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CES501859

Discovering the Mysteries of AutoCAD Raster Design

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Learning Objectives

- Learn about the tools in AutoCAD Raster Design to help you spatially insert, manage, and view images
- Learn about how AutoCAD Raster Design can assist you with editing and cleaning up raster images
- Learn how raster to vector conversions including OCR, can be done using AutoCAD Raster Design
- Learn about how AutoCAD Raster Design uses a tool called Raster Entity Manipulation for faster raster entity editing

Description

The AutoCAD Raster Design toolset is one of those modules for AutoCAD software and industry-specific AutoCAD-based applications that doesn't get much attention. Many AutoCAD users, even experienced ones, are often unaware of the power and capabilities of AutoCAD Raster Design. Let's walk through this set of tools and see what it can do for you.

Speaker(s)

R.K has worked in the Civil Engineering/Survey fields for over 25 years and currently serves as the Customer Service Manager for a leading civil engineering firm based in the U.S. R.K. has over 20 years' experience in application development and training classes for various CAD applications. R.K. created CAD Panacea (http://cadpanacea.com) in 2005 as a resource for CAD users all over the world. He is a charter member of the Autodesk Expert Elite and a member of multiple Autodesk Customer Councils.

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Inserting Images

In years gone by many drafters and designers would have received aerial imagery from some service entity, either internal or external. These images may have had the data necessary for correct spatial location embedded in them or included as a separate file. These days, there are multiple services that not only supply the imagery but come with tools to ensure correct placement for you. Autodesk has included Bing maps and imagery since the 2014 version, and there are 3rd party solutions such as NearMap and Plex.Earth.

So why might you need to use Raster Design for this? There are still sources of maps and imagery that are not "automatic" – let's jump in and take a look.

Note that if you are using AutoCAD Map or Civil 3D, which is based on AutoCAD Map, there are similar commands and tools for doing this, but they are slightly different than the commands in Raster Design.

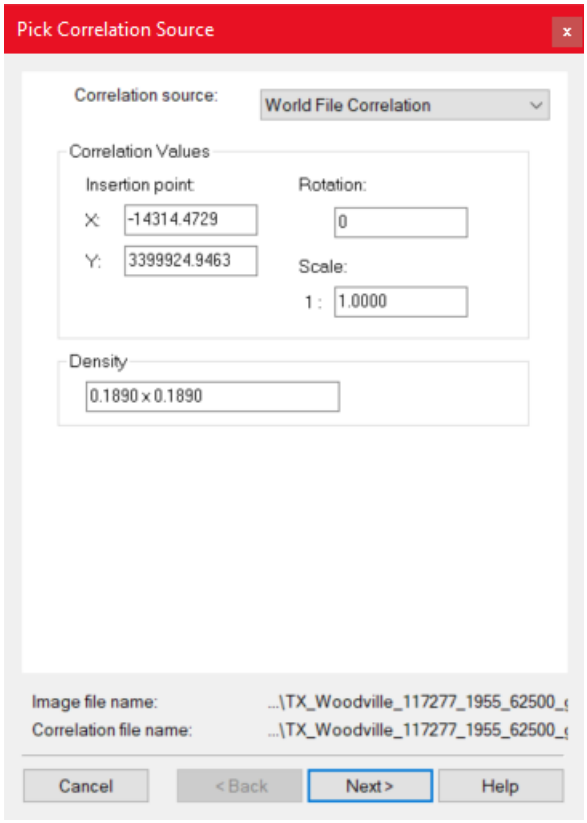
Getting Started

You will need an image with either internal correlation data, or an image with an associated world file. A world file will usually have a file extension that is a variation of the file extension of the image file. For example, the world file for a TIF image may have a file extension of .TFW. For a JPG image, the world file may have a file extension of .JPW, and so on.

AutoCAD does not have the commands for pre-selecting a coordinate zone, so if you do not know the units of the image, set your AutoCAD insertion units to "Unitless"

Steps

- Switch to the Raster Tools ribbon. Click the Insert button in the top left, a file dialog will open. Choose your file and note the "Insert Options" on the bottom.
- Quick insert: Quickly inserts the image using whatever correlation data it can find, with no user input.
- Insertion Wizard: Walks you through the steps of selecting the appropriate correlation data.
- Insertion Dialog: Similar to the wizard, but without the sequence of steps.



