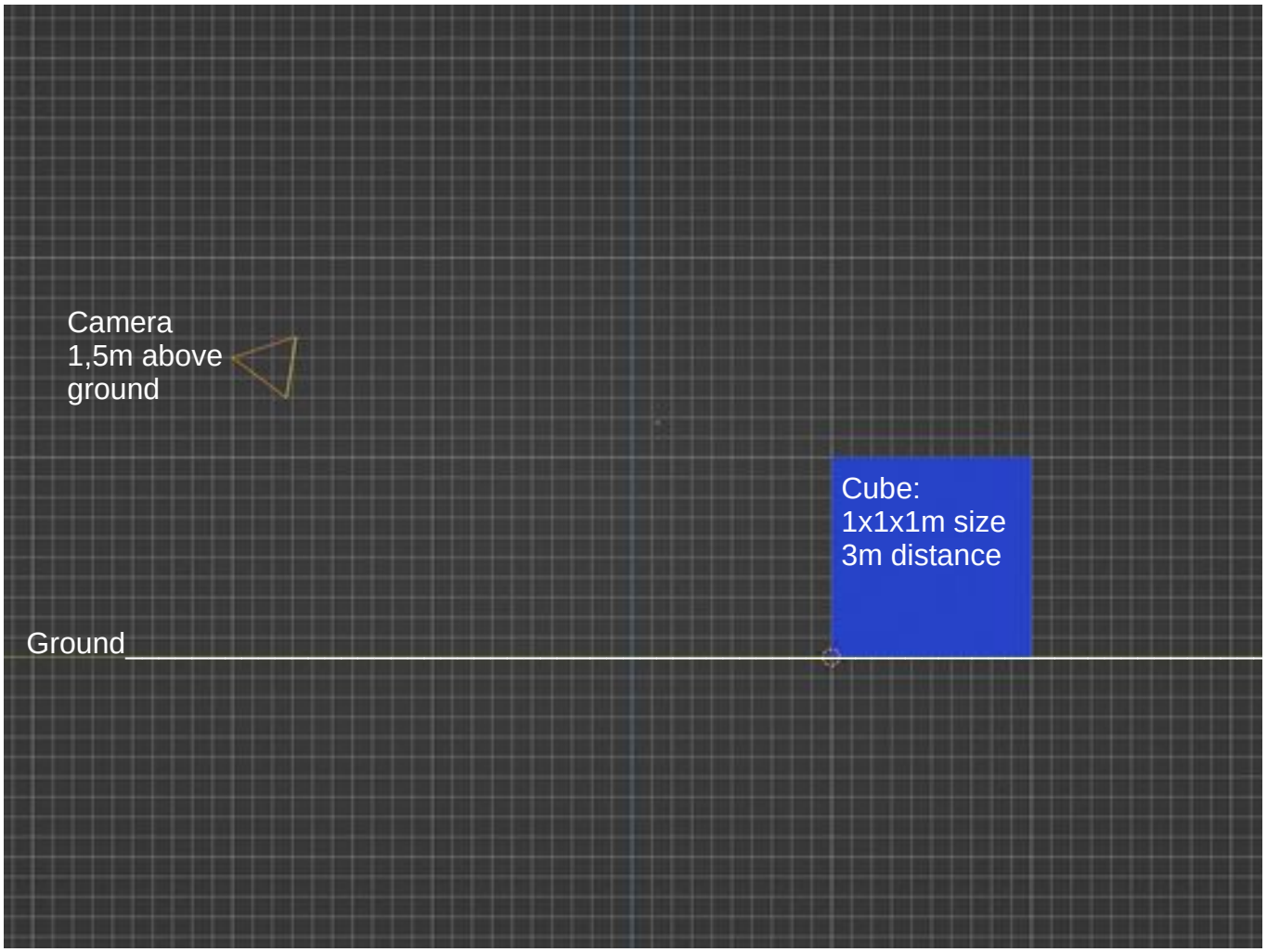
How do I choose the right size for a 3D street painting?

