forest background is blurred with a slower speed than the front plan (the stones on the bridge and the tree in particular). The two resulting layers were then combined in Adobe Photoshop.

This sample project and all necessary materials are also available in the examples installed with the application (in the "Lexus - Transparency" directory).



Static picture



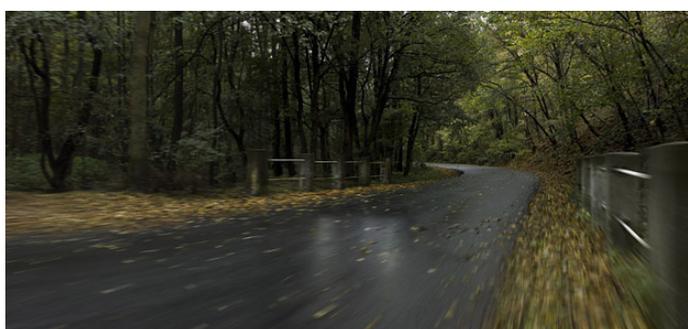
VirtualRig™ Studio layout with blurrers



Transparent front plan blurred in lower speed



Another render in higher speed



Background composition combining different speed  
of front plan and background



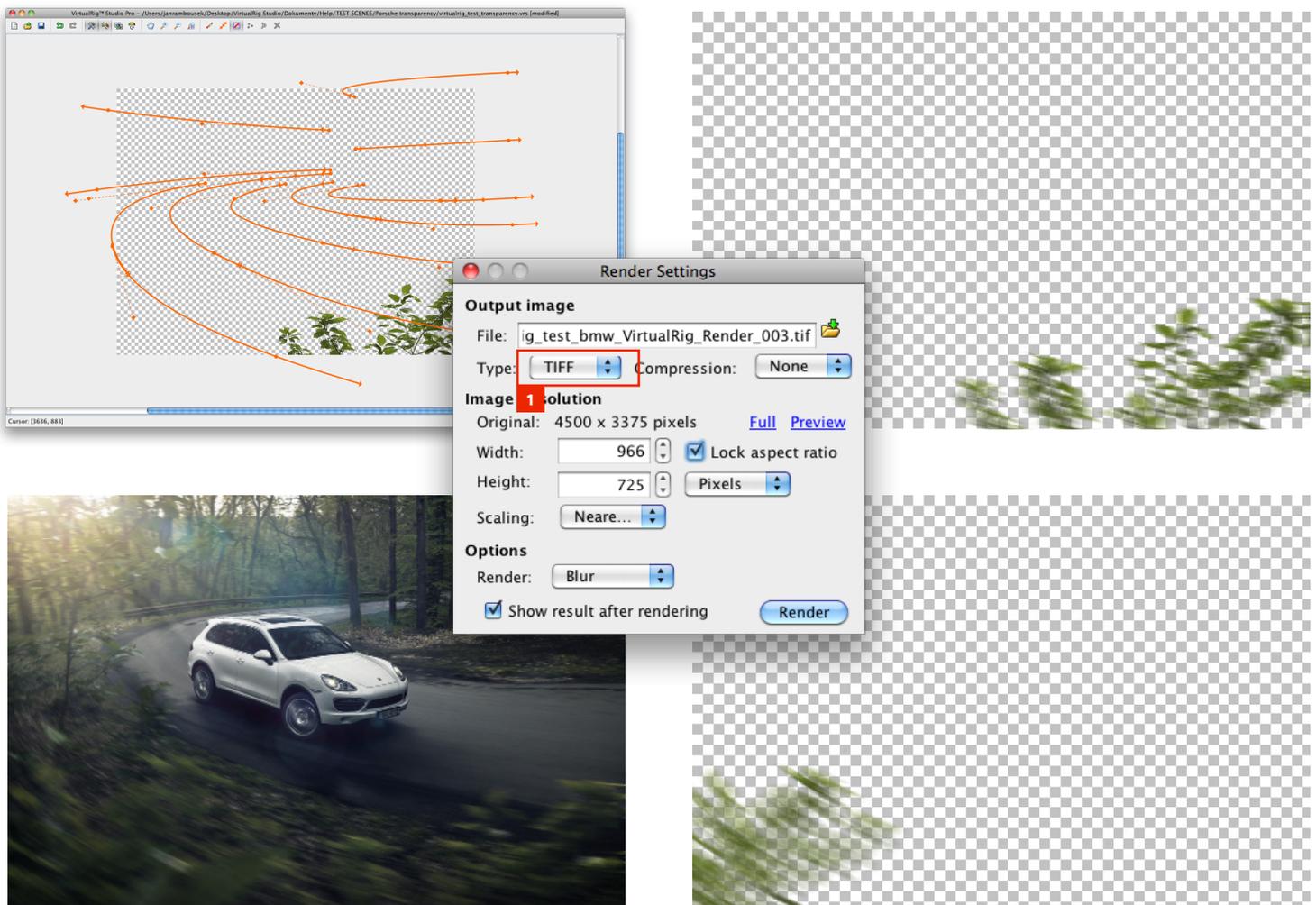
Final composition

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## TRANSPARENT IMAGES

This is another example of use of transparency feature. The bushes in the front of the scene are blurred with different speed setting, and then combined in the final composition using Adobe Photoshop. Please note that the render output type has to be set to TIFF or PNG [1] in order to preserve the alpha channel in the resulting image.

This scene and all materials are available in the examples installed with the application (in the "Porsche - Transparency" directory).



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## HDRI FORMAT AND SPHERES BLUR

VirtualRig™ Studio Pro version supports high dynamic range images (HDRI) in Radiance 32-bit RGBE format. The RGBE format preserves more luminance information per pixel than traditional image formats and thus it is useful to represent high-resolution panoramic images, although panorama and HDRI are independent features. In order to render an HDRI image you need to set HDRI output image file type [1]. Note that this only works if the input image is also HDRI.

The spherical-image mode [2] simplifies blurring of 360-degree horizontal panoramic images. This mode ensures that the right and left sides of the image are blurred the same way so that their connection will be smooth. If the spherical-image mode is activated, the main window will also display mirrored copies of all vectors and blurrers, in order to help you understand how the motion blur will be applied to the image. This sample scene below is included in the examples installed with the application (in the "HDRI Panorama" directory).

