

A 3D wireframe rendering of a large stadium or arena structure, showing the complex steel framework and curved roof. The rendering is set against a solid green background. The structure features a prominent curved roof supported by a network of steel beams and columns. The seating area is visible as a grid of lines.

# Rendering Techniques in 3D AutoCAD<sup>®</sup>, Part 2

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Independent Consultant

# Evaluation Forms

**Please remember to fill out  
your evaluation form**

**This is session GD115-2**



And, please silence your cell phone.

# David S. Cohn

- Independent consultant
- Contributing editor *Desktop Engineering*  
contributing editor
- Former editor of *CADalyst*, *Engineering Automation Report* and *CADCAMNet*
- Frequent contributor to *Computer Graphics World*, *PC Magazine*, and others
- Registered architect—25+ years experience
- AutoCAD experience—20+ years
- Author of numerous books & articles
- President of Eclipse Software



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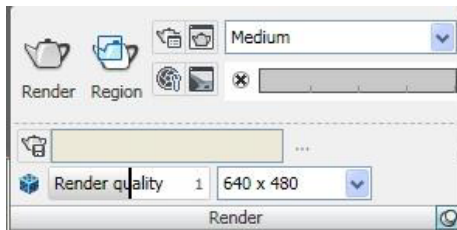
# Previously...

This is part 2 of a class that began earlier today. In part 1 we covered:

- How rendering has changed from earlier versions of AutoCAD
- Working with lights
- Sun & Sky Background settings
- Working with Materials (including creating and modifying materials)

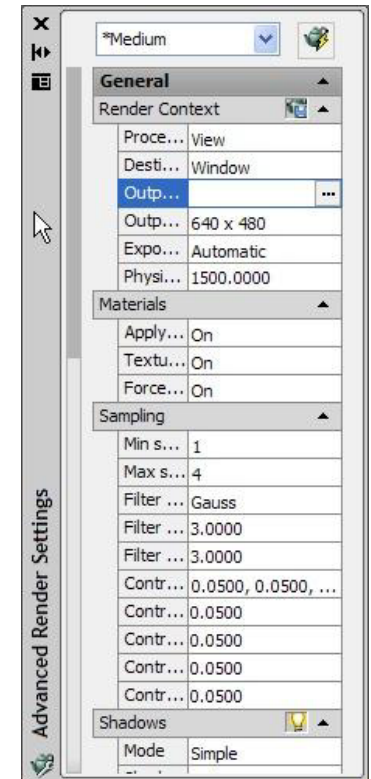
# Render control panel

Provides access to AutoCAD's rendering commands



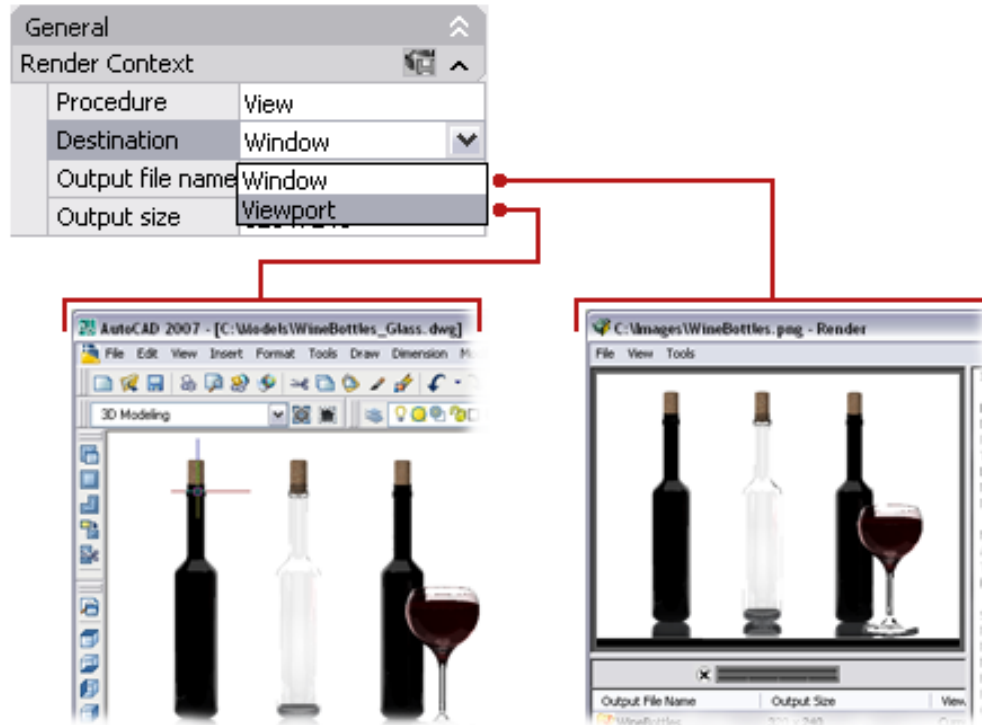
- Render
- Render cropped region
- Render presets
- Render progress

- Adjust exposure
- Render environment
- Advanced render settings
- Show render window
- Sampling limit
- Storage location
- Output resolution



# Render destination

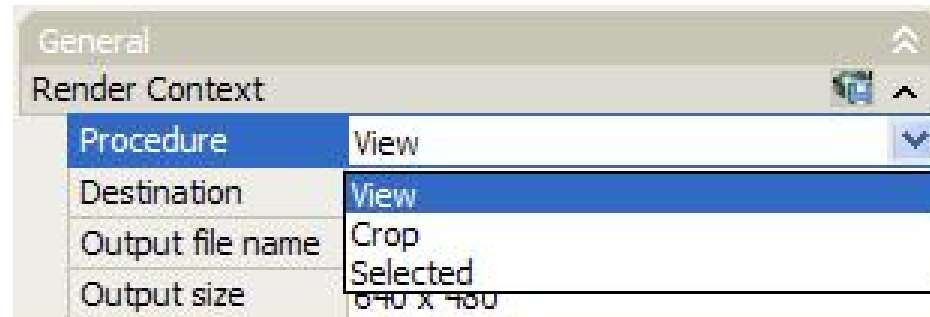
Controlled from the Advanced Render Settings palette



- **Window** – renders to the Render window
- **Viewport** – renders to the current viewport

# Render procedure

Controlled from the Advanced Render Settings palette



- **View** – renders the current view
- **Crop** – renders user-specified window
- **Selected** – renders user-selected objects