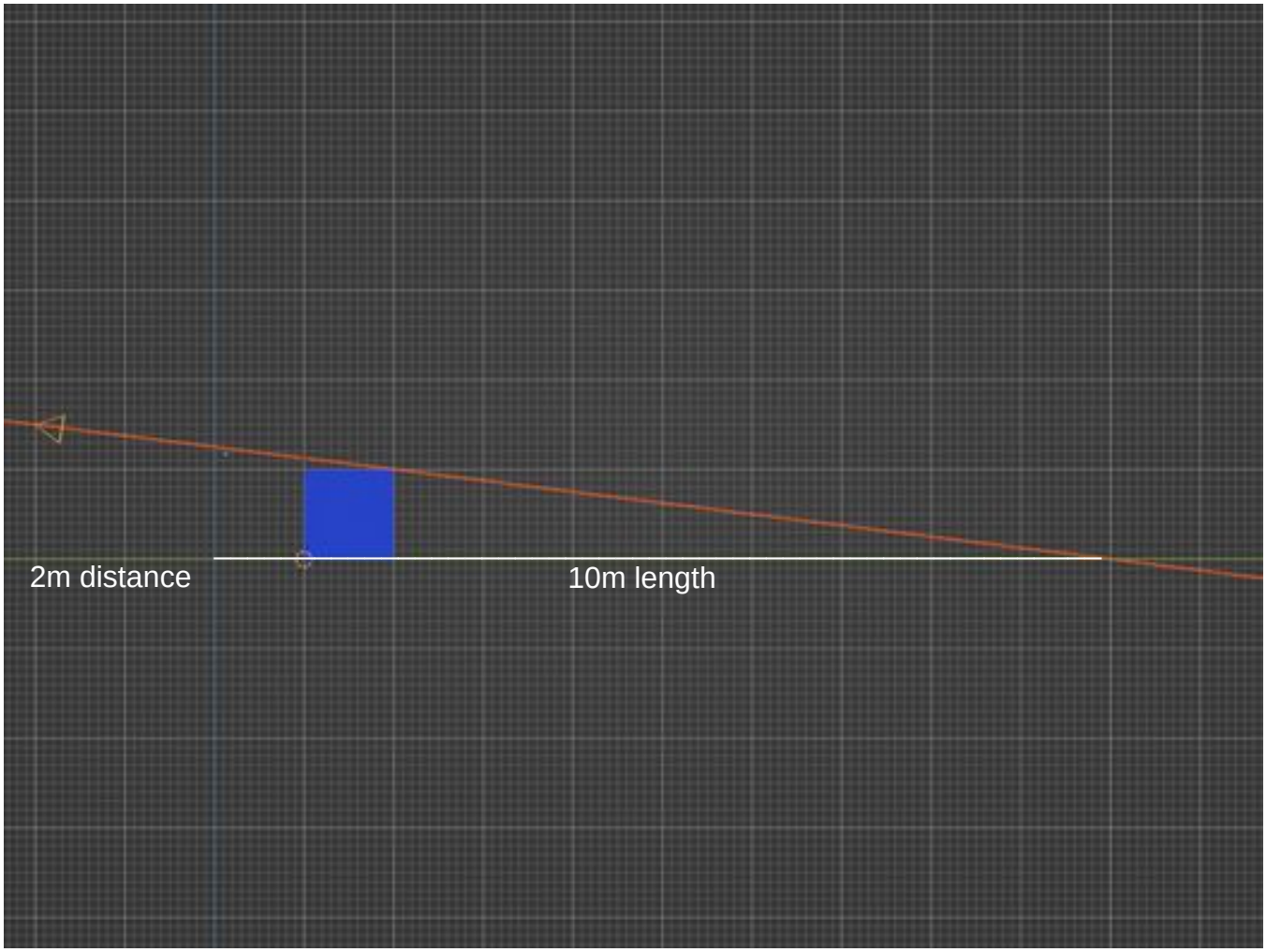
Here I explain when to choose which image size for a 3D painting. Not everything is representable on the ground or only with some tricks which I will come to later. It mainly depends on the size of the object to be painted.