INSERTION WIZARD – FIRST PAGE

View/Manage

In the “Manage & View” panel, there is a button to open the Image Manager Toolspace. Inside this palette, there are two views, “Image Data” and “Image Insertions”.

- Image Data: Allows you to view image information such as color depth, image type, file size, path, etc.
- Image Insertions: Allows you to view insertion data about the selected image, such as X,Y,Z position, rotation, layer, etc.

In either view, there are various right-click menus for many of the items listed. Explore this.

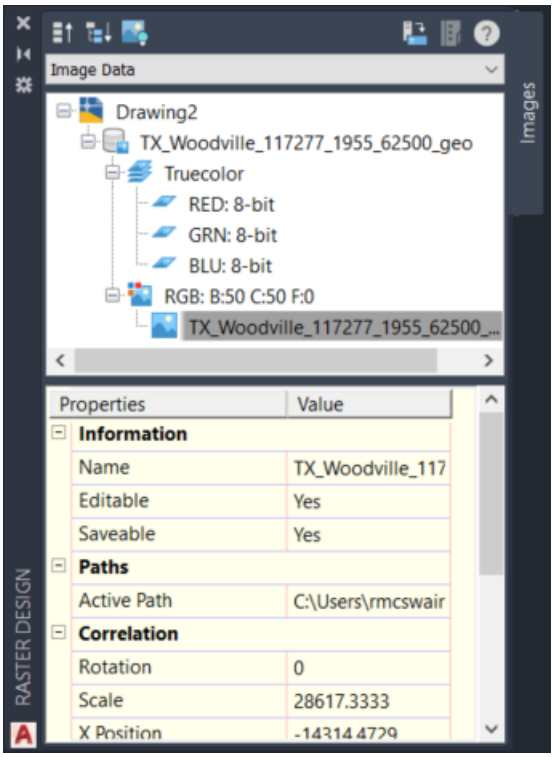
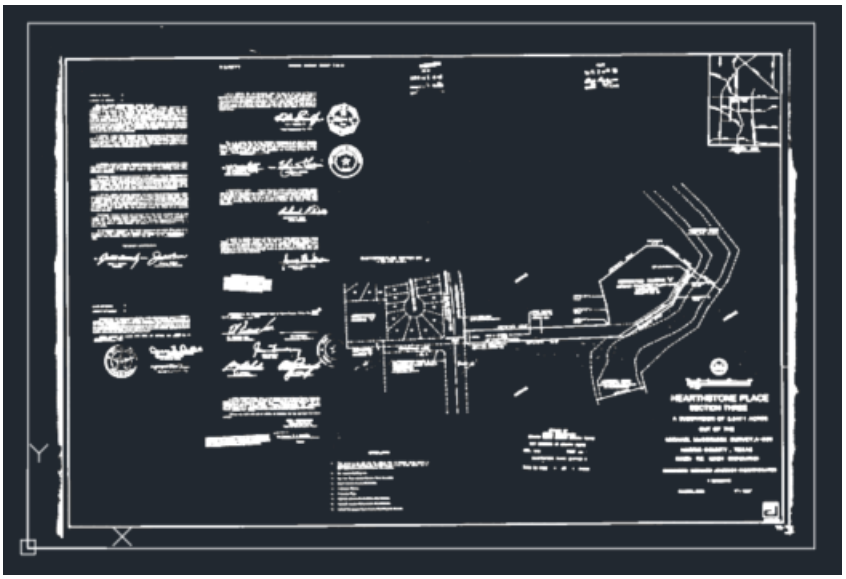


IMAGE MANAGER TOOLSPACE

Cleaning up Images

If you have a scanned image of less that optimal quality, you may want to clean it up before using that image in your drawings. Let's take a look at some of the tools to do this.

Starting with a new AutoCAD drawing, we will use the same Insert command as above to insert a scanned image of a drawing. The scanned drawing is of a plat, and the goal is to extract just a portion of this image for use elsewhere.