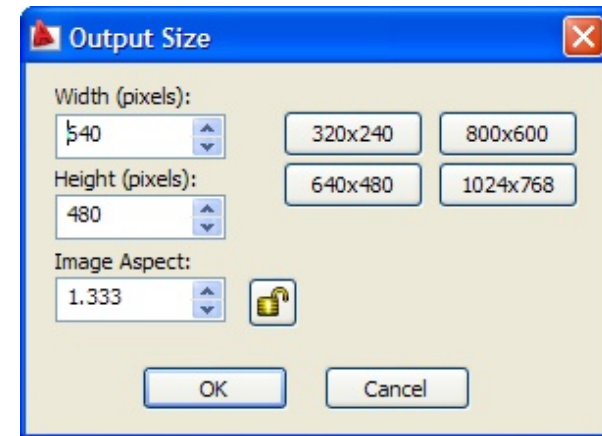
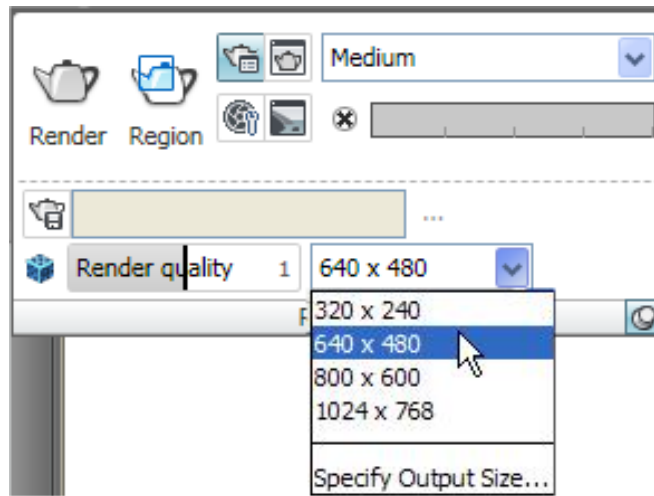
Or render a cropped region using the button in the Render panel



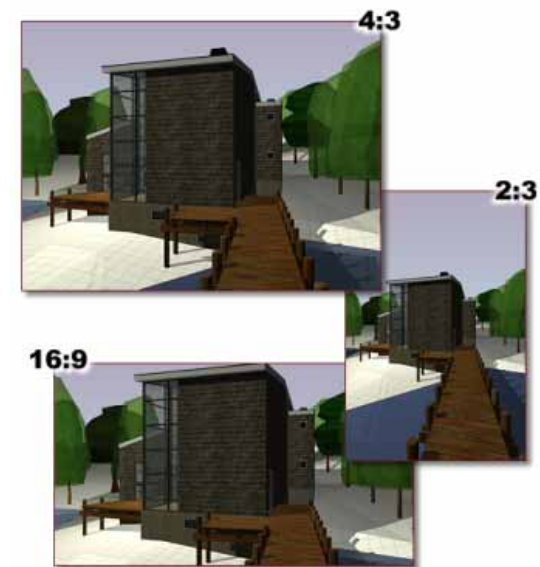


# Output Resolution

Controlled from the Advanced Render Settings palette or Render panel



- **Resolution** – width and height in pixels
- **Aspect ratio** – ratio of width to height

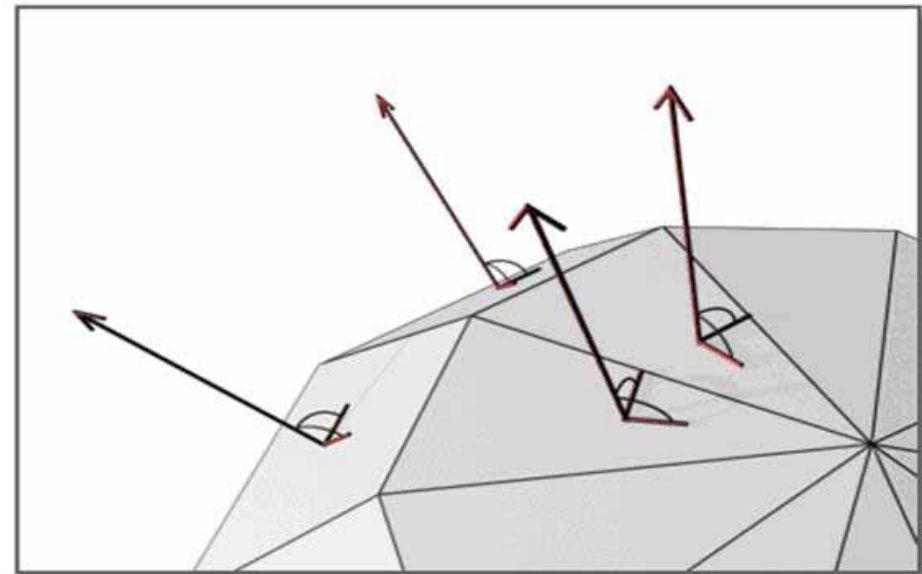


# Preparing Your Model

*The way a model is built helps optimize rendering*

If normals all orient in the same direction, you can speed up rendering by only rendering one side of each face

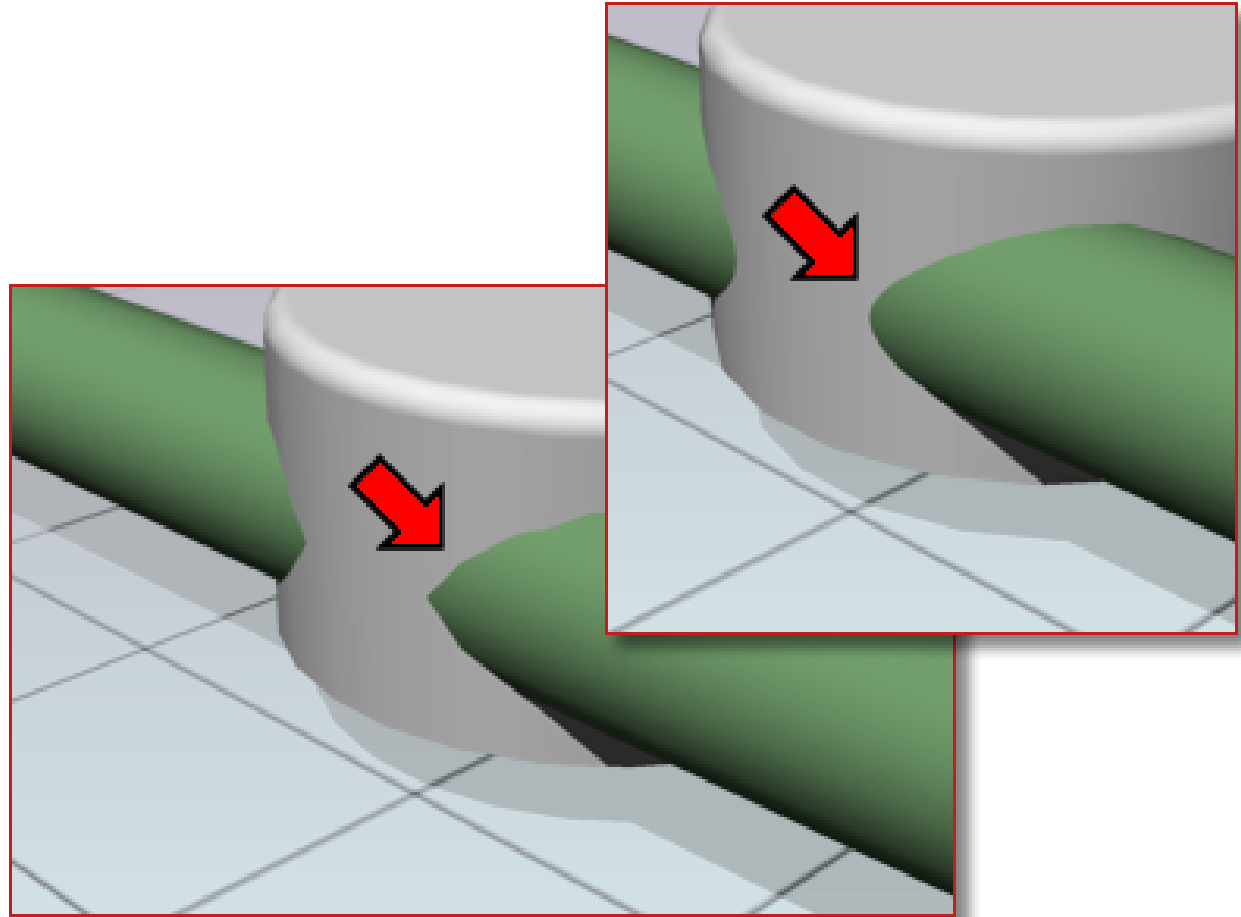
- Otherwise, if some faces appear black
  - Reconstruct missing faces
  - Force 2-Sided