Objects above or on the ground

Suppose we want to draw a cube that is 1x1x1 meter and is placed on the ground in front of us.
The cube should be three meters away from the camera, i.e. where you are standing. The camera is assumed to be placed 1.5 meters above the ground, tilted slightly forward. 1.5 meters is a good average height when shooting with a smartphone. And you rarely hold your smartphone straight. How big does the area to be painted have to be?

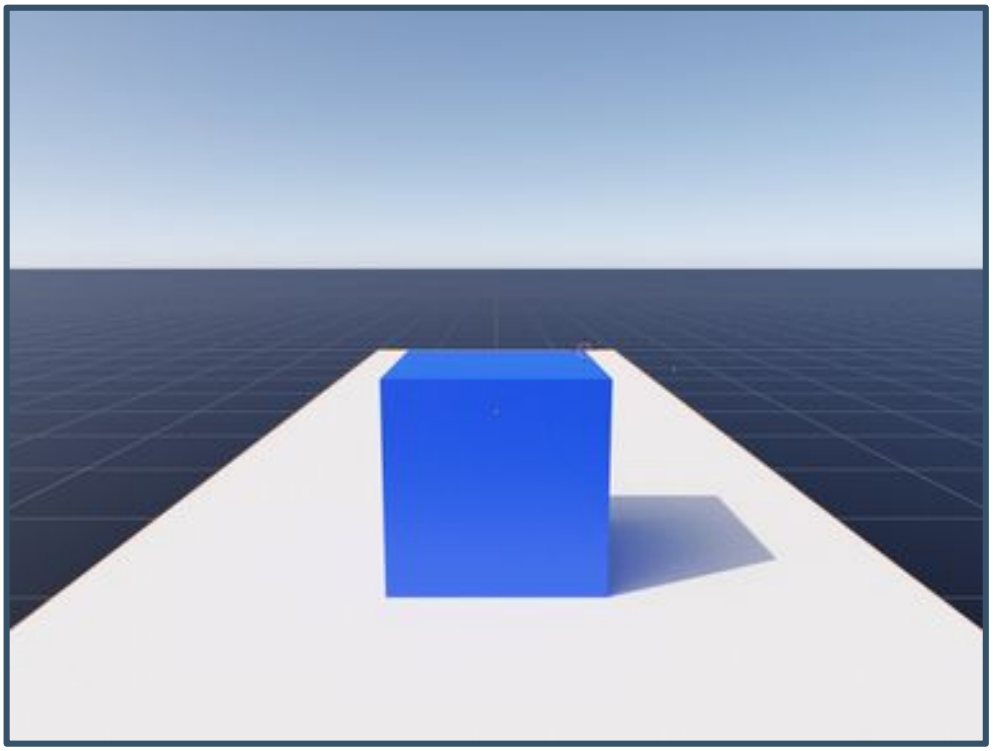


We draw a line that goes from the camera across the back top edge of the cube to the ground. Where this line intersects the ground is the end of the picture plane. That's where our picture will stop. In this case it is 12 meters from the camera.
The camera has to be a little bit away from the beginning of the painting, so that the picture can be photographed from the beginning to the end. Two meters is a good distance to take a 3D painting in most cases. So we come to an image length of 10 meters. Count the boxes on the grid.

