

That CAD Girl

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Drawing Orientation and Rotation

Many times when you begin a drawing by bringing in survey points or drawing from deed calls, having North pointing straight up the page causes the drawing not to fit the sheet of paper easily. There are two basic methods you can use to change the orientation of the drawing to the screen so that, when plotted, the longest side of the plan lies parallel with the longest side of the sheet of paper.

Method #1 - Change the UCS (User Coordinate System) from WCS (World Coordinate System)

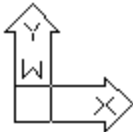
Because so many people now change the UCS rotation as a way to make drawings better fit the sheet, it is extremely important to have the UCSICON turned ON at all times so that you can tell whether it's been rotated or not.

The visibility and properties of the UCS Icon are changed through the UCSICON command. There are options for turning the icon ON and OFF. There are also options for locking the position of the icon. Use the "Noorigin" (No Origin) option to keep the icon locked to the bottom left of the screen regardless of where the 0,0 coordinates are on the graphic screen. Use the "ORigin" option to allow the icon to float so that it is always positioned at the 0,0 coordinates of the drawing.

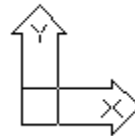
The UCS Icon can look very different depending on which version of Autocad you are using and whether the UCS is set to World or if the UCS has been rotated to another Coordinate System.

Pre Autocad 2000:

World

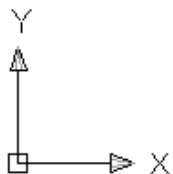


Rotated UCS

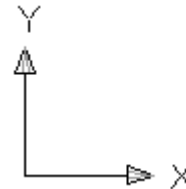


Autocad 2000 and newer:

World



Rotated UCS

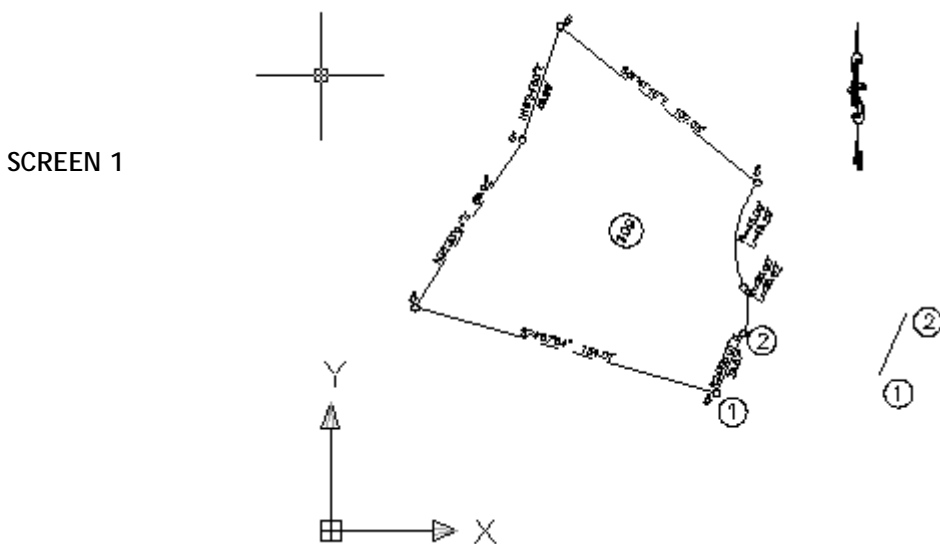


The drawback to changing UCS rotation from World is that it changes the "origin" (0,0) to a new location and also changes the rotation of the X & Y axes. If you choose this method of changing the UCS rotation to set up drawings, you should do practically everything in the drawing that you can, (linework, profiles, dtm, etc) and only rotate the UCS when you are ready to do the labeling.

Issues with this method will mainly come up when stationing an alignment, labeling contours or labeling lot lines. Although these are text entities that should be oriented upright on the plotted page, they are created from Land Desktop commands that demand your UCS be in World rotation for them to work. After the text is added, the UCS may be rotated but Autocad will always orient this text as if it's in the World Coordinate System. Many of these types of text entities will need to be manually rotated to have them right side up on the plotted sheet.

The drawing shown here has North straight up and the UCSICON has a box in the bottom corner telling us that we are using the WCS (World Coordinate System). What we are going to do is rotate the UCS (User Coordinate System) so that the property line along the street with bearing N 24-05-01 E is parallel with the bottom of the AutoCAD screen and therefore our sheet of paper.

This method requires two steps: 1) rotate the UCS, 2) rotate the plan view to match the new UCS.