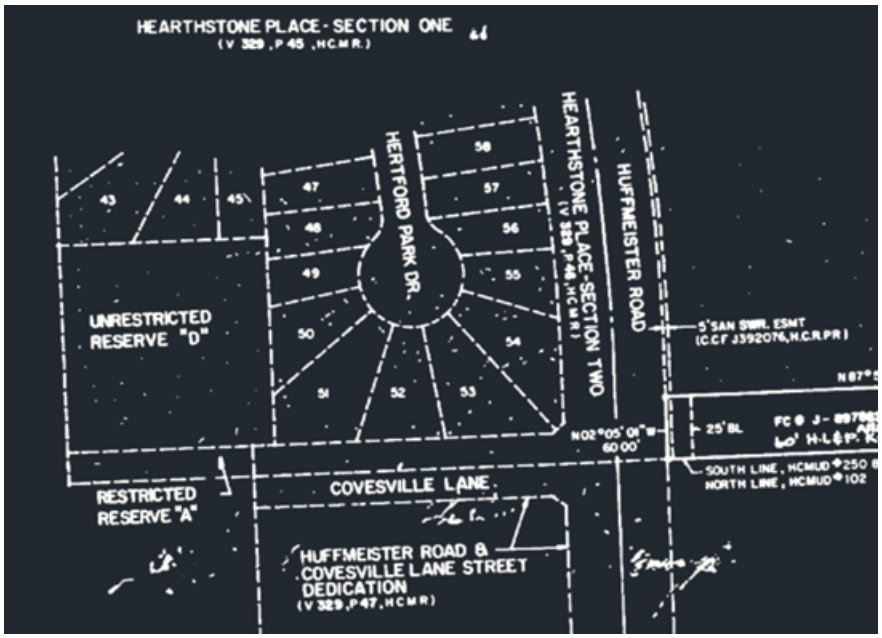
SCANNED IMAGE IMPORTED INTO AUTOCAD

We are not interested in the plat language, the border, the notes, etc. Only the linework. The first tool we can use is Crop. There are multiple crop shapes you can choose, let's crop this using a rectangular shape. This takes care of the majority of what we want to remove.

AFTER THE INITIAL RECTANGULAR CROP

The next tool we can use is the Remove tool. Choose the shape that best fits the need and it is as simple as the Erase command in AutoCAD.

Next, we zoom into the area around the lots on the cul-de-sac and see that there are many raster "speckles". These are artifacts from the scanner itself, or perhaps markings or dirt on the original document. There is an easy way to remove most of these.



NOTE ALL OF THE "SPECKLES", OR UNDESIRED PIXELS

Use the "Despeckle" tool on the Edit Panel, Cleanup dropdown. You can operate on a portion of, or the entire image. You can pick a sample speckle, or enter a size in pixels, and all speckles that size and smaller will be selected. All speckles selected for deletion will be colored red before you confirm deletion, or you can choose to reselect. Pay close attention so that you do not erase items that you want to retain. Remember, Raster Design does not know the difference between stray pixels and a period or dot over an "i".

If during your cleanup, you do remove some raster entities and want to restore them, it may be possible depending on how complex the items were. One way is to use the "Touchup" command, this is essentially a paintbrush for drawing new pixels in the image. Another way would be to draw the objects using AutoCAD lines, arcs, etc., and then convert those to Raster objects. During Vector to Raster conversion, you can control the width of the raster objects by color of the vector objects.

After all pixel cleanup is done, since this is a map of a real-world location, let's There are a few more areas to cleanup using some of the Remove tools, then one last thing to do. Since we have several known dimensions in the raster image, we can draw a vector line the actual bearing and distance and match the raster image to it. This will get us closer to a real-world scale for distance and area measurements. Use the "Match" command for this.