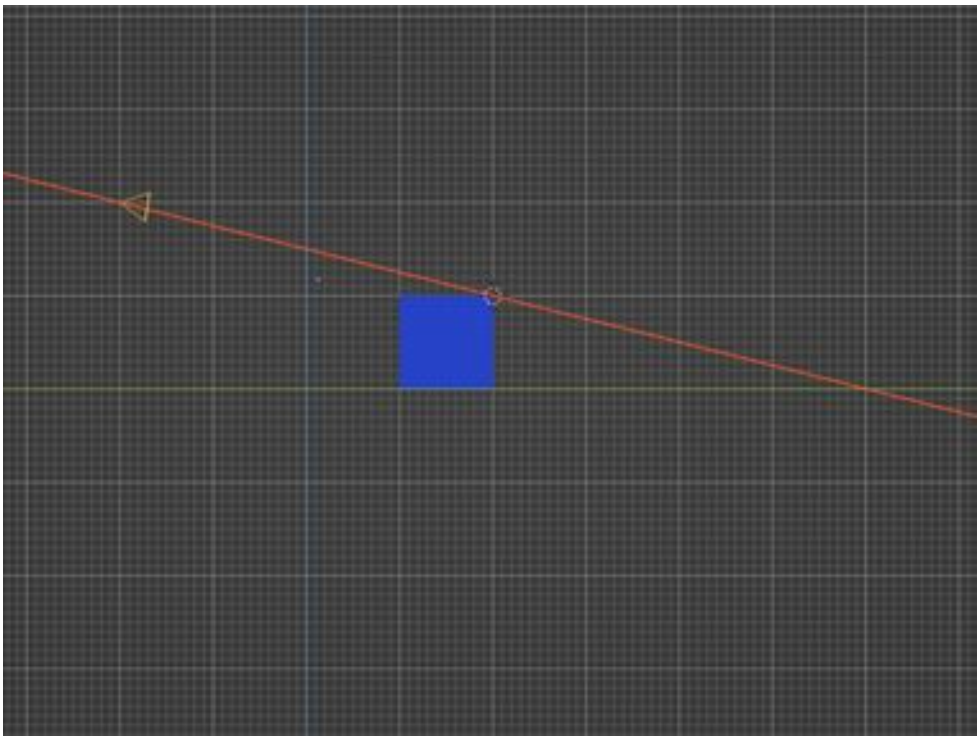


With such a grid you can quickly check how big or long your painting will be.
This can also be done quickly with a sketch, where you roughly draw a grid with 1x1 meter boxes, determine the distance of your camera or smartphone. Then you just have to draw the object in the right point with the right height. Then just draw the line from the camera across the highest point of the object to the ground and you have your image length.

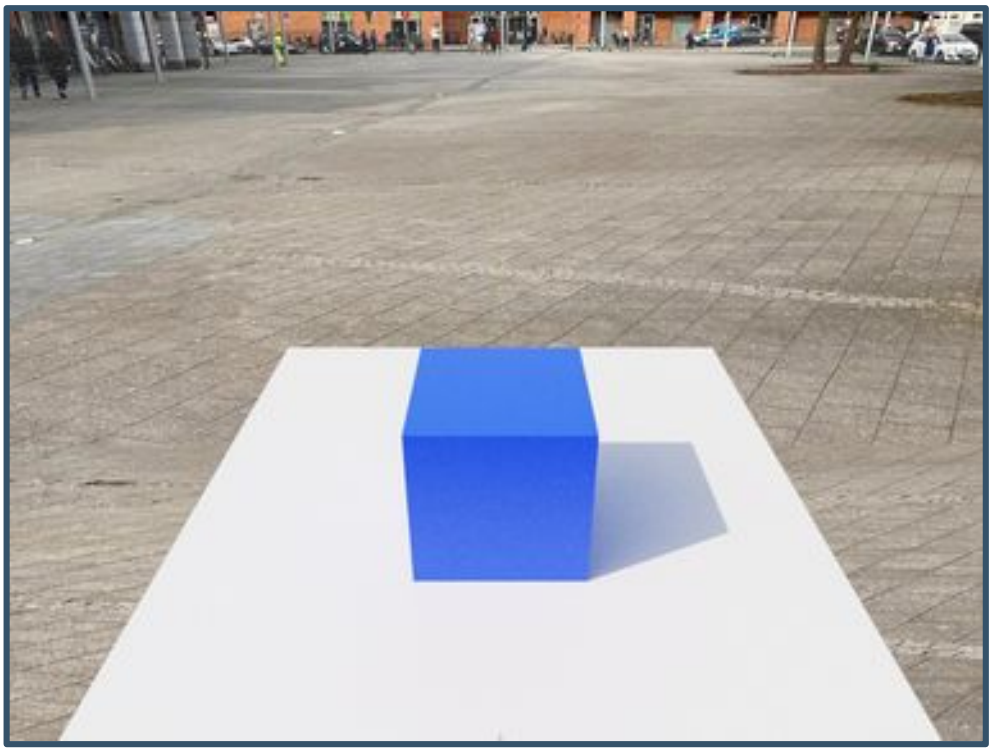
Below is what this looks like from the camera's point of view. The picture area is white and the cube ends exactly at the end of the area.



