EVERFLOW STUDIOS
PERSPECTIVE MATCH TUTORIAL VL.1

This tutorial concerns itself with composting 3d elements into a still photograph. This is an effective technique that can help with visualization, for example adding or replacing existing structure with proposed architectural designs. There are many uses for this technique, please feel free to explore them.

We will begin with an initial image. There are many things to consider when it comes to selecting the proper photograph/image to use. In this tutorial, I will assume you have no knowledge of the focal length of the camera, height of the person taking the picture etc. Try to use a photograph that has as little warping as possible (fisheye etc.) as this will complicate things greatly.

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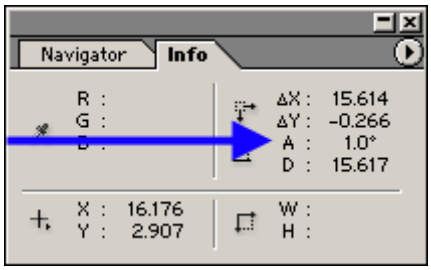
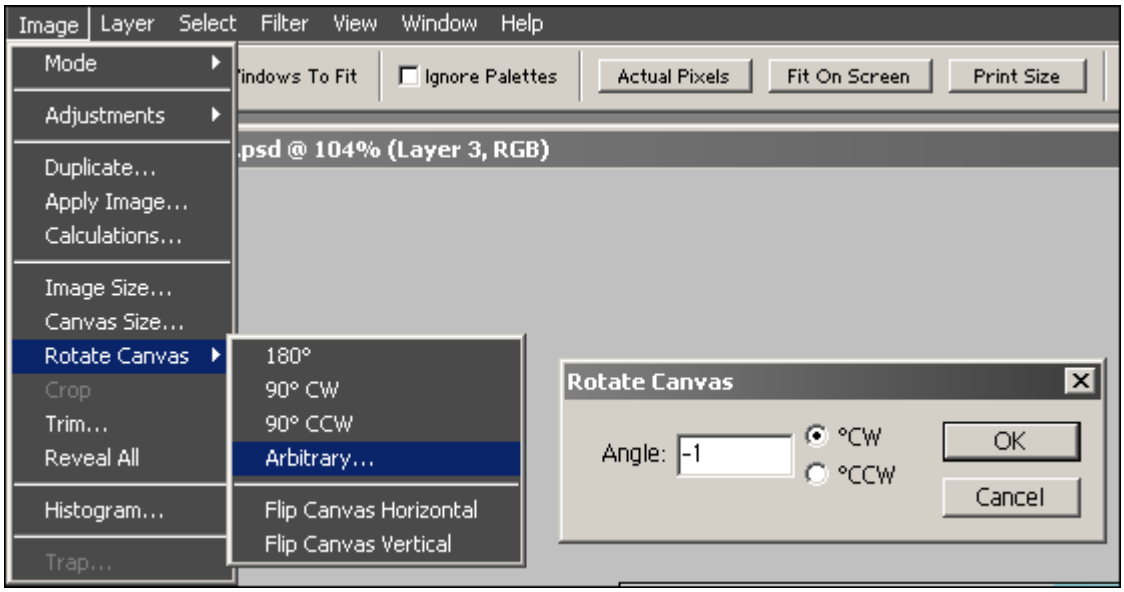
Initial Image