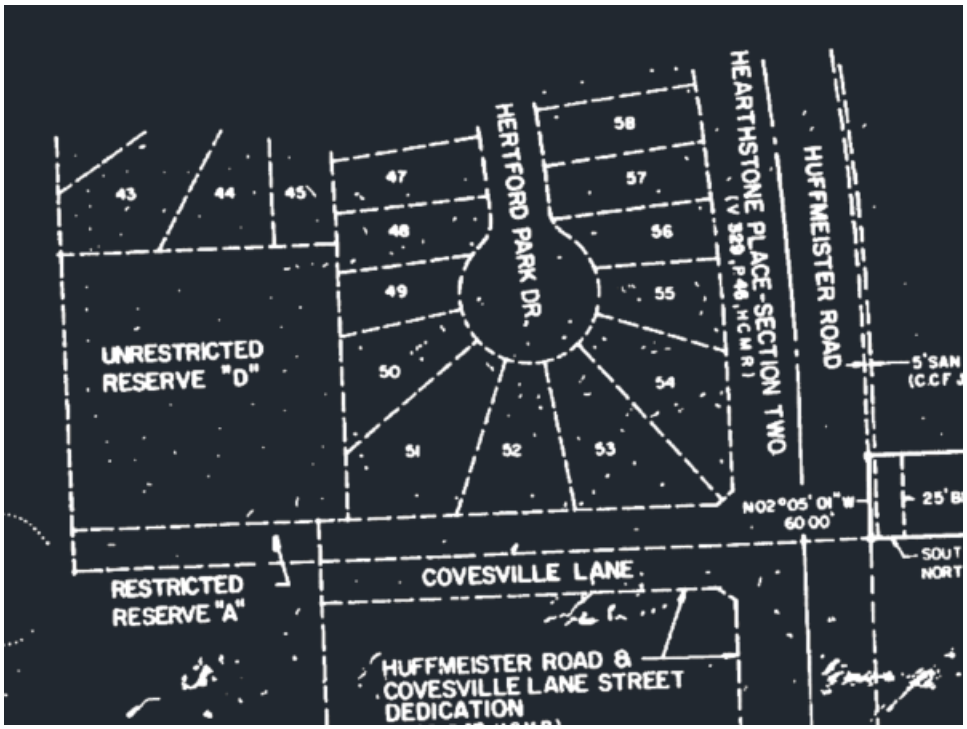
After this step, we can turn on the Bing imagery and check for accuracy. If desired, we could export this image to a new image with a world file for importing into other drawings.

BING IMAGERY BEHIND OUR CLEANED UP RASTER IMAGE

Raster To Vector

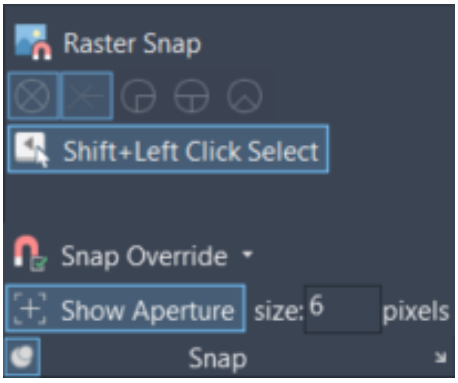
Previously, we were working only with the raster image. But what if you want to convert some or all of that raster image to AutoCAD vector entities? Well, first off there is no magic button that converts an entire drawing at once, but the tools inside of Raster Design can help you speed up the process over manually tracing a drawing.

Going back to the same scanned drawing from earlier



OUR ORIGINAL SCANNED FILE

Start by enabling the Raster Snap on the Snap panel and make sure the aperture size is reasonable. There are multiple options and tools available for converting raster data to vector and it is not a [one settings fit all] situation. You will have to experiment with the settings to see what best works on each task.