# Preparing Your Model (con't)

Intersecting faces can appear rippled

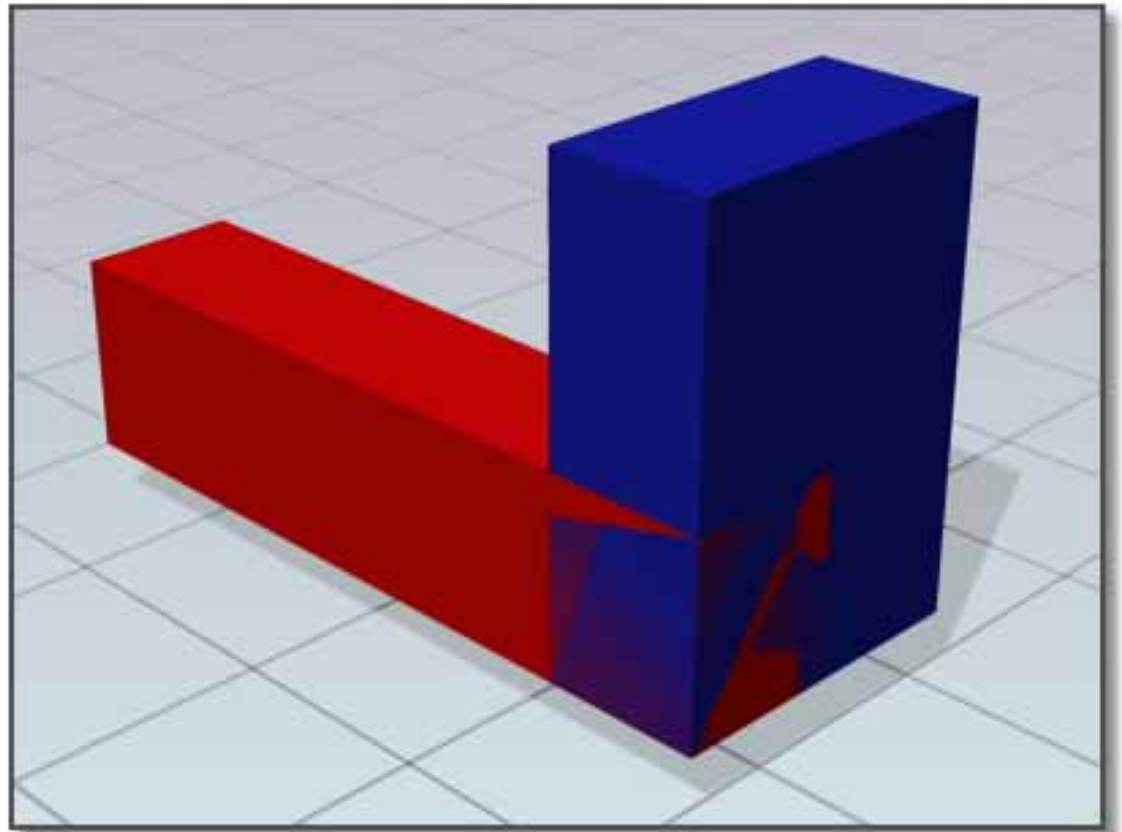
- Create Boolean union between objects



## Preparing Your Model (con't)

Faces that overlap in the same plane can create weird results, esp. if different materials are applied to the faces

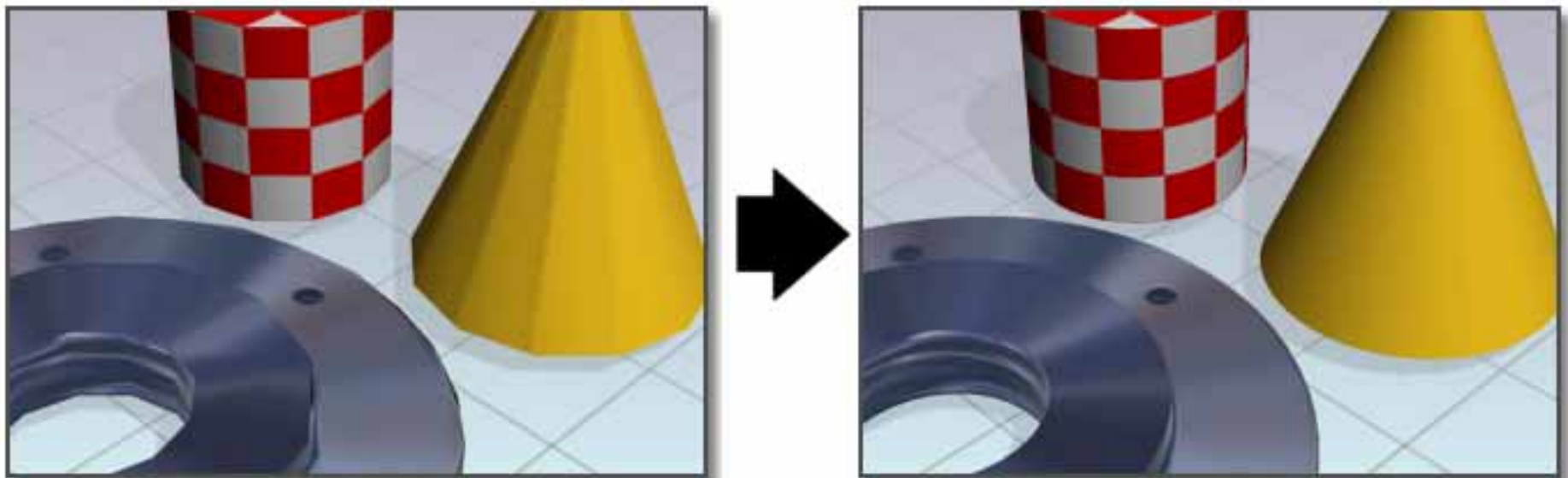
- Move the objects slightly so they are no longer coplanar



