

# ArcGIS Image Analyst Stereo Mapping Tutorial

Available with ArcGIS Image Analyst extension in ArcGIS Pro.

ArcGIS Pro provides the capability to compile three-dimensional (3D) feature data in a stereo viewing and mapping system. This enables you to visually analyze imagery and collect 3D features of interest. The main applications of photogrammetric stereo techniques are the identification, measurement, and manual digitization of 3D features such as buildings and infrastructure from vertical overhead imagery.

This tutorial introduces how to set up the stereo environment, collection of stereo images in your project, then how to compile and edit features in the stereo display. We will follow a workflow approach, where you will set up your stereo environment, use the stereo map to view the stereo model, create 3D buildings, and view your buildings in a scene. This workflow has five steps:

1. [Download sample data](#)
2. [Set up the stereo environment](#)
3. [Set up your stereo map collection](#)
4. [Edit features in a stereo map](#)

Collecting and editing 3D features in stereo leverages the existing editing tools in ArcGIS Pro. After setting the stereo model and adjusting other stereo-related parameters on the Stereo Map tab, you can switch to the Edit tab to collect features. Stereo 3D feature editing supports concurrent editing and versioning. You can edit points, multipoints, polylines, and polygons as follows:

- Create features using the **Create** tool.
- Modify features using the **Modify** tool.
- Define XY tolerance for snapping.

For more information about editing, see [A quick tour of editing](#).

The z-coordinate of the stereo map is based on the stereo model of the source data, which is the z-coordinate at which the stereo images will be adjusted. At ArcGIS Pro 2.1, in order to collect features, you need to create the feature classes with the following vertical coordinate system:

- For satellite data sources, define the vertical coordinate using Ellipsoidal WGS84.
- For aerial and drone data sources, define the vertical coordinate as same coordinate system as your GPS or GCP control points.

## Prerequisites

1. ArcGIS Pro 2.1 or higher
2. Local access to Drive c (c:\)
3. Internet access
4. You must have either active shutter eyewear or anaglyph 3D glasses.
5. If you are using active shutter eyewear, you will need the [appropriate hardware](#)

## Download sample data

The Stereo Mapping sample data is comprised of a mosaic dataset over the area of Hollywood, California. It contains 78 aerial images captured by the Ultracam – Vexcel sensor, at a ground sample distance (GSD) of about 4cm. The mosaic dataset containing the stereo imagery already has the stereo models built. The sample dataset also includes the 78 source image files and associated metadata files, DEM and ArcGIS Pro project files.

1. In a web browser, open the [Stereo Mapping Sample Data](#) website.
2. Click the Download button. Optionally right-click the .zip file and click Download.
3. Once the download is complete, unzip the .zip file to C:\
4. Confirm c:\SampleData\Vexcel-Hollywood\0\_MosaicDataset\VexcelHollywood.gdb exists.

Now you have sample data to use in your stereo workflow.

## Set up the stereo environment





To display data in stereo mode in ArcGIS Pro, you need to turn on the correct stereoscopic mode. This task only needs to be performed once, and the application will always use this mode for new projects you create until you change modes.

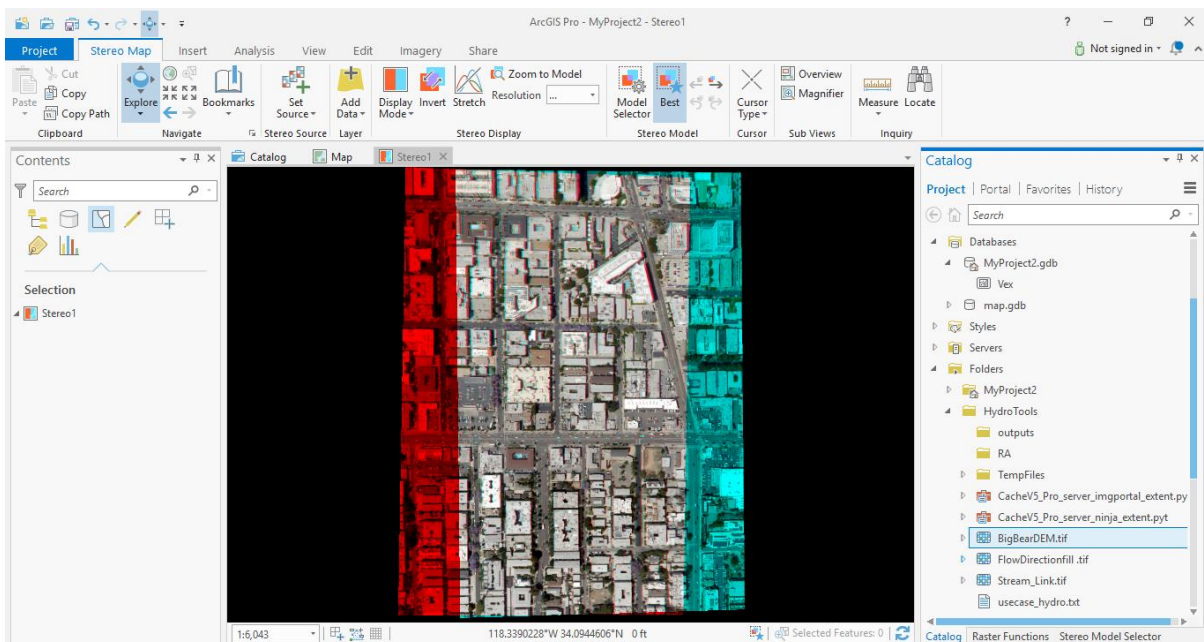
1. Click the **Project** tab.
2. Click **Options**.
3. Click the **Display** tab.
4. For **Stereoscopic mode**, choose either **3D cyan/red glasses** or **3D shutter glasses**, depending on the type of eyewear you are using. If you are using shutter glasses, make sure that your system meets the display [requirements](#).
5. Click **OK** and wait for the program to restart.