As you can probably guess, the higher the camera is, the shorter the frame gets. However, in most cases no giant takes pictures. Let's say there is a pedestal or the photo point is higher than the picture area. For example, if you are shooting from a window or balcony, or from a ladder. Even at a viewing height of two meters, the image length is reduced to just six meters. At three meters, the image length is only four meters.



That's great, then I don't need to do such a big painting! Unfortunately, you can rarely photograph from this height. The next picture also shows why it only makes limited sense to set the photo point higher with a pedestal or stage. If necessary, two meters can also be reached with a stretched arm. From three meters and more you need a chair, a ladder or something. And what you can still see from the surroundings in the photo is almost only ground.



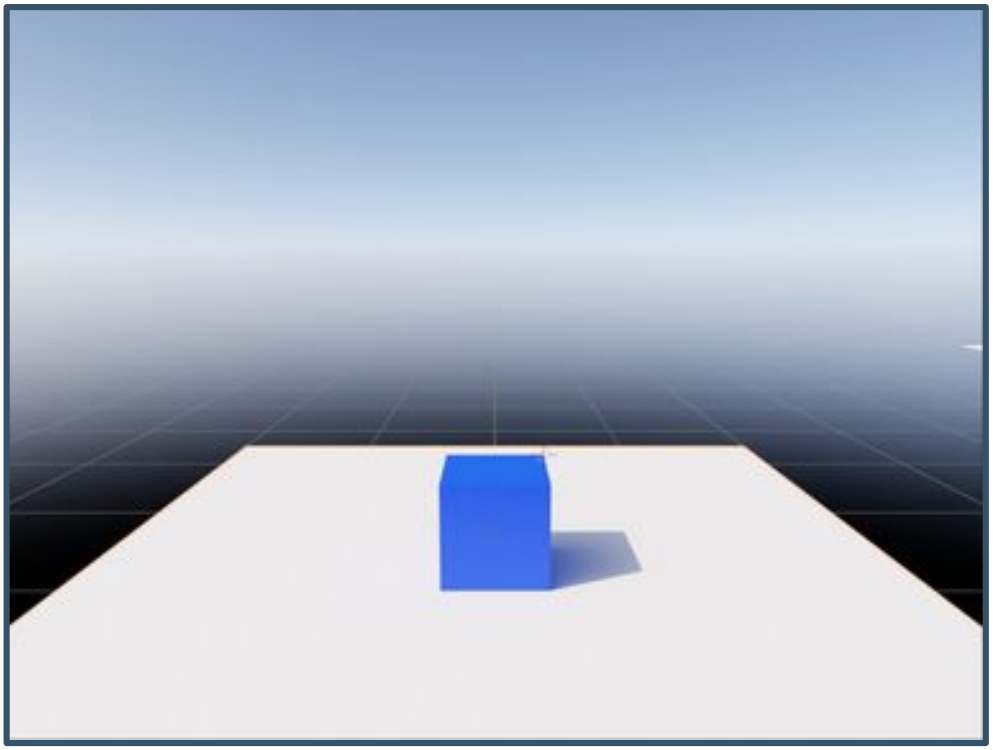
Here the camera is placed at a height of three meters and tilted sharply downwards. Surely you can get by with a picture length of four meters, but does it still look good? In rare cases and with a lot of preparation of the picture for the special situation, this is feasible and sometimes useful.
As a rule, however, one should assume an average height of the camera point. It is 1.5 - 1.6 meters. And then the painting with our cube has to be 10 meters long.

Why have I only mentioned the length of the picture until now? The width of the painting is not quite as important. A 3D picture has to be drawn much more distorted in length than in width.
I'm looking at the picture from the front and not from the side. So the higher everything is, the more distorted it is painted in length.
Here is our example of the 1x1x1m cube with a 5x10m size of the picture from a bird's eye view.