# Preparing Your Model (con't)

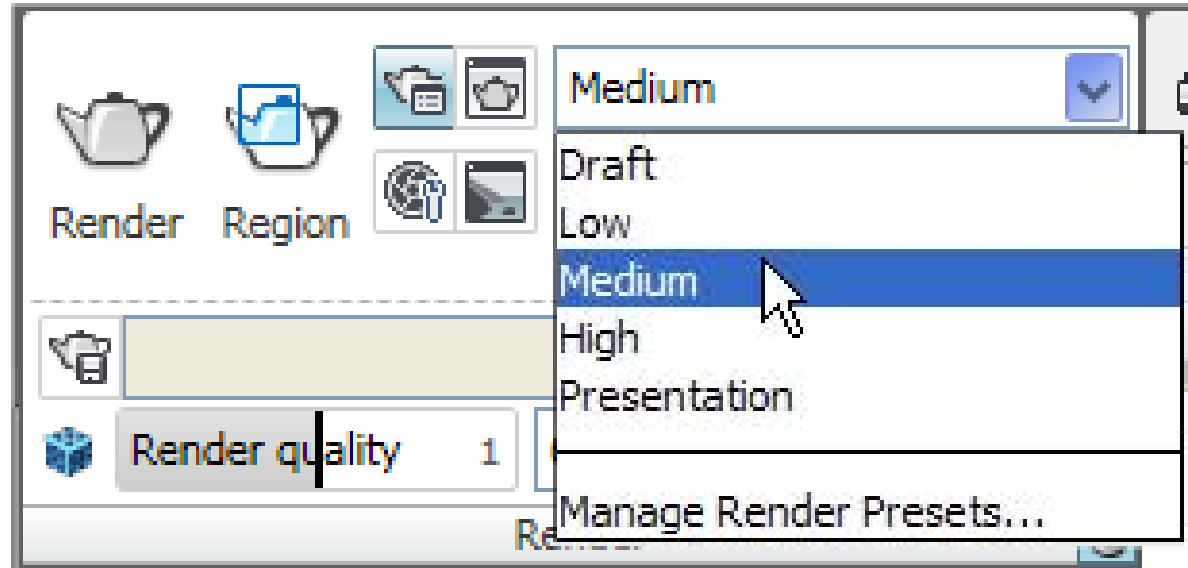
Mesh density affects the smoothness of surfaces.

- **VIEWRES** – smoothing of 2D linework
- **FACETRES** – mesh density of curved solids (solids appear faceted if too low)
  - Acts as a multiple of the VIEWRES setting (ie. if FACETRES equals 2, tessellation will be twice that set by VIEWRES)



# Adjusting Rendering Settings

- AutoCAD comes with 5 render presets
  - Draft
  - Low
  - Medium
  - High
  - Presentation

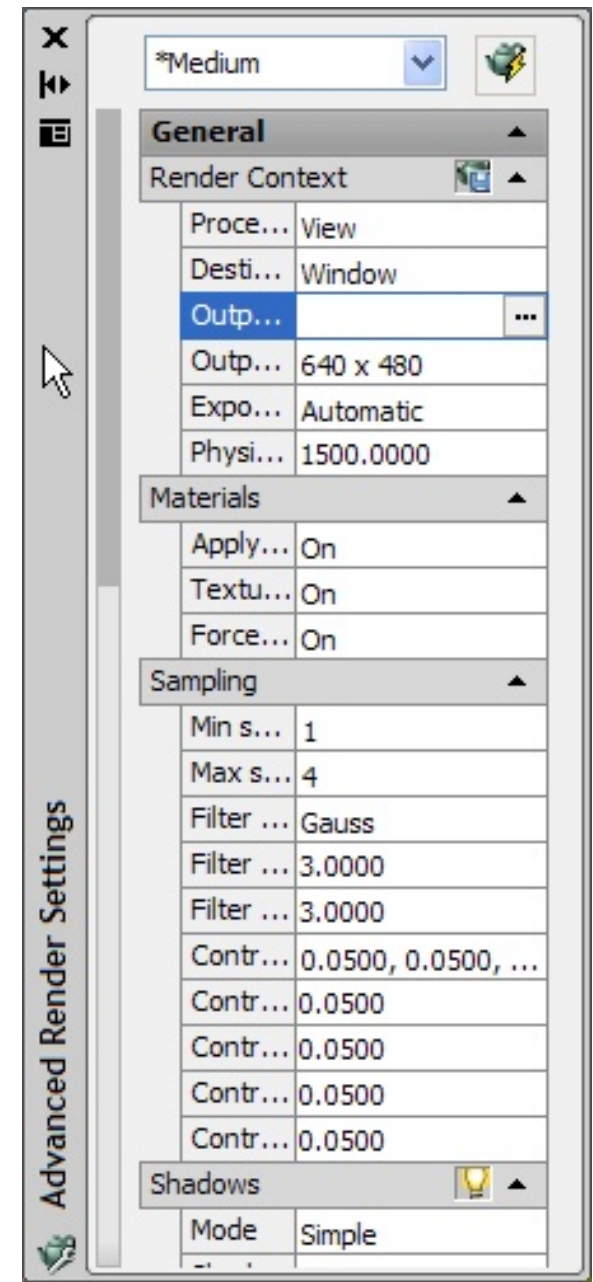


- You can change these settings
- You can create and save your own render presets