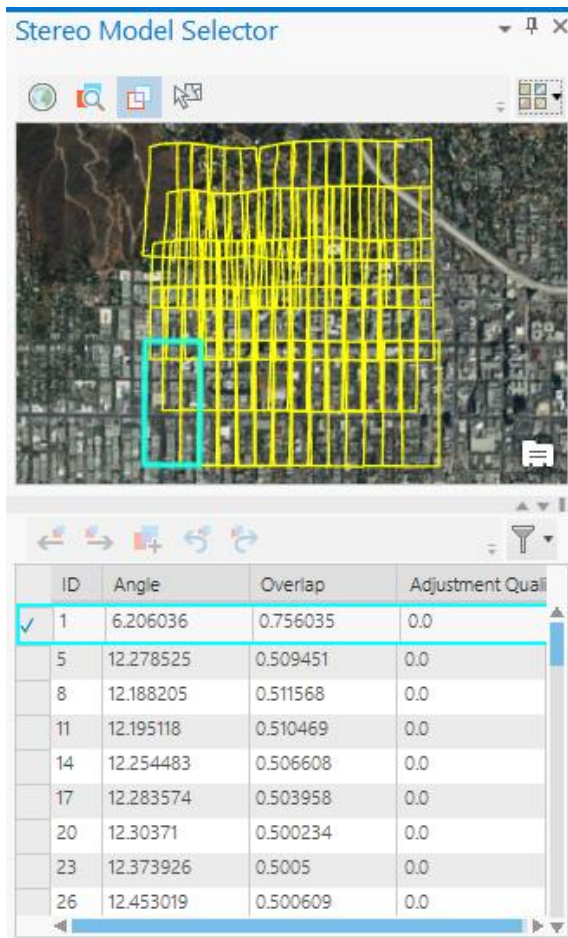
ArcGIS Pro is now ready to display data in stereo using the type of stereo viewing glasses you have specified.

## Set up your stereo map collection


The mosaic dataset sample from the data download site is a mosaic dataset that has a stereo model already built.

1. Click the **Insert** tab.
2. Click the **New Map**  drop-down arrow and click **New Stereo Map** .
3. On the **Stereo Map** tab, click **Set Source** .
4. On the **Set stereo source** dialog box, set **Source Type** to **Stereo model collection**. This option filters the browse results to show only mosaic datasets.
5. Click the **Browse**  button and browse to `c:\SampleData\Vexcel-Hollywood\0_MosaicDataset\VexcelHollywood.gdb` and choose the `VexcelHollywood_Stereo` mosaic dataset.
6. Click the mosaic dataset, and click **OK** to select it.
7. Click **OK** to close the **Set stereo source** dialog box, and load the mosaic dataset with a stereo model.
8. Wear your stereo glasses so you can see the stereo pairs in 3D.





9. When a stereo model selection is added to the stereo map, the **Stereo Model Selector** pane is available. The **Stereo Model Selector** pane is used to select the stereo pair that you want to work with from your mosaic dataset source.









Once you have selected the stereo pair you want to work with, you can set it as your stereo source and add it to the stereo map using the **Add to stereo** button 

10. Use the map navigation tools to zoom in and pan around until you focus on the object of interest, such as the rooftop of a building. Press and hold the Ctrl key and scroll the mouse wheel to zoom.
11. Temporarily change the stereo pointer mode from **roaming** to **fixed** by pressing **F8**. This allows you to navigate the map without clicking the mouse.
12. To return to roaming mode, press **F8** again.
13. If necessary, adjust the x-parallax by pressing and holding Ctrl+Left Arrow or Ctrl+Right Arrow until the objects look clear.

Your stereo environment is now set up with a stereo pair. You can start your 3D editing workflow. [Click here for more information on stereo map navigation and keyboard shortcuts](#) (see end of help topic).

## Edit features in a stereo map

Now that your stereo model is set up, you are ready to collect 3D features in stereo mode.

1. Add any feature classes you want to edit. You can add existing feature classes using the **Add Data** button , or you can create a new feature class.
2. Optionally open the **Magnifier**  and **Overview**  windows to help you navigate around the stereo model.
3. Click the **Edit** tab to view all the editing tools.
4. Turn on **Snapping** . The XY tolerance, in the **Snapping Settings**, controls the snapping tolerance for 3D feature collection.
5. Hover the cursor over a corner of the base of a building structure and rotate the mouse wheel to adjust the z-coordinate. To increase the z-value, rotate the wheel backward. To decrease the z-value, rotate the wheel forward. You will have the correct z height when your two stereo cursors are positioned over the same location in the left and right images.
6. Click the **Create Features** tool  to open the **Create Feature** pane. For more information about editing, see [A quick tour of editing](#).
7. In the list, click the feature class where you want to save the edits.
8. Click the **Polygon** tool , and create the necessary vertices on the display by controlling the floating mark. To finish the feature, right-click and click **Finish** , or press the F2 key.
9. Once you finish collecting your features, click the **Save Edits** button .

You have completed creating 3D features. You can load the features and view them in map and scene view.

### Related topics

- [Introduction to stereo mapping](#)
- [Stereo mapping in ArcGIS Pro](#)
- [Stereo map](#)
- [Stereo Model Selector pane](#)
- [Stereo map navigation](#)