But I have only little space for the picture. Is there a trick?

The good news is yes! As with all tricks, it is not quite as good that the attentive observer recognizes the cheating.

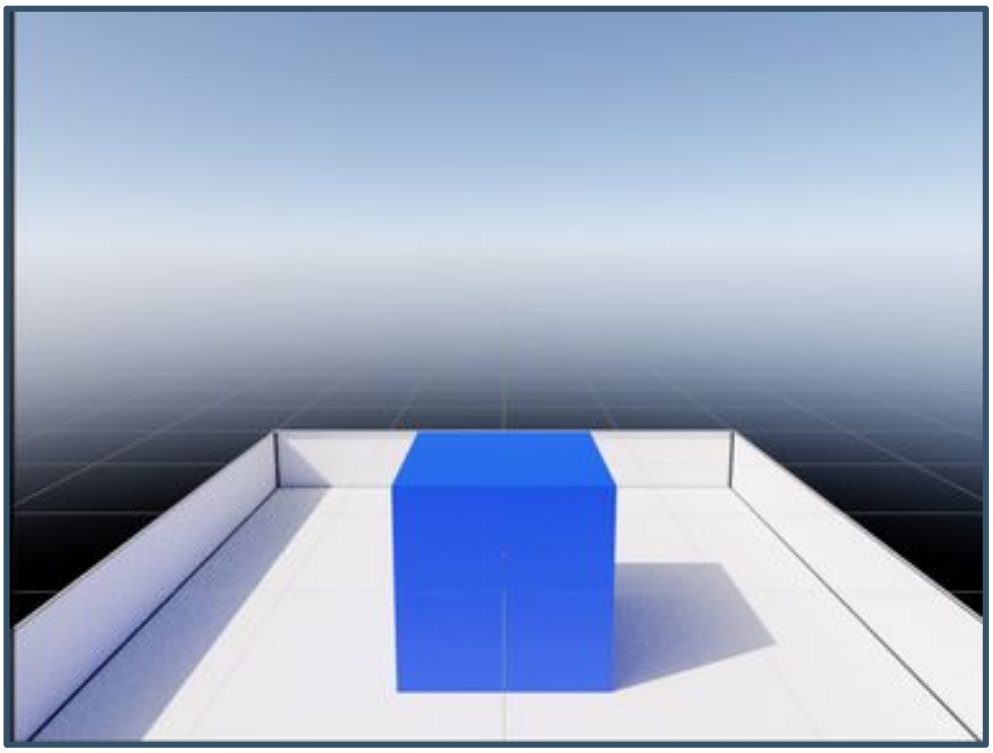
First you can simply paint the cube smaller. Half the size doesn't mean half the painting. If you paint the cube only 0.5x0.5x0.5m in size, just 3.5 meters in length is enough. It's up to you to decide if that matters. If a true-to-scale illustration is not important, you can save a lot of space by scaling the objects.



Of course, this trick has its limitations. At some point it just doesn't look good anymore, or the picture becomes unbelievable because the proportions are simply not right.

Just paint a hole!

The next trick is that you don't paint the cube standing on the ground, but simply put it lower. To do this, you have to offer the viewer something so that he can still perceive the proportions correctly. So let's draw a sink in the ground that's half a meter deep. The cube is 1x1x1m again, but is now in the hole. This means you can get by with a 4x4 meter painting surface. Great, isn’t it?!