# Advanced Render Settings

The Advanced Render Settings palette contains the main rendering controls

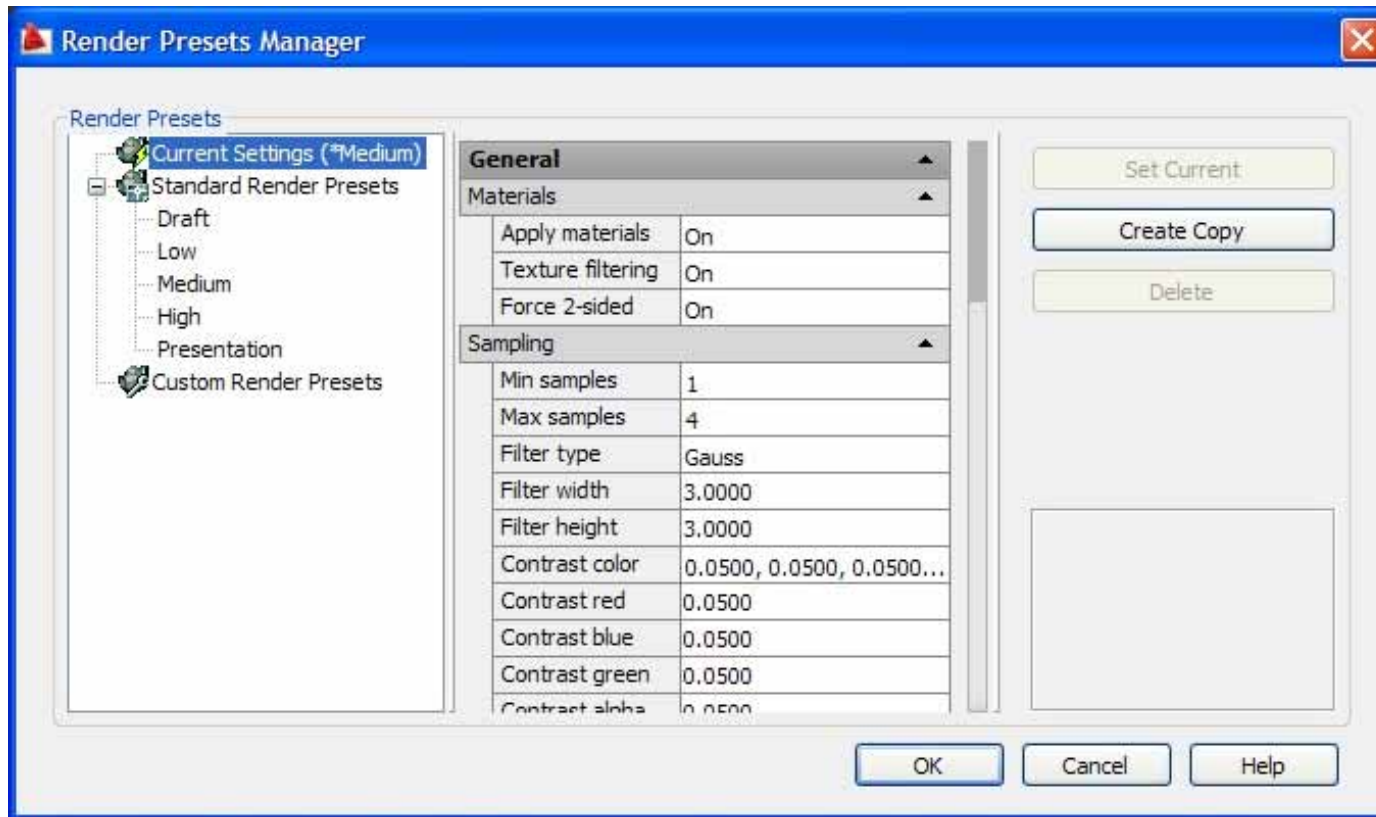
- Changes you make override the rendering preset



# Creating Render Presets

Adjust presets or create your own using the Render Presets Manager

- Can modify existing and create new
- Can only delete custom presets

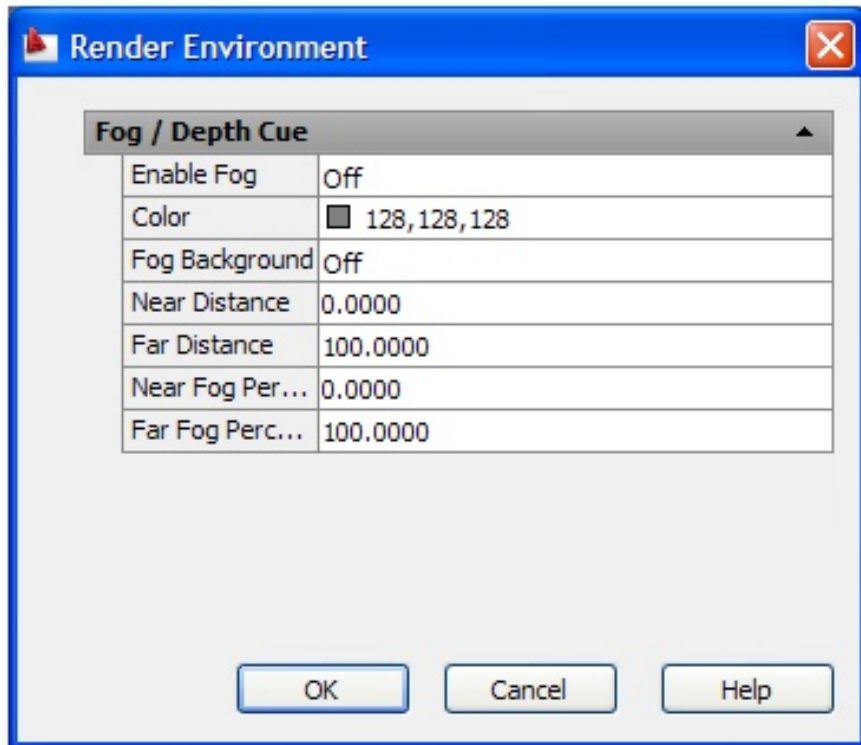




# Controlling the Render Environment

## Create fog effect to enhance sense of distance

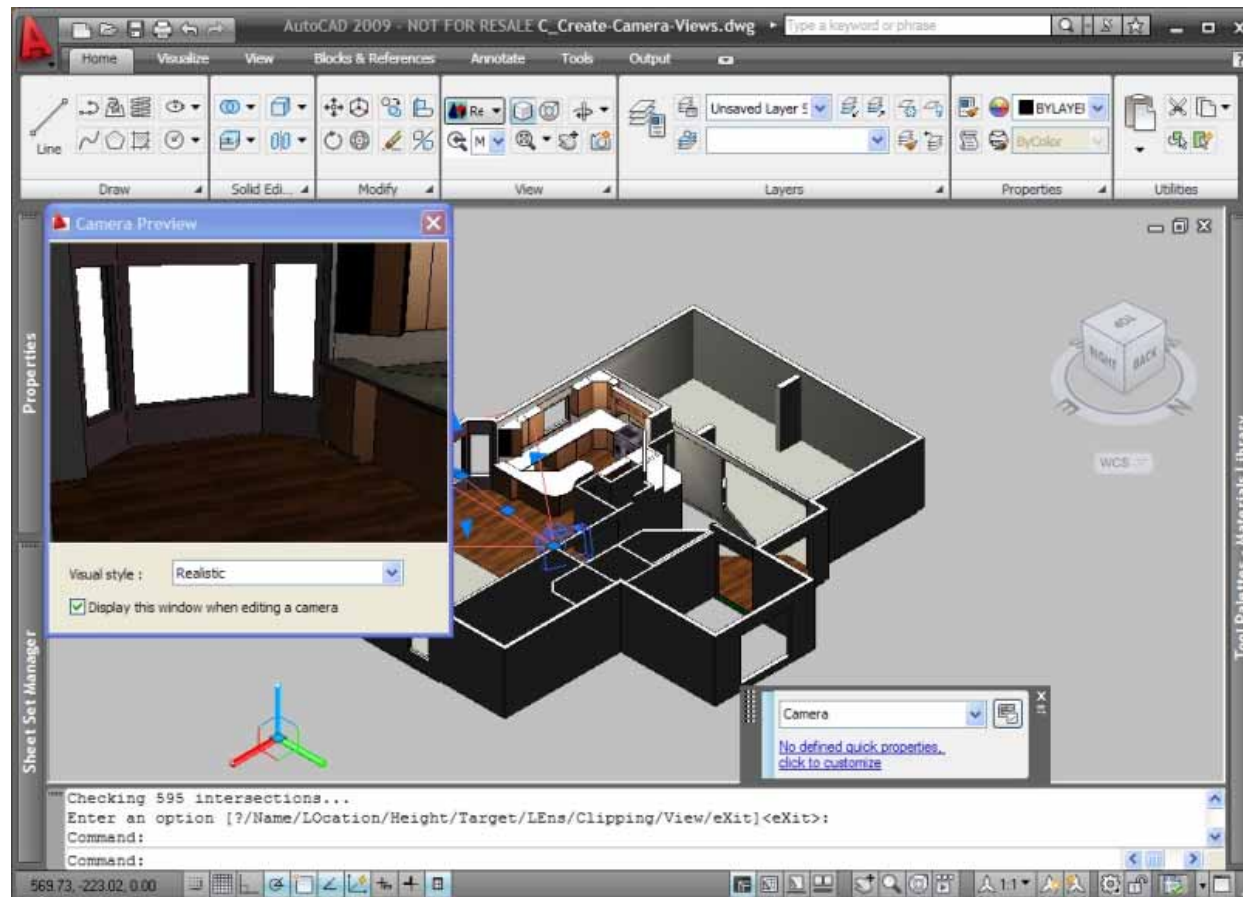
- Turn fog on
- Specify fog color
- Apply fog to background
- Distance at which fog begins
- Distance at which fog ends
- Opacity of fog at near distance
- Opacity of fog at far distance