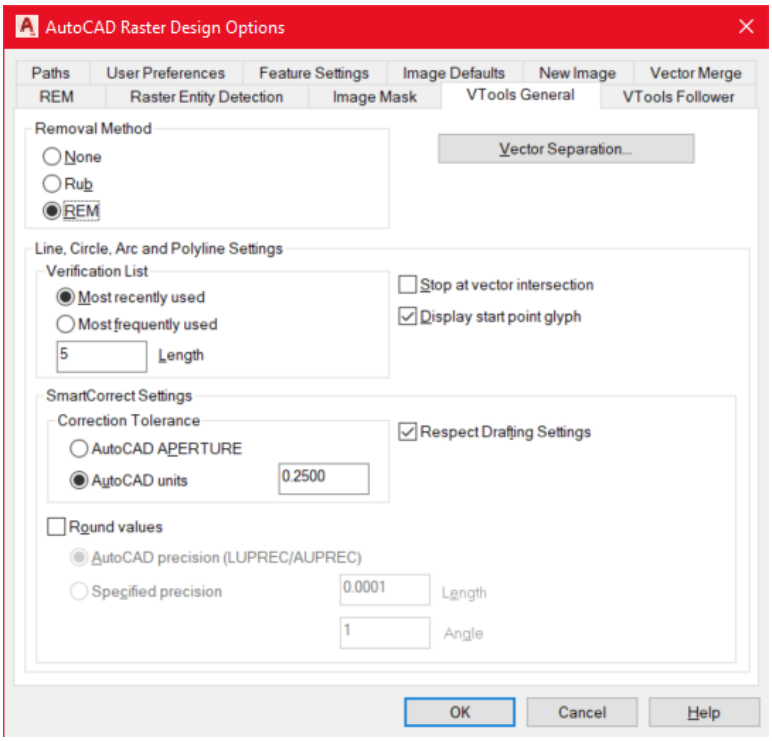


THE SNAP PANEL OF THE RASTER TOOLS RIBBON

Primatives and Followers

After you have configured the Raster Snap settings, we can start to look at some of the tools on the Vectorize and Recognize Text panel. The tools under Followers will attempt to follow polylines and contours. The tools under Primative, will attempt to recognize lines, circles, arcs, and rectangles. Are there options and configurations for this? You bet.

Tap the arrow in the lower right of the Vectorize & Recognize panel to open the options. All of these are well documented in the Raster Design help file. One option of note is the Removal method. When you are converting raster objects to vector, Raster Design can remove the raster objects at the same time. If you choose the Rub method, there is a configurable width associated with this method, while the REM method does not honor this setting.

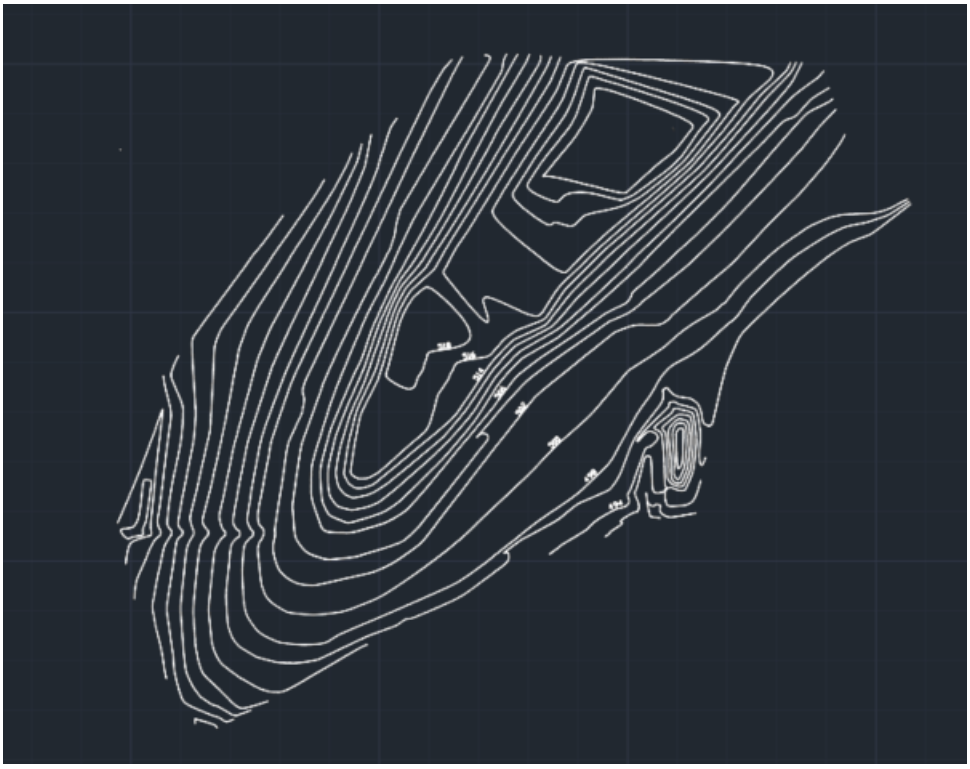


VTOOLS GENERAL OPTIONS

Let's start with a few lines. Create Primitive > Line can be used for this. Will it handle dashed or other non-continuous lines? The other primitive commands work similar, including Circle, Arc, and Polyline.

