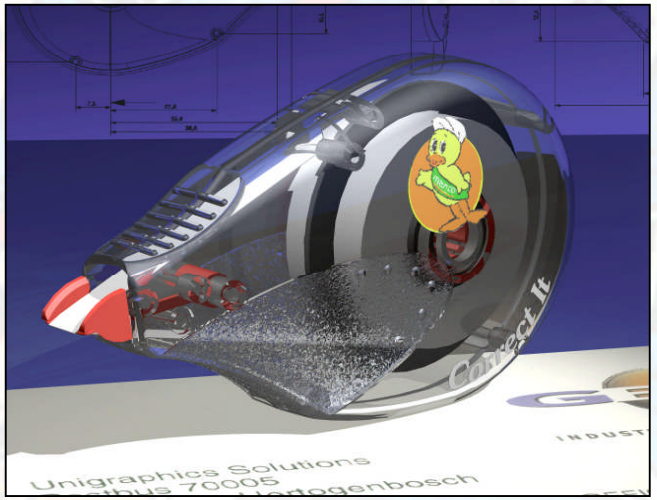
Render methods, Compositing, Post-process and NPR in NX Render

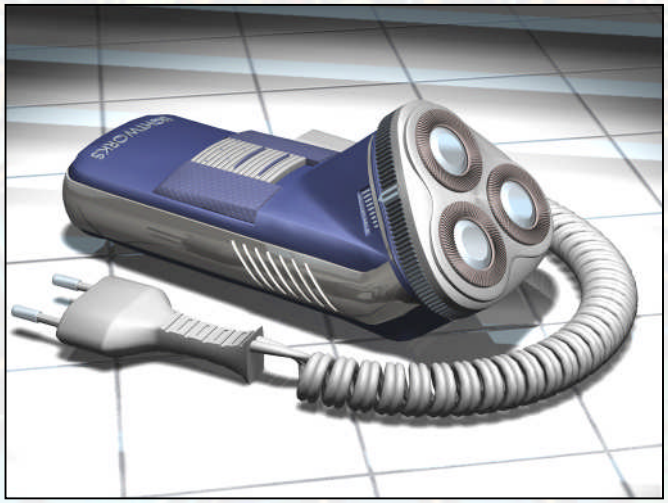
Overview

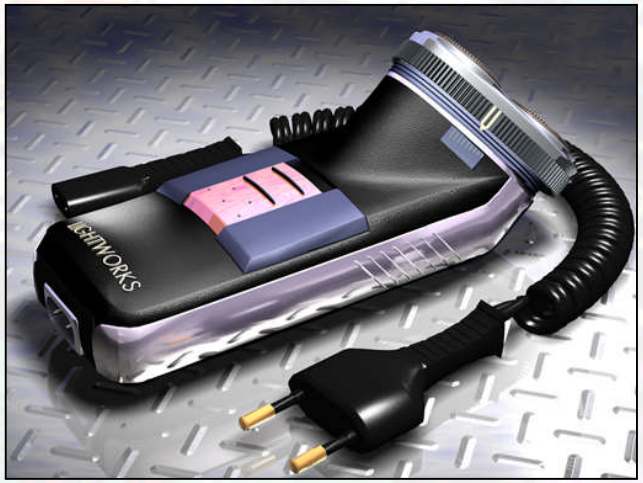
- What makes a good rendered image
- Render methods in NX Render
- Foregrounds and backgrounds
- Post-processing effects
- Compositing models in photographic backgrounds
- Non-photorealistic rendering
- Radiosity

What makes a good rendered image

- Geometry
- Context
- Lighting
- Composition
- Materials







Scene Geometry

- Scene geometry adds context
- Provides surfaces to cast shadows onto
- Provide reflections in raytraced objects
- Indication of scale and weight
- Compositional element
- Create scenery libraries

Scene Geometry

Create your own scenery library

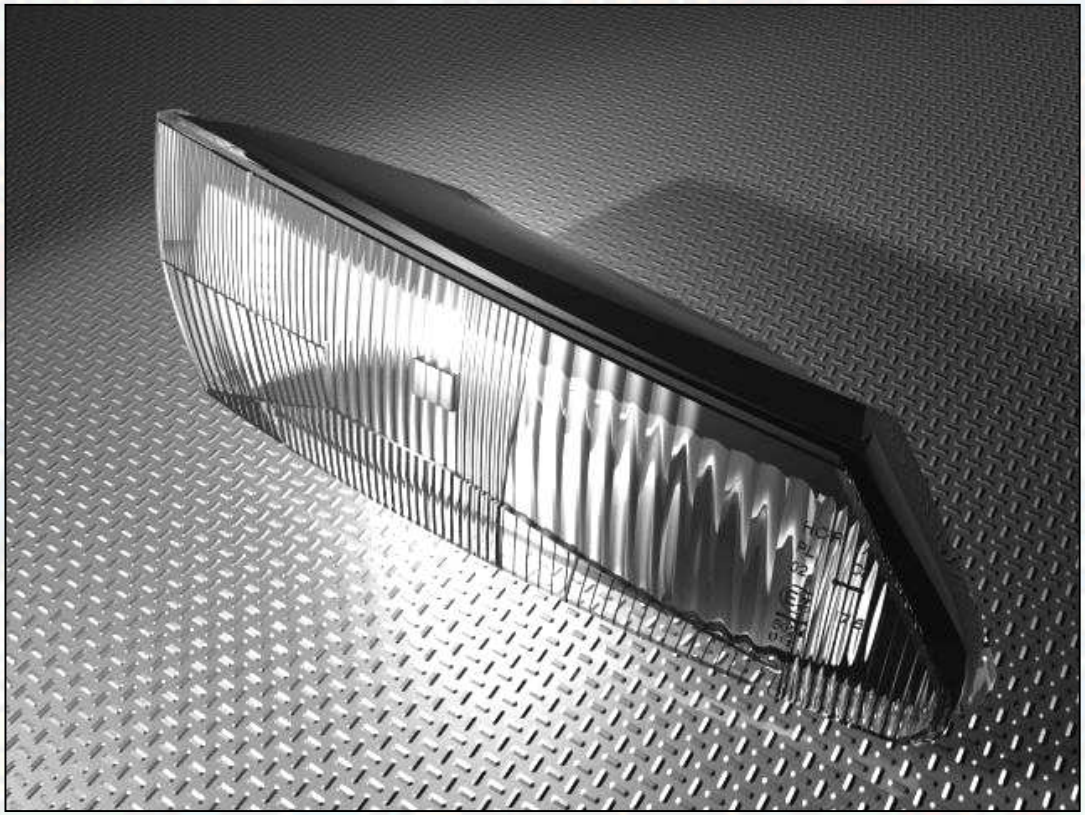
Scenery provides surfaces to cast shadows onto