# Placing Cameras and Creating Views

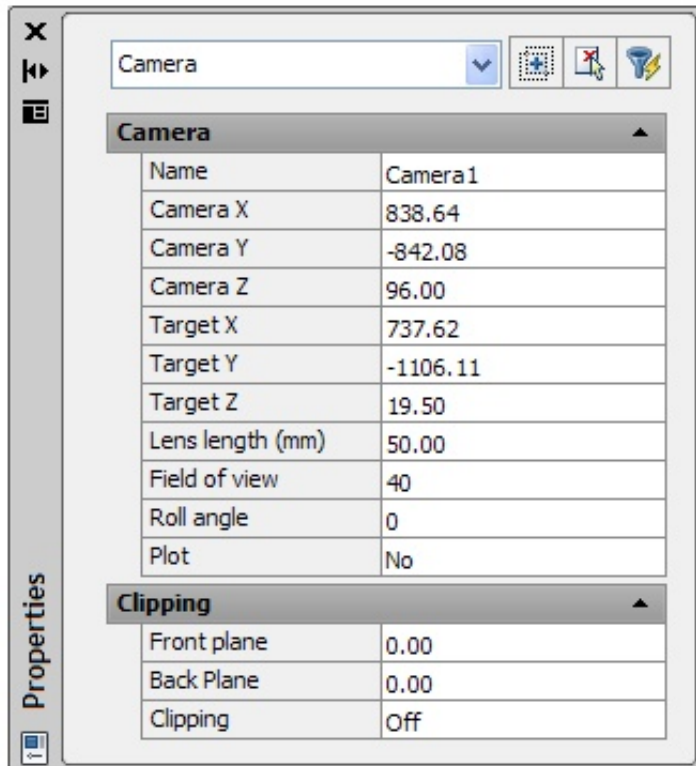
## *Much easier than in previous versions*

- Each time you place a camera, AutoCAD creates a named view
- Select the camera glyph to see a preview
  - Adjust the view style used to display the camera view



# Camera Views (con't)

Control view name and properties using the Properties palette or the View Manager dialog box

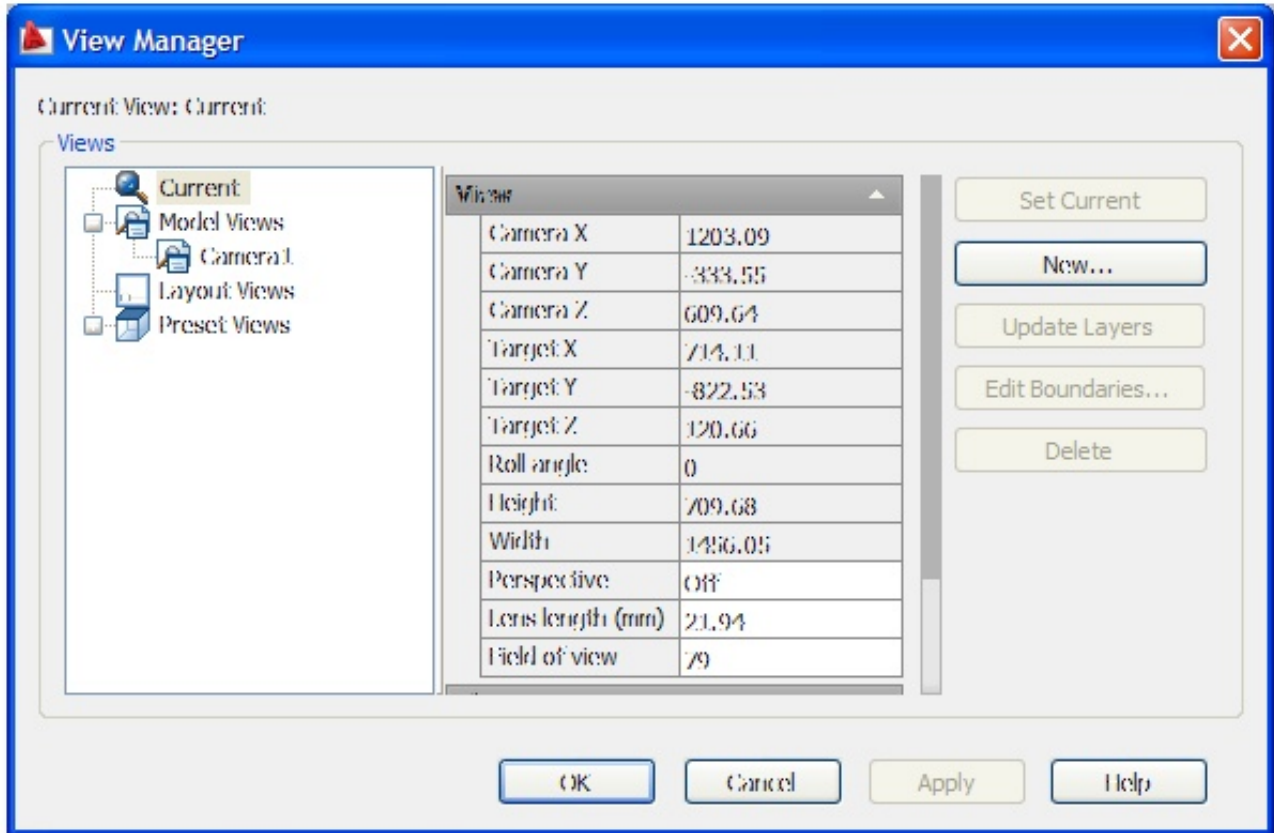


The Properties palette for a Camera view is shown. It has a title bar with 'Camera' and a dropdown menu. Below the title bar are icons for grid, zoom, and pan. The main area is divided into two sections: 'Camera' and 'Clipping'. The 'Camera' section contains a table with the following data:

Name	Camera1
Camera X	838.64
Camera Y	-842.08
Camera Z	96.00
Target X	737.62
Target Y	-1106.11
Target Z	19.50
Lens length (mm)	50.00
Field of view	40
Roll angle	0
Plot	No

The 'Clipping' section contains a table with the following data:

Front plane	0.00
Back Plane	0.00
Clipping	Off



The View Manager dialog box is shown. It has a title bar with 'View Manager' and a close button. The main area is divided into two sections: 'Views' and 'View'. The 'Views' section contains a tree view with the following structure:

- Current
- Model Views
  - Camera1
- Layout Views
- Preset Views

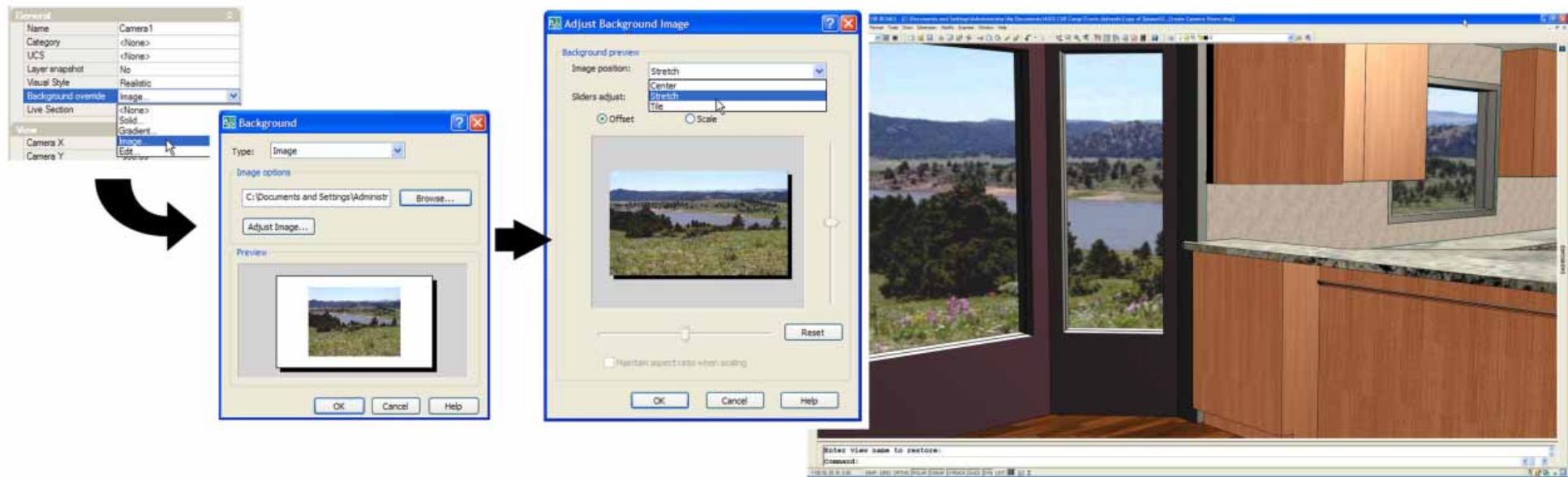
The 'View' section contains a table with the following data:

Camera X	1203.09
Camera Y	-333.55
Camera Z	609.64
Target X	714.11
Target Y	-822.53
Target Z	120.66
Roll angle	0
Height	709.68
Width	1456.05
Perspective	Off
Lens length (mm)	21.94
Field of view	79

On the right side of the dialog box, there are several buttons: 'Set Current', 'New...', 'Update Layers', 'Edit Boundaries...', and 'Delete'. At the bottom of the dialog box, there are four buttons: 'OK', 'Cancel', 'Apply', and 'Help'.

# Camera Views (con't)

Associate a background with a camera view



# Saving Rendered Images

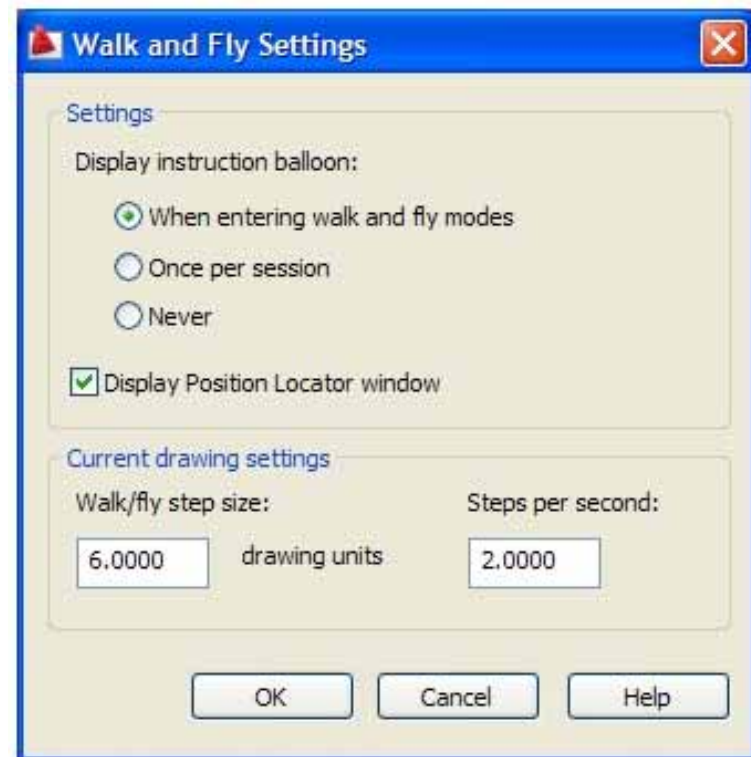
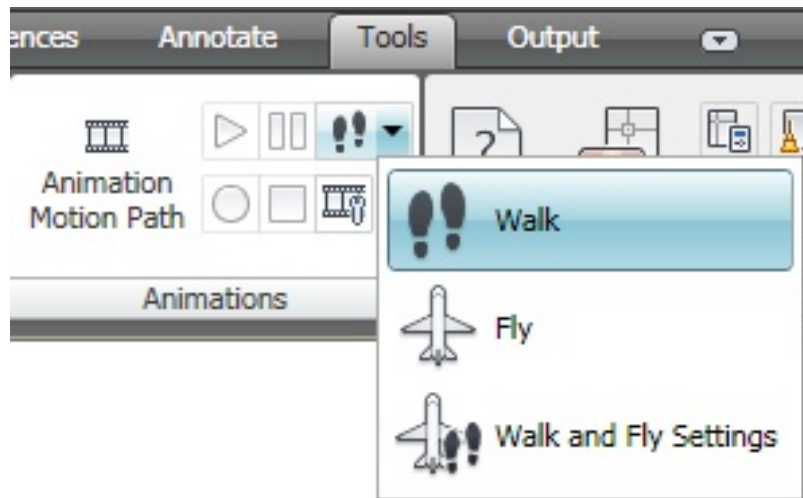
You can save renderings as BMP, PCX, TGA, TIF, JPG, or PNG files.