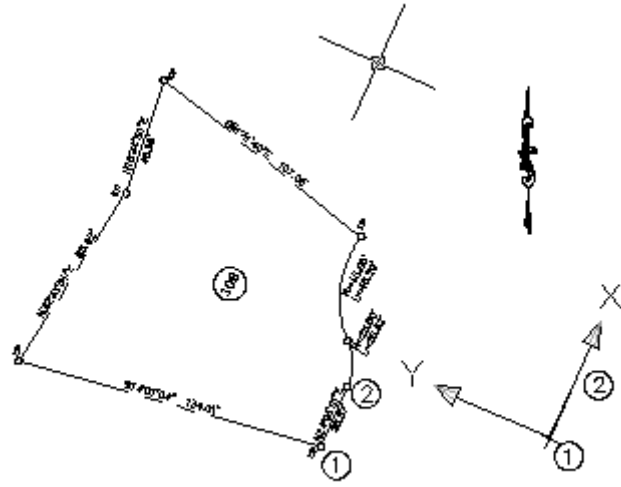


Through this exercise, it is important to note the appearance of the UCS Icon, the crosshairs and the North Arrow to fully understand the adjustments taking place.

Begin by drawing a Line on top of the property line segment you want to use to rotate the UCS. Draw the line by picking Points #1 and #2 as designated above. Once you've drawn the line, move it so that it is no longer on top of the original parts of the drawing.

Type in the command UCS and then the New, OBJect option. AutoCAD prompts you to "Select object to align UCS:". Select the new line at a point closest to Point #1. Your crosshairs and the UCS Icon on your screen should rotate so that the "X" direction on the icon is now pointing in the direction that you drew the new line.

SCREEN 2



Note that the UCS Icon moved to Point #1 and the positive X is now pointing in the direction of Point #2. This means that the coordinate system now sees Point #1 as its 0,0 and the direction from Points #1 to #2 as its positive X direction.

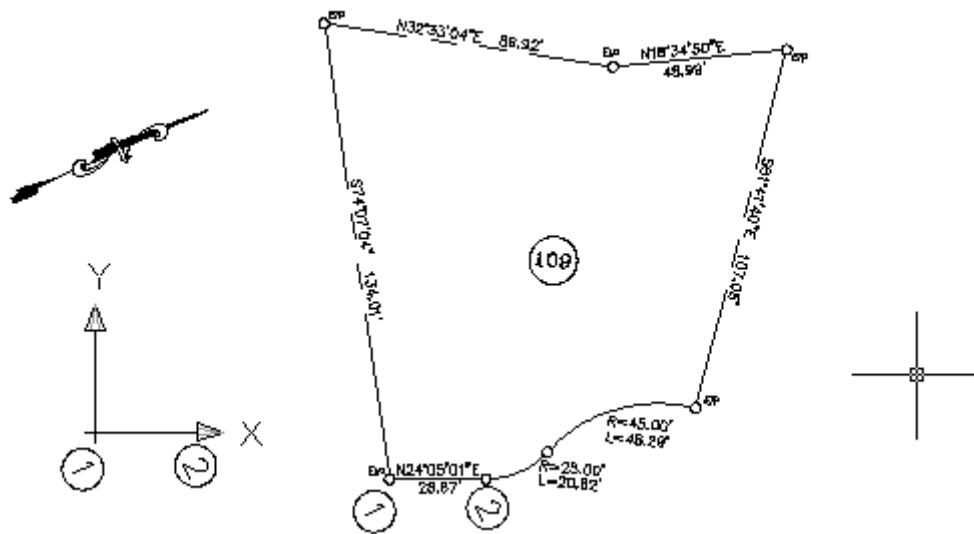
Note also that the small square in the corner of the UCS Icon is gone - indicating that the UCS is set to something other than "World". The crosshairs have also rotated to reflect the change in UCS.

However, the drawing is still oriented as it was originally brought in. While the coordinate system has changed, the drawing on the screen has not been.

At this point, we need to orient the plan view of the drawing to match the new UCS. In other words, we want the screen to rotate so that the new X direction is parallel to the bottom of the screen.

The partner to the UCS command is the PLAN command. Type in the PLAN command and accept the default option of <Current UCS>. This changes the plan view to match the current UCS. The plan view will now be oriented so that the selected property line is parallel to the bottom of the screen. Again, note the appearance of the crosshairs, the UCS Icon and the North Arrow.

SCREEN 3



You should save and name this UCS rotation so that you can easily change between World and the rotated UCS. You can save and name the UCS in the UCS command with the Save option.