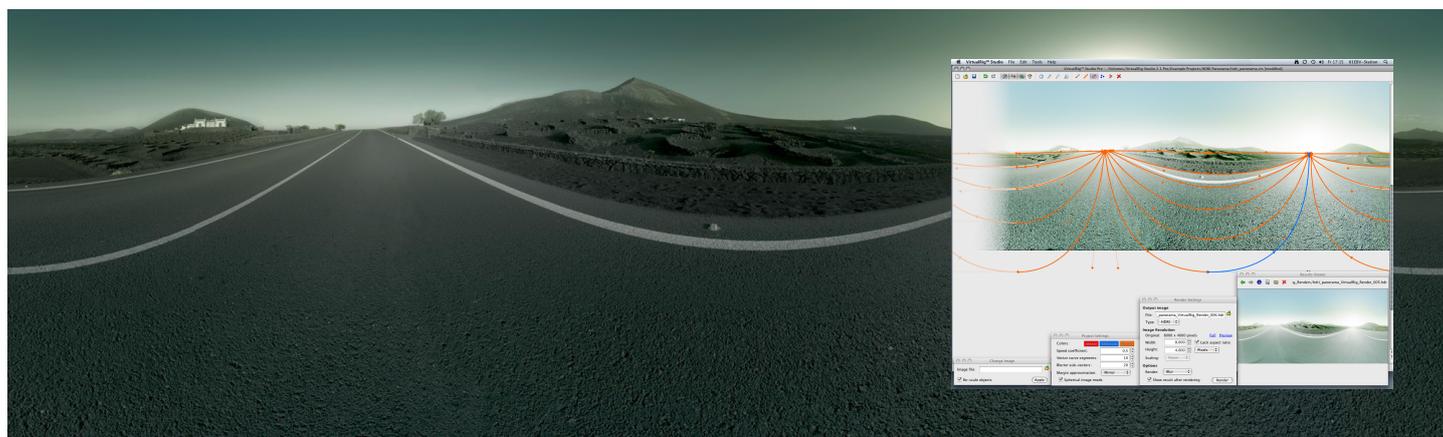
Spherical image mode: OFF

Spherical image mode: ON

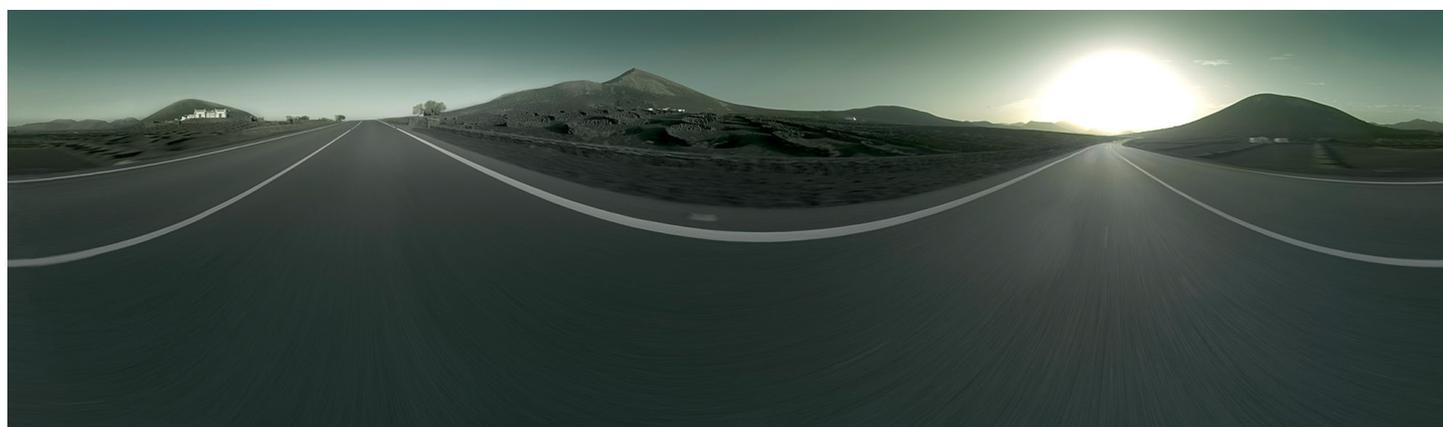
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## HDRI SPHERES EXAMPLE

This is an advanced example of an HDRI spherical image blur to give photorealistic reflections to your render.



Static backplate and the layout of blurrers. Photography and CGI by René Staud Photography.



Blurred HDRI sphere saved into \*.hdr



Static reflection without blurred HDRI sphere.

Blurred HDRI sphere in reflections.

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## KEYBOARD SHORTCUTS

VirtualRig™ Studio provides keyboard shortcuts to help you quickly perform tasks otherwise available in the menu. Most of the keyboard shortcuts is also displayed in the menu next to the command name or when you hover the mouse over the toolbar buttons.

Task	MAC	WIN	ICON
Create new project	⌘ N	Ctrl + N	
Open existing project	⌘ O	Ctrl + O	
Save project	⌘ S	Ctrl + S	
Close project	⌘ W	Ctrl + W	
Quit VirtualRig™ Studio	⌘ Q	Ctrl + Q	
Undo	⌘ Z	Ctrl + Z	
Redo	Shift + ⌘ Z	Ctrl + Shift + Z	
Select and move objects (press and hold Alt key when in drawing mode)	V	V	
Select all	A	Ctrl + A	
Draw new vector	⌘ D	D	
Draw new blurrer	C	C	
Zero vector's length	0	0	
Straighten vector	9	9	
Move canvas view (press and hold Space)	H	H	
Zoom in	Z	Z	
Zoom out (press and hold Alt during zoom)	Alt + Z	Alt + Z	
Zoom to full extent	E	E	
Project settings	P	P	
Change image	I	I	
Render settings	S	S	
Render	R	R	
Results viewer	W	W	



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## CONTACT AND SUPPORT

If you have any questions or comments, do not hesitate to contact us.  
Please send your requests for support to [support@virtualrig-studio.com](mailto:support@virtualrig-studio.com).

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