- **Rendering to a File** – bypass the screen to use resolutions higher than your display
- **Saving a Viewport Rendering** – if you render to a viewport, save the image using the SAVEIMG command
- **Saving from the Render Window** – select the image from the history list, right-click, and choose Save or Save As.

# Create Walkthroughs and Flythroughs

Navigate through your model

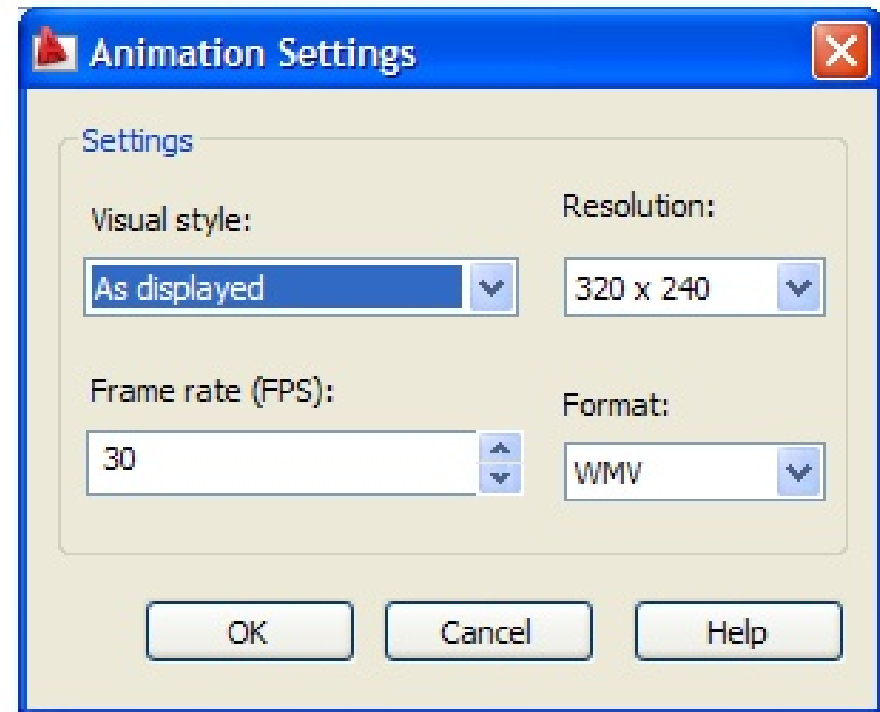
- 3DWALK – keeps camera at consistent height
- 3DFLY – lets you change the camera height



# Walkthroughs and Flythroughs (con't)

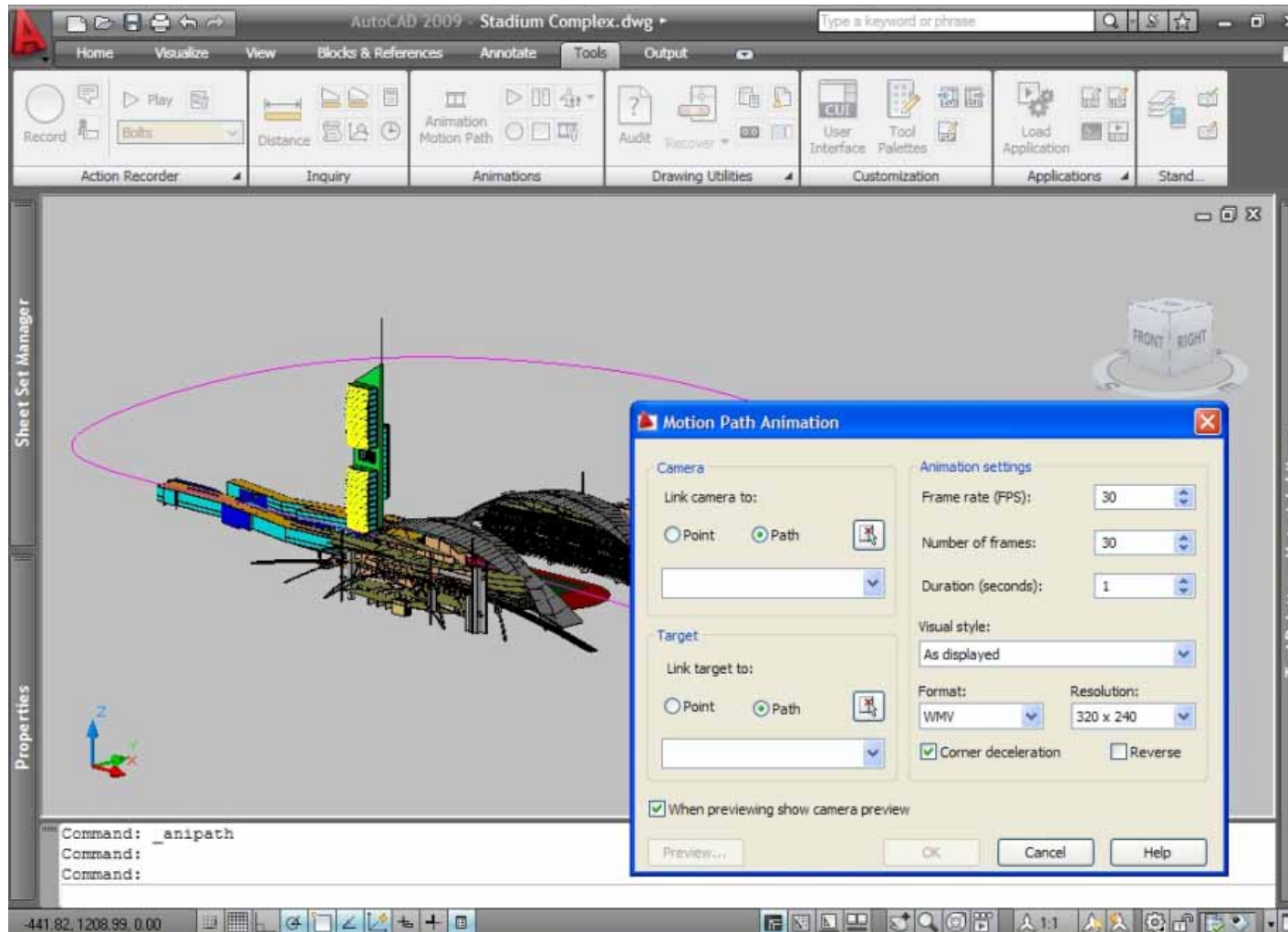
You can record your movements and then save the walkthrough or flythrough to an animation file.

- Control visual style (incl. rendering)
  - Resolution
  - Frame rate
  - Format



# Flythrough using ANIPATH

ANIPATH lets you define camera and target paths and control resulting animation.





# Advanced Render Settings

*You may not need to ever changes these, but...*

- Materials
- Sampling
- Shadows
- Ray Tracing
- Indirect Illumination
- Diagnostics

# Conclusion

**Although there are far more rendering tools available in 3ds max that you can use to create more sophisticated renderings and animations, AutoCAD does provide all of the basic tools you need for creating professional, photorealistic image and animations.**

# Evaluation Forms

Please remember to fill out your  
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# Questions & Answers

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