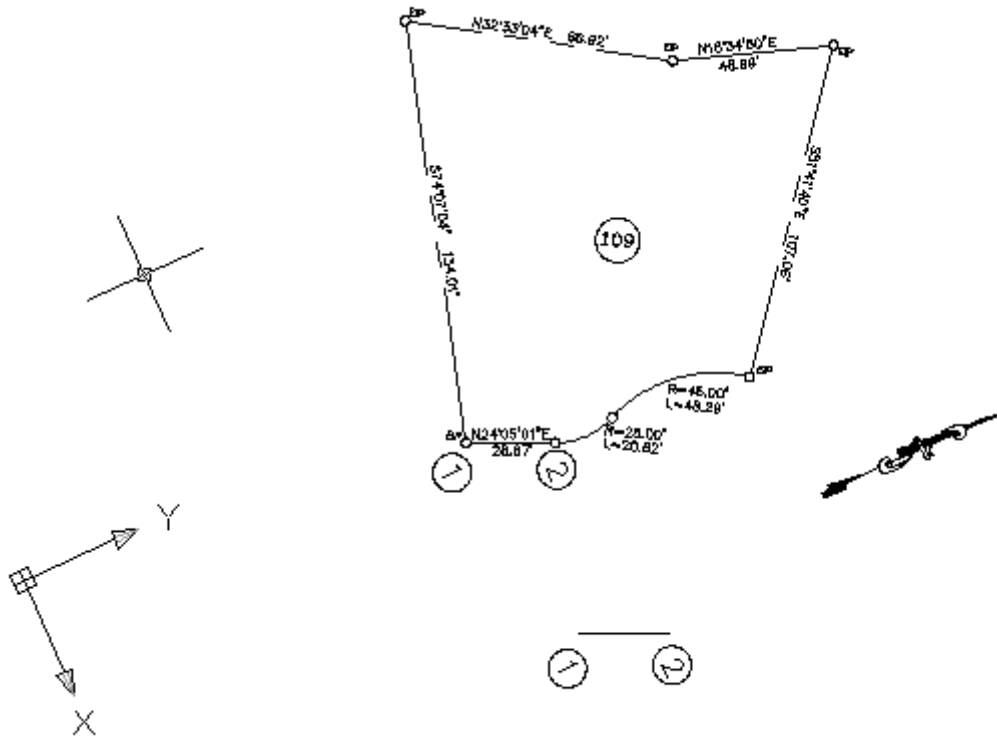
Being able to save and restore multiple orientations is the single biggest advantage of using UCS over DVIEW Twisting.

Adding text to a drawing demonstrates another benefit to using UCS rotation over DVIEW. Because Autocad considers the current UCS when determining the 0-degree alignment of text, using the UCS rotation method ensures that all text created at a 0-degree rotation will align parallel to the screen.

With your UCS rotated, all AutoCAD commands such as text and dimensioning will work with no problems. However, to perform any Land Desktop commands (point manipulation, DTM, earthworks, alignments, profiles) you will need to return the UCS to World.

To return the UCS to World, type in the UCS command and accept the default <World> option. The UCS Icon will rotate and the small box will return to the corner of the icon indicating you are in the World Coordinate System. Not that your plan is still rotated to match the saved UCS and will be until you use the PLAN command to update the plan view to reflect the new (World) UCS.

SCREEN 4



Because the UCS is now set to World, all Land Desktop commands will work. To return the view rotation to match the WCS, type in the PLAN command with the <Current UCS> option and you are back to where you started.

To save the additional step of entering the PLAN command after every UCS command, you can set the UCSFOLLOW system variable to "1" and it will make the PLAN command to automatically follow the UCS command. Setting this will keep you from being able to work in Land Desktop with the drawing view rotated. UCSFOLLOW set to "1" can also create problems when working with viewports. If you are working in a Layout tab and make a viewport current and active, UCSFOLLOW will perform a ZOOM> EXTENTS on the viewport.

Method #2 - Change the Plan View Using DVIEW with TWist Option

If you are working with drawings that have only one plotted sheet and would prefer to not have to worry about changing the UCS each time you need to use a Land Desktop command, another alternative is to use the DVIEW command with the TWist option.

The DVIEW command simply rotates the plan view of the drawing and will keep you in the World Coordinate System at all times. The DVIEW command does not always put Land Desktop created text entities right side up and you will have to manually rotate some of these entities.

The DVIEW allows multiple rotations within the same drawing only if used in different viewports. But, DVIEW will not allow you to save different rotations so that they are available in Model Space.

This method requires two steps: 1) Twist the plan view of the drawing, 2) Change the orientation of the crosshairs to match the plan

Using the new line drawn from Point 1 to Point 2, list the line to determine the "Angle in XY Plane". This angle needs to be in decimal degrees. The line shown here is 65.9164-degrees.

Type in the command DVIEW. When AutoCAD prompts you to "Select Objects:", select any object on the screen. Type in "TW" for the Twist option. For the "New View Twist", enter the negative of the angle of the line you rotating to. In this case, you would enter "-65.9164" and hit the Enter key. Hit Enter again to exit the command. The UCS Icon is now rotated, but the drawing is still in the World Coordinate System as indicated by the small square in the corner of the UCS Icon.

The line you selected is now aligned with the bottom of the drawing screen. In order to have the crosshairs to match the rotation, use the command SNAPANG and enter the positive of the same angle as you used for DVIEW. In this case, you would enter "65.9164".

To return to the original configuration, enter the DVIEW command, select any entity, select the TWist option and give the "New View Twist" as "0". Change the SNAPANG back to "0" as well.

SCREEN 5

