# Precise (and repeatable) model placement with QR codes

If you have completed either of the Beginner's Guides you may have spent a while trying to position your model with the physical space of your room only to accidentally lose tracking and have to repeat the process all over again. This is tedious and avoidable! If you have access to an A4 printer, you can generate placement QR codes in Fologram that can be physically fixed in space and used to precisely and repeatably place and orient your models in mixed reality.

Generating QR Codes
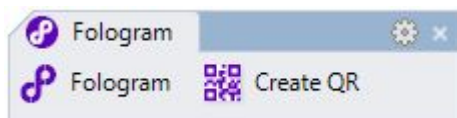
Run the *FologramQR* command in Rhino or click on the Create QR button in the Fologram Toolbar to start creating a position QR code. Rhino will now prompt you to draw a rectangle defining the position and origin of your QR. Type *0,0,0* and hit enter to specify the origin of our Rhino model as the position of the code, then click anywhere in the positive x and positive y quadrant to set the orientation of our code.

Now we can specify some properties for our QR code. The *Include_Rotation* property lets us specify whether to use the orientation of the QR code to set the rotation of our model, or whether to simply specify the location. The *Code_Size_Millimeters* property allows us to create codes of any size. Large codes will track better from far away, small codes may be more convenient. The default size of 180mm is a good size for printing on A4. We can also specify a page size for the PDF and optionally include a screengrab from Rhino to remind us where the code is supposed to go. Hit enter to accept the default settings and create a PDF. I've also attached the QR code to this article - it is useful for placing the origin for *any* model.

Generated: 11/02/2020 1:52:19 PM
Size: 180mm (A4)
Border: 5mm
Content:
{"Size": "0.18", "Pos": "0, 0, 0", "Rot": "0, 0, 0", "Up": "3"}

Placing your model on the QR code

OK - now print your PDF at A4 and be sure *that you print at 1:1 scale*. Don't shrink to fit! Use some tape to fix the QR code on the ground where you want to place your model origin.

Launch Fologram and load a model or connect to Rhino. On mobile, tap the Edit ⬚ button then tap the Snap 🔳 button to begin scanning for placement QR codes. On HoloLens, tap and hold to open the menu then tap Snap. Position the code within the camera frame on your screen and hold your head or phone steady until you get a confirmation message that your model has been placed. Avoid doing this in bright sunlight, or with shadows across the QR code that can interfere with tracking.

Making adjustments and re-placing

You can move the code around if you like, just tap the Snap button again to re-place in the new position. If your device loses tracking after walking around the model, or you start to experience some drift in the model from its correct location (this can often happen when filming someone work with the HoloLens, where differences between what you see on mobile and what you see on device become quite apparent), just re-place the model on the marker to correct it.

Presenting your mixed reality experience on multiple Hololens and mobile phones

Fologram allows you to share your mixed reality experiences with anyone else with the Fologram for Mobile or HoloLens app by adding their device to your Fologram session. To do this, click the *Connect a Device* button in the Fologram for Rhino plugin window. Now launch the Fologram app on the HoloLes, phone or tablet you want to connect and scan the connection QR code when told to do so.

Placing shared models in the same location

By default, each connected device will be able to place the Rhino model anywhere they like. This means that your mixed reality experience won't necessarily appear in the same place for everyone. To place the model in the same spot for all connected phones, use a placement QR code (from the last article) and ask everyone in the experience to snap their model to the code. Voila!

Shared modelling scenarios and interaction

Models are interactive by default, so anyone connected will be able to move Rhino objects around, toggle layers on and off, or scale the model (when Sync is switched on in the Fologram for Rhino plugin window).

4 ways to stream, film and share your mixed reality experiences

Mixed reality experiences are best when they are shared and everyone in the audience can engage and participate. It is also useful to create high quality video of mixed reality experiences for use in project documentation, presentations and teaching material. Here are four simple ways to capture and share mixed reality experiences with Fologram.

1. Recording video from Fologram for Mobile

You can record a first-person view of what you see by tapping and holding the record button (circle) in the bottom bar of the Fologram for Mobile app. Once recording starts you can release your finger and interact with the app as normal. Tap the record button again to stop the recording and save it to your device. Fologram recordings are saved in the DCIM / Fologram folder on Android devices and in Camera Roll / Fologram Album on iOS.

If you have multiple devices connected to the same experience, make sure all devices have placed their model in the same position using a QR code to ensure recording interaction with holograms (especially on the HoloLens) is an accurate representation of the experience for other users.