Moving over to the Followers drop-down, let's look at the Polyline and Contour follower. In AutoCAD, these are essentially the same since there is no provision for creating a "Contour" entity. But one difference is that the contour follower will present you with a prompt for an elevation.

Let's load a different raster image and explore this in more detail.

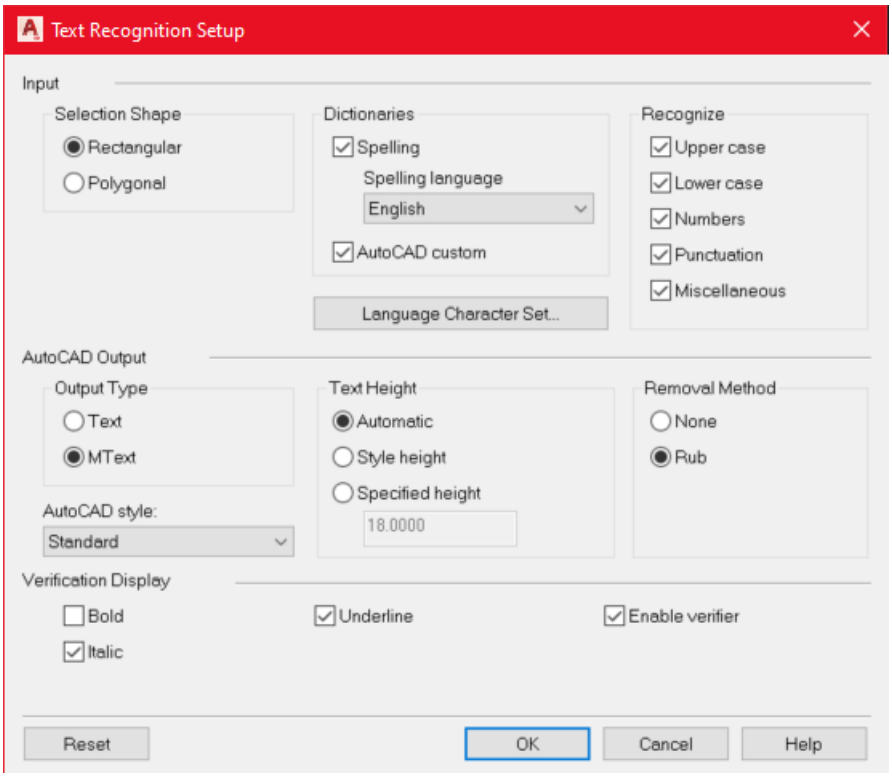


RASTER CONTOUR MAP

Use the Followers > Contour tool to convert each raster contour line to an AutoCAD polyline. We will discuss some of the command line options such as Switch, Rollback, and Continue. When we are done, we will have a true three-dimensional contour map that can be used in Civil 3D or other CAD application for surface creation.

OCR

OCR stands for Optical Character Recognition. Raster Design will analyze a selection of text and try to convert the pixels into actual text. As with most other tools in Raster Design, there are options for this one. Everything in this dialog is fairly self-explanatory.



TEXT RECOGNITION SETUP DIALOG

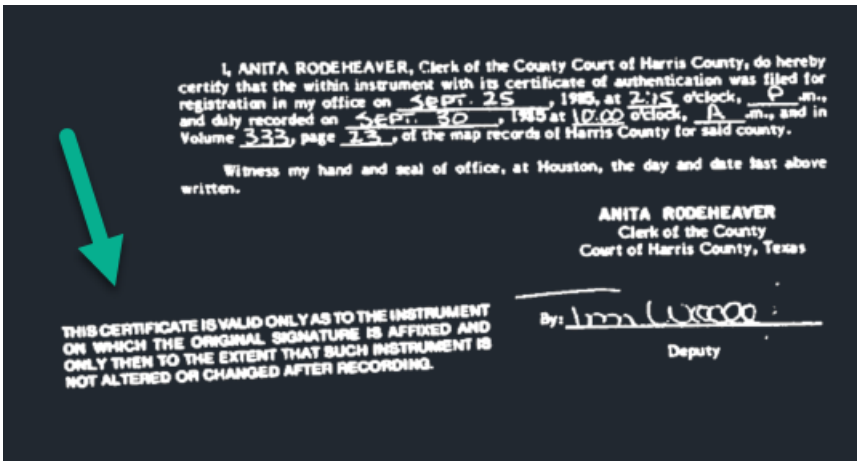
After you have reviewed and possibly adjusted the settings, click OK. Then choose OCR > Recognize Text. Make your selection, taking care to get as close as possible on the rotation angle of the selection. Once you finish your selection, don't be alarmed if AutoCAD appears to have frozen. OCR is fairly complex and it will take several seconds, and unfortunately there is no progress bar or feedback to let you know how it is going. Be patient.