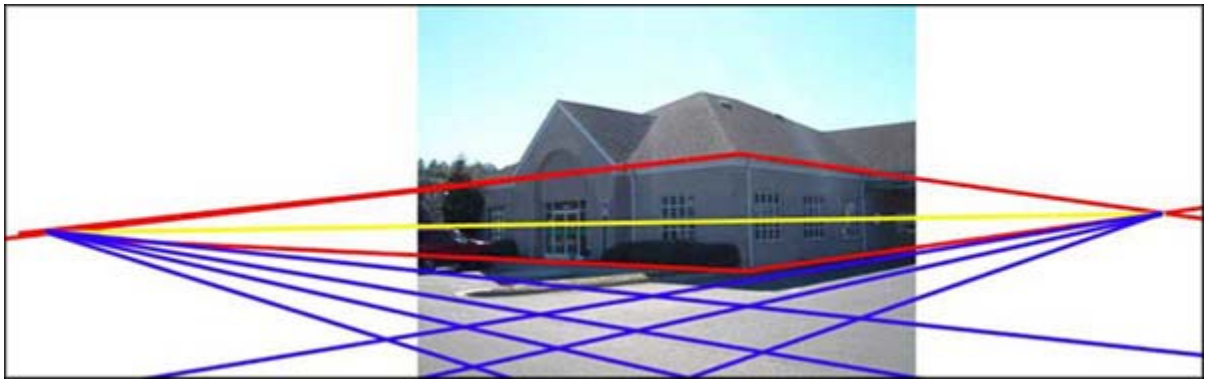
The first thing we need to determine is the horizon line. In this case, we know that the bricks are more or less parallel to the ground plane. The next few steps are done in Adobe Photoshop. If you need a primer in perspective, horizon lines and such, check here.

In order to find our horizon line, we simply intersect two pairs of lines on either side of the image, that follow existing perspective lines. Now create a line that connects our two intersection points. This will be our horizon line. Due to human error, sometimes the line is not perfectly horizontal because the camera was at a slight angle when the picture was taken. When you draw the line in photoshop, pay attention to the angle (located in the info dialog) and rotate your image accordingly. (See below)