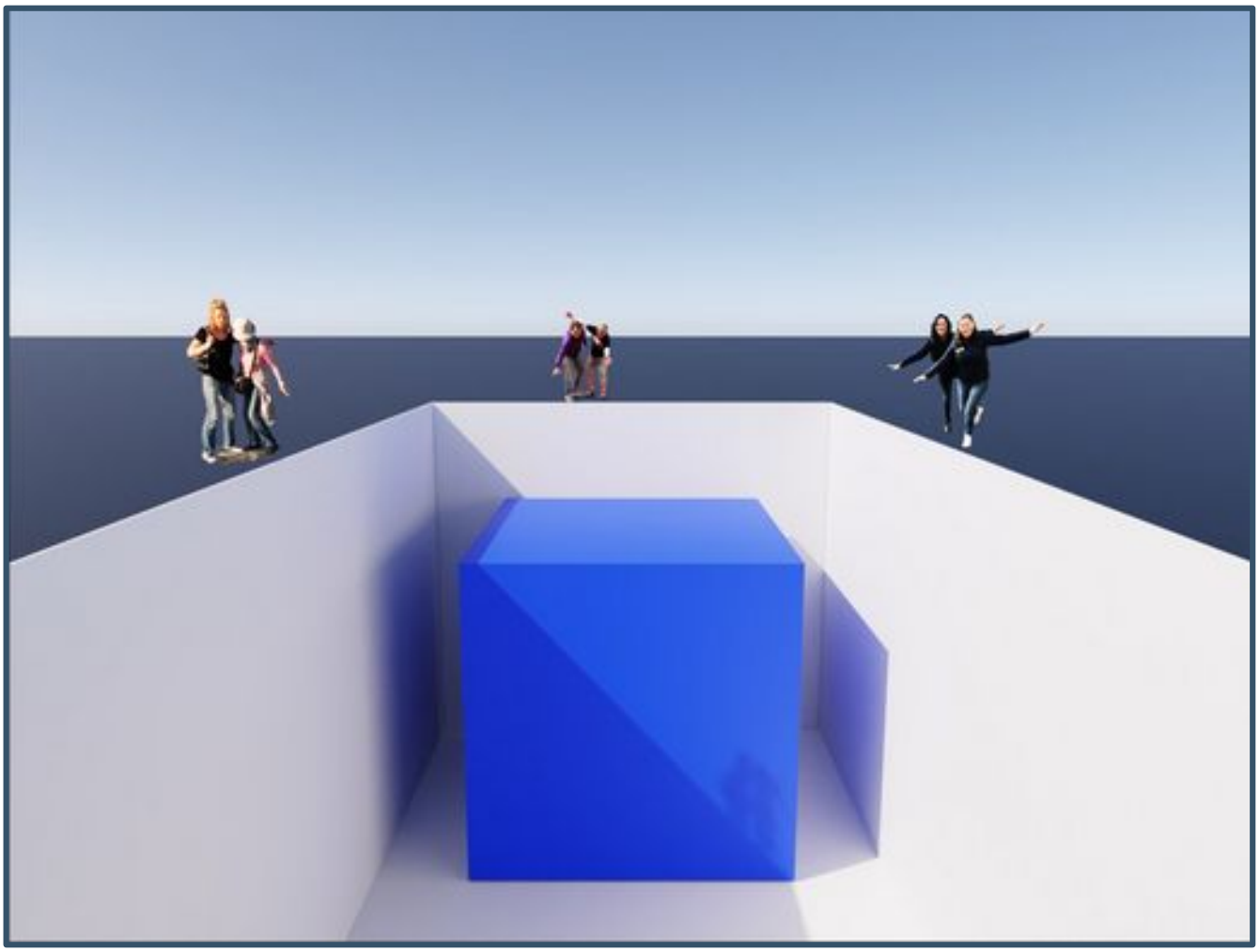


You can really use this perspective trick to the full. Of course, there are also limits here, where the depicted object simply looks too implausible in relation to the actual environment.

This allows you to paint objects that are actually much too large to be represented in a 3D painting.
You remember at the beginning where we put a 1x1x1 cube on the floor? Imagine the cube is 5x5x5 meters. If it's on the ground, you have to go crazy high with the camera. And then it looks funny again because nothing of the surroundings can be seen.

But with the hole trick such a large cube is also possible. Of course, the image size has to be adjusted, but at least it works.

The painting here is eight meters wide and 16 meters long. The cube is 5x5x5 meters and stands on the bottom of the hole, which is about seven meters deep. If you examine the relationship between the people and the cube, you will see that it is in the right proportion.



If you now combine both tricks, the scaling and the hole, then a lot is possible. If you paint the hole open at the bottom, i.e. without walls, you can fool the viewer into thinking that an entire city can be seen from above below.