2. Record your screen on Mobile

Most modern phones support screen recording that will allow you to capture video of the Fologram UI (layers, sliders, menu etc) as well as first person mixed reality footage. This can be especially useful for demonstrating what the experience of the app is like. On iOS devices, follow Apple's step by step guide for screen recording. On Android, download a screen recorder like MNML and follow the app instructions to record your screen.
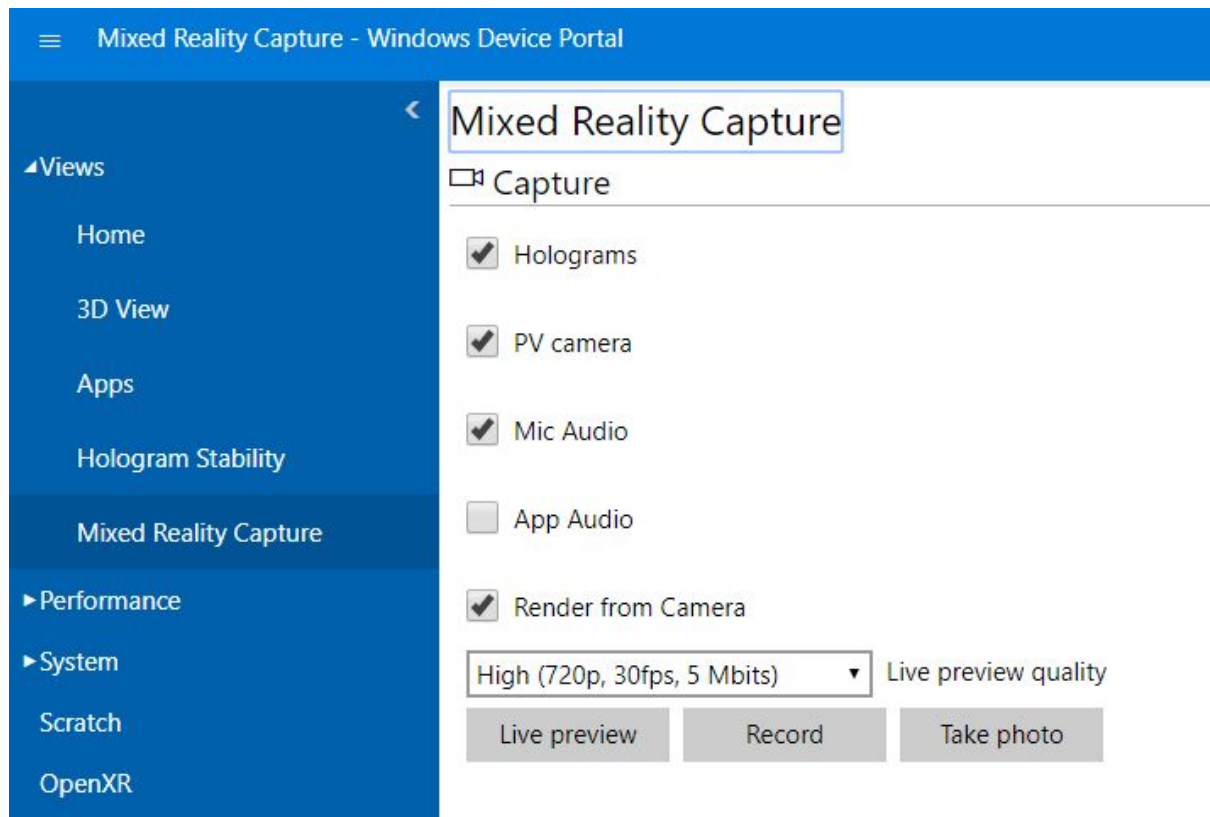
3. Streaming and recording mixed reality capture from the HoloLens using Device Portal

Fologram makes it easy to access device portal and stream what you see through the HoloLens. Once you've started Fologram on the Hololens and connected to Fologram for Rhino, click on the device name in the Fologram for Rhino plugin window to open device portal. You will need the user name and password for your device from the administrator to log in. Then click on Views > Mixed Reality Capture to open the capture window, and click Live Preview to stream first person video from your HoloLens. To save a recording of the stream, click Record instead. You can download the recording from your HoloLens from the list of videos and photos at the bottom of the window.

4. Streaming using Miracast

You can stream first person footage from the HoloLens to a Miracast enabled display in real time by tapping the Connect icon 🖵 from the Windows Home menu on the HoloLens. If you want to stream to your laptop of PC you might have to enable projecting to your PC first. Check out this guide from LaptopMag for how to do so.

For more ideas for capturing and streaming media from the HoloLens, check out Microsoft's article on Holographic Capture.