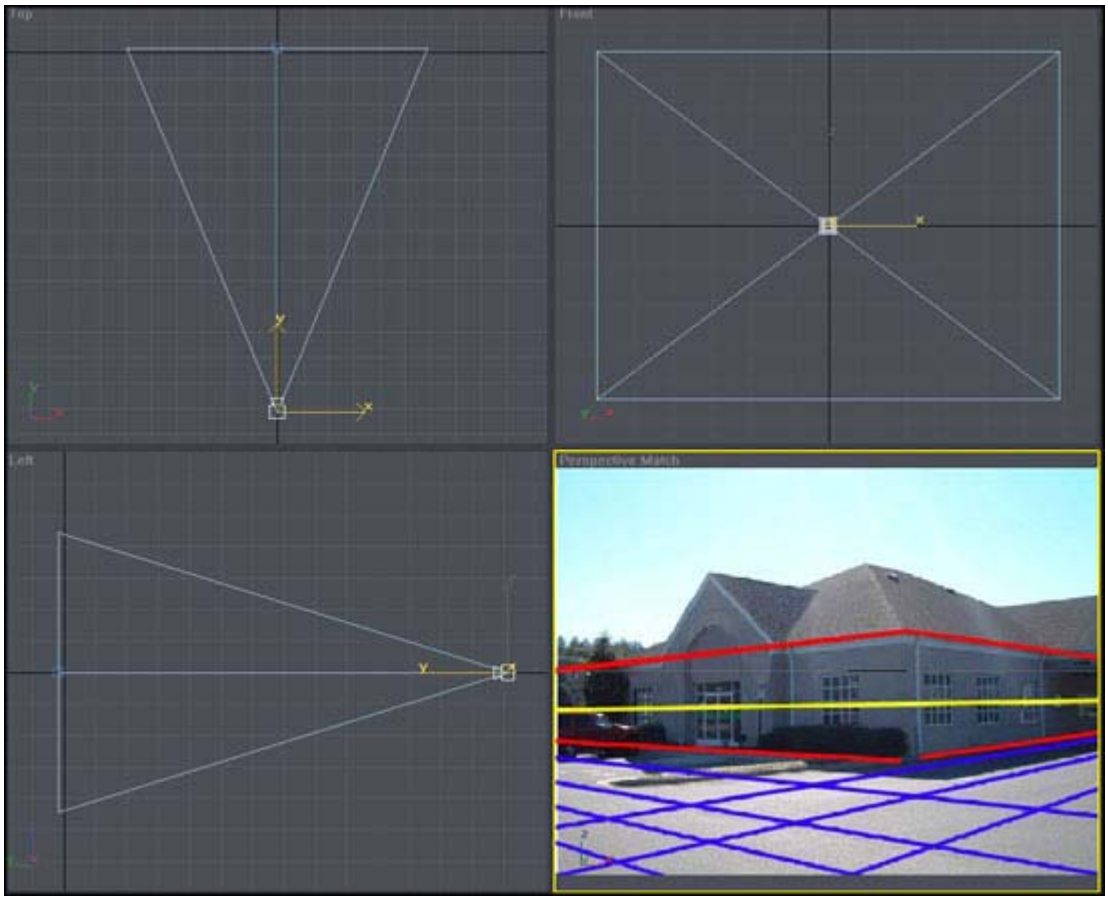


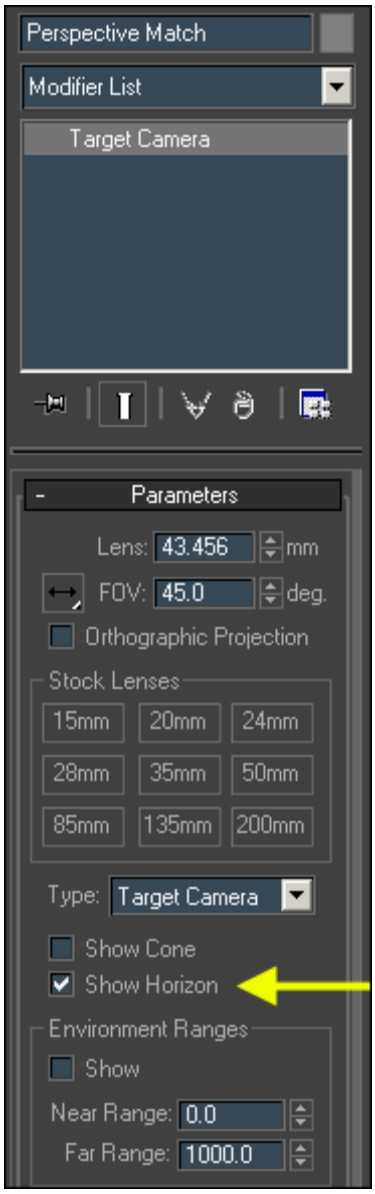


Secondly I create an array of lines emanating from the endpoints so as to create a grid defining the ground plane. This will be the grid that we compare to our viewport grid. It is important to be as precise as possible in this step, making sure you stay true to the endpoints.