Raster Entity Manipulation

REM is short for Raster Entity Manipulation. REM allows us to edit raster entities as if they were CAD objects. This is like using copy and paste and other editing commands in a raster image editing application such as MS Paint, Photoshot, Gimp, etc.

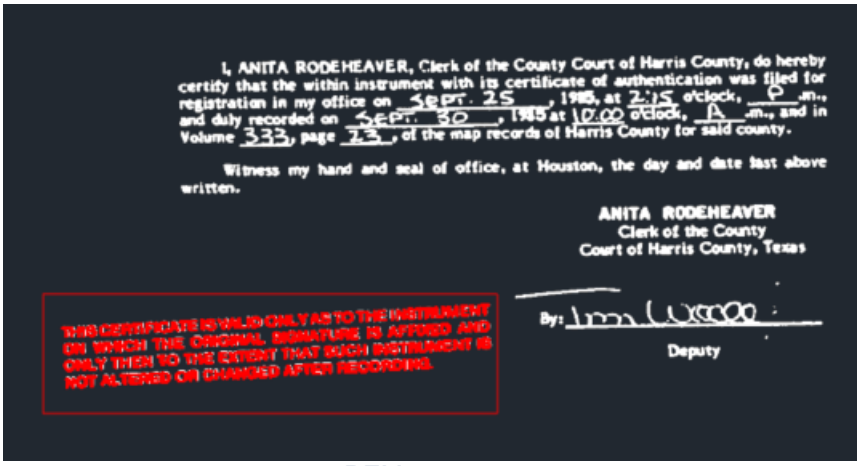
You start by defining a region, and then you are free to use regular AutoCAD or Raster Design tools and commands on that region. The result of your actions could be to modify an existing raster image, or to create a new raster image.

Let's do a few examples. First, let's fix this crooked paragraph, without affecting the rest of the image.



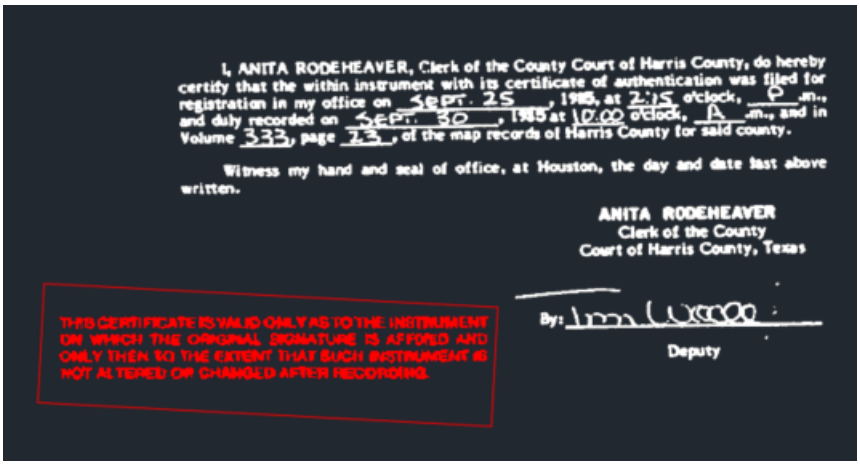
BEFORE

First we will define the REM region using a rectangle since this will work without interfering with other parts of the raster image.