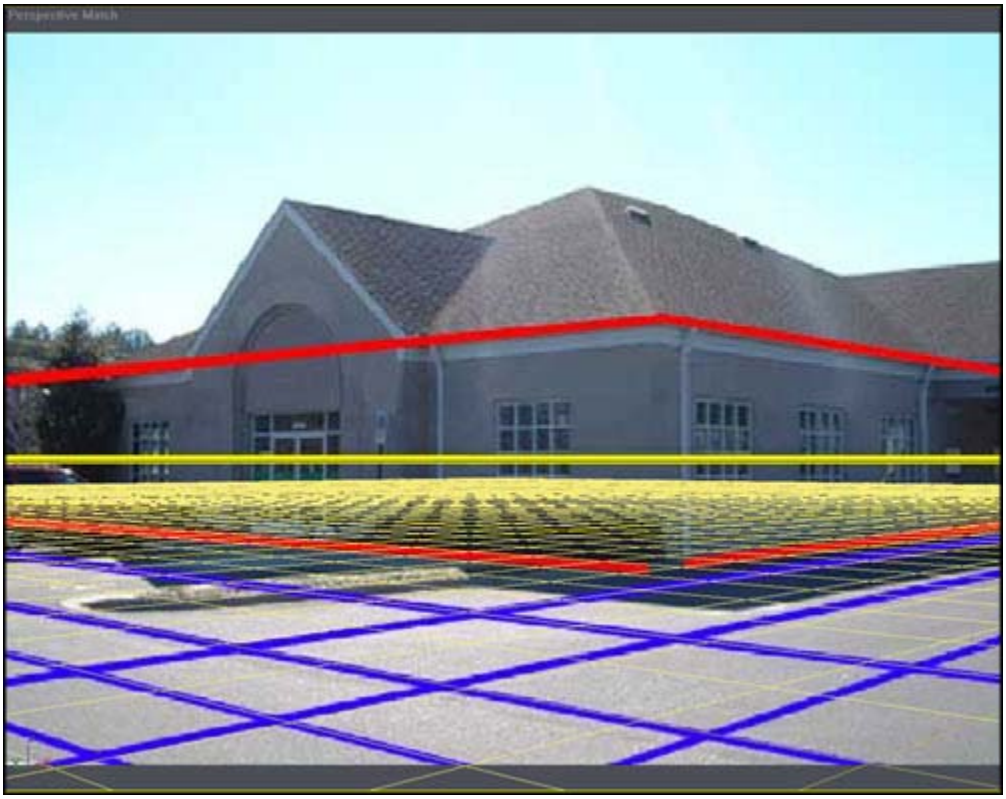


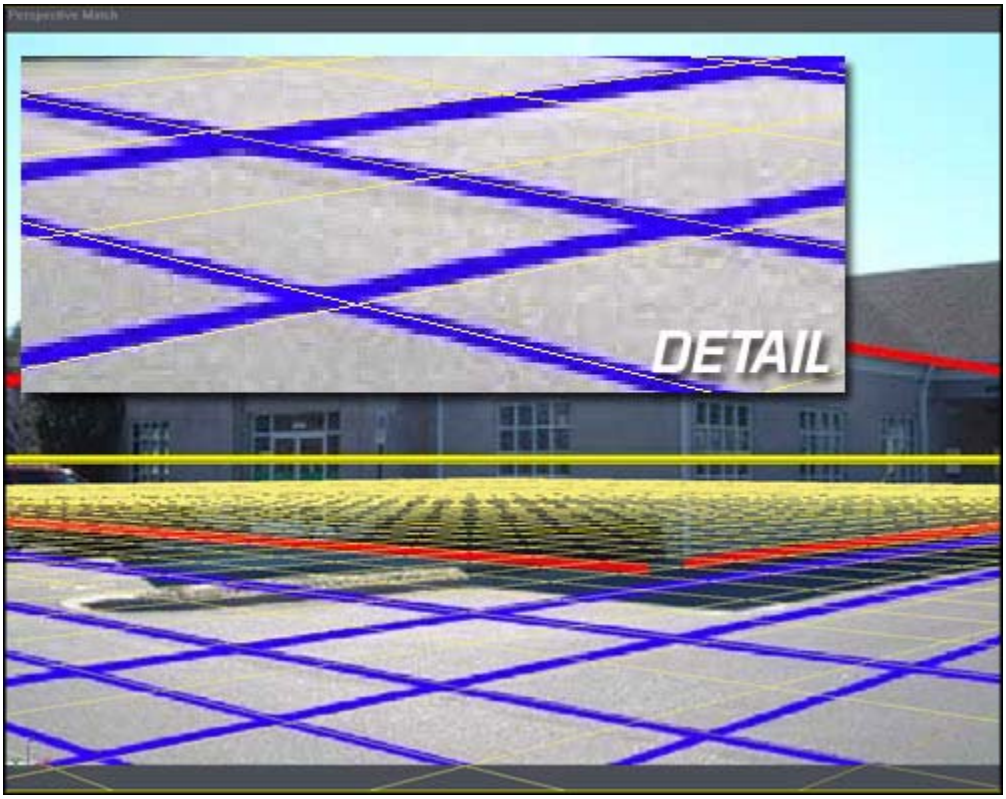
Now that our image is prepared, we can insert it into the background of our camera viewport. Create your target camera perpendicular to our image plane Make the cameras horizon line visible. Select both the camera and the target. Move them vertically either up or down in order to match the images horizon line. Make sure your viewport grid is visible. The viewport grid will represent the ground plane. You may change your grid color so the relationship between the viewport grid and the reference image grid is clearly visible.