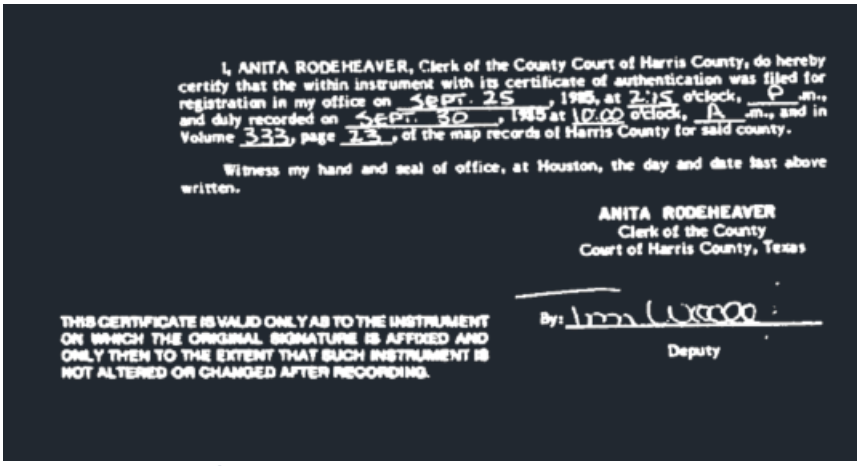
REM SELECTED

Next use the AutoCAD Rotate command to straighten it up. In this particular case, the rotation angle is about -3 degrees.



AFTER ROTATING THE REM OBJECT

When you are done, use the tool to merge this back into the raster image. The final result is below.

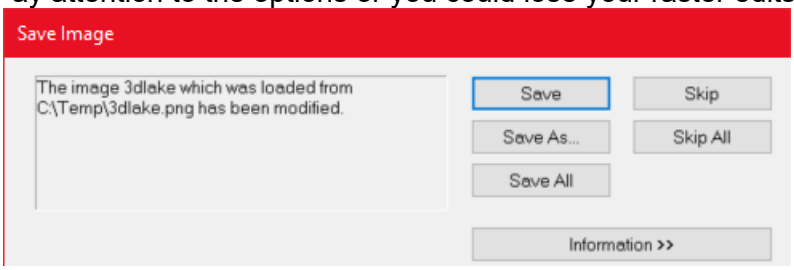


AFTER MERGING BACK INTO THE RASTER

Of course that is just one example of the many things that can be done with REM objects in Raster Design.

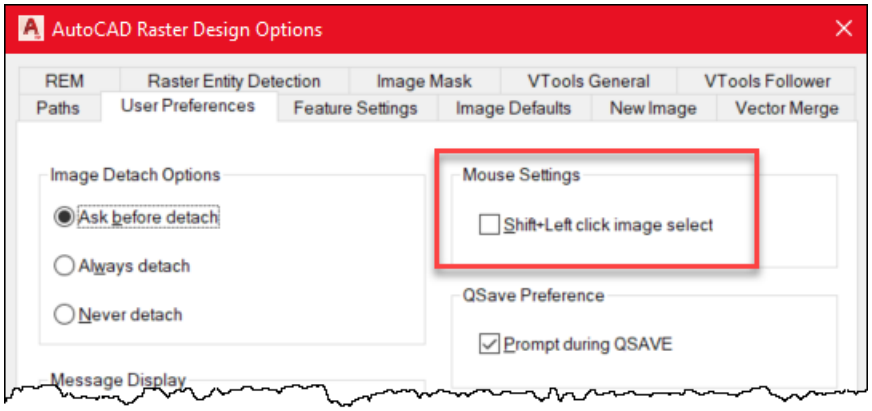
General notes

- When exiting a drawing with a modified, unsaved raster image inserted via Raster Design, you will be prompted to save the image using a dialog that you may not be familiar with. Pay attention to the options or you could lose your raster edits.



RASTER FILE SAVE DIALOG

- There is a setting in Raster Design so that Shift+Left Click will select an image, even when you are zoomed into a portion of the image and cannot reach the image frame. Note that when this setting in enabled, it will override the Shift+Left Click functionality in AutoCAD related to deselecting entities.



IOPTIONS COMMAND

- Due to time constraints, we have only been able to look at a few of the tools and features in Raster Design. I encourage you to explore Raster Design on your own, and you might find more time saving tools to help you with your daily tasks.