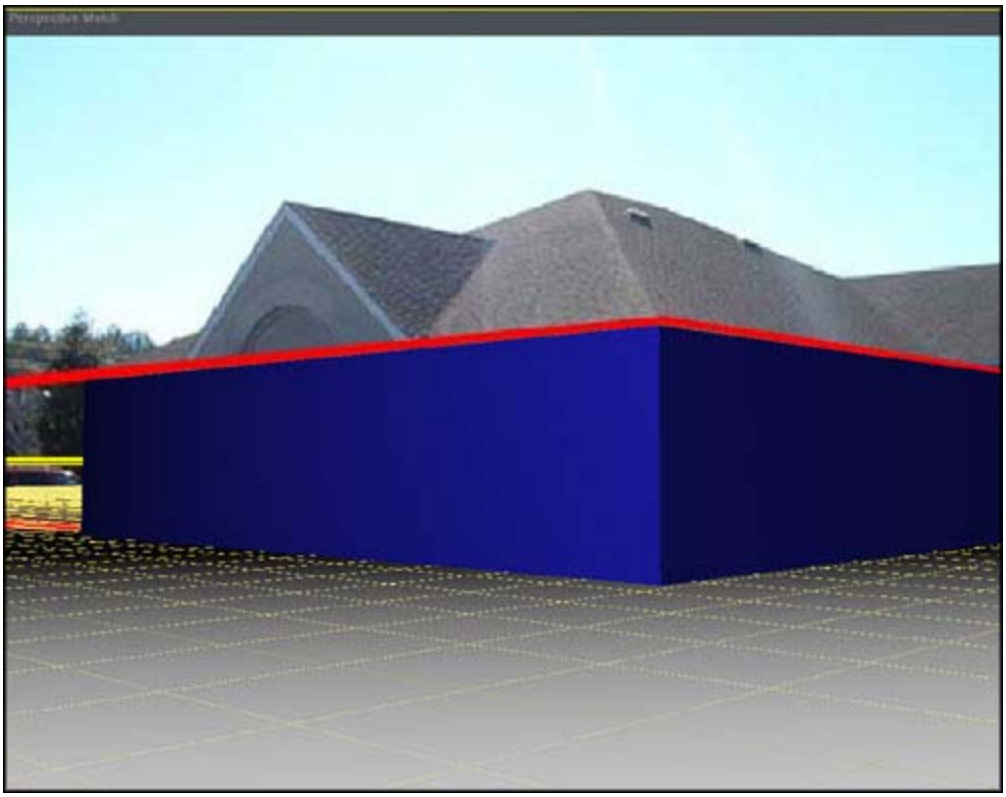


Next is the tricky part. Move your camera until the viewport grid (ground plane) matches the grid you created in your reference image. Make sure you maintain the match between the horizon lines.
When you believe you have achieved a match, create some dummy geometry to represent the structures in the scene. This will allow you to see the accuracy of your match. A plane on 0,0,0 (your viewport plane origin) would be your ground plane. Tweak the lens/field of vision (perspective) as necessary.





Almost there. Note that you do not need to match your grids perfectly, just the relationship between them.



There are a number of variables that will effect the accuracy of your match. The focal length and the perspective of the virtual camera and the reality camera differ, there will be deviations between the two.

Now that you have your camera placed and your dummy geometry in place, you can approximate the lighting. Here is a simple way to visualize the general location of the light source in your scene. Match a point in the scene with the same point on the shadow. (these are represented with two yellow arrows) Connect the two points and you will have the direction of your light source.

To further add realism to your composited elements, make the color of your shadow match the existing shadow color.

Our scene is set up and ready for our 3d elements.

Let me introduce a good friend of mine, the matte material. In 3dstudio, the material is called the shadow/matte material. We will assign this material to our ground plane, in order to 'catch' the shadows of our composited items. (make sure you have accept shadows on) An example of how the matte material is useful is illustrated below. The matte material is handy when you want to mask out areas in the scene that your 3d objects move behind. Below, I built the extruded triangular roof element, and assigned it the shadow/matte material, then placed the ball behind it.

As a final note, it is an artform in itself to get your composited elements to blend realistically with your background. Don't be afraid to rip textures directly from your image, as we did with the color vaules of the shadows. Use blur and pay attention to the saturation of the colors of your composited elements (i obviously didn't ;P)

As always, this is just one way to get the job done, it has worked for me and allowed me to do this type of work extremely quickly. Hopefully it will work for you. Enjoy.

-Bruce