- Place model slightly above base plane

Setting the view

Define a view early in the image creation process

- Focusing on one view simplifies the problem



Setting the view – Frame Composition

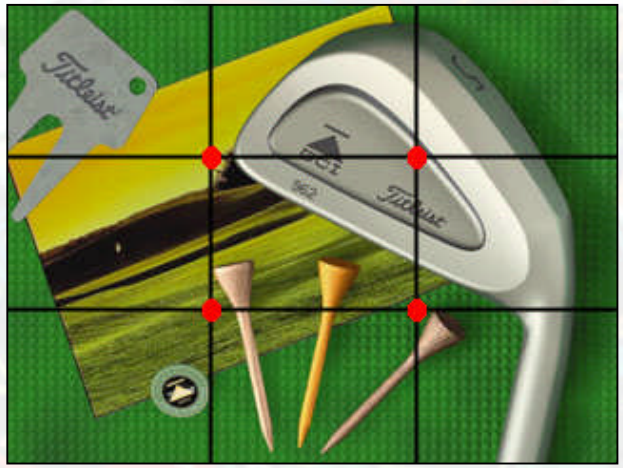
The 3rds principle

- Centres of interest coincide with vertical/horizontal thirds
- Set horizon line, if applicable, level with upper or lower third line

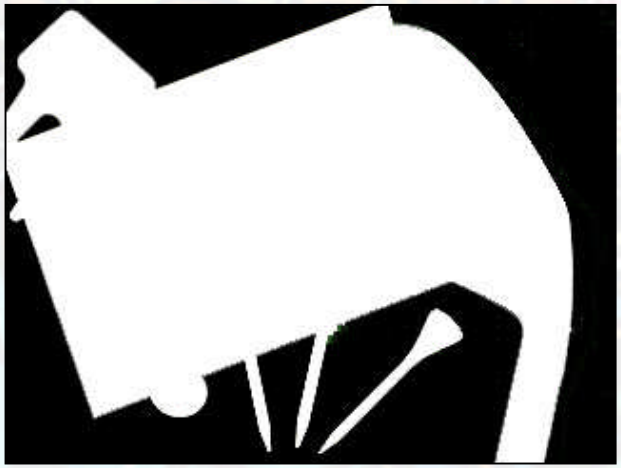
Negative space

- Can be a good way to get a more interesting composition

Experiment – there are no rules



3rds Priciple



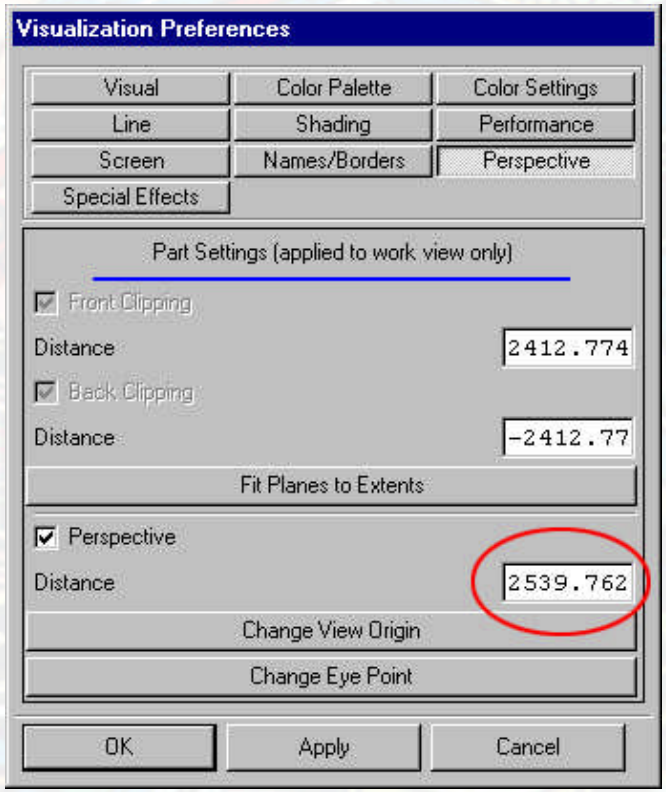
Using Negative Space

Strong central composition

Setting the view – Perspective

Photo-realism requires perspective view

- *Distance* defines the amount of foreshortening
- Use *Distance* equal to front clip plane as a starting point



Preferences>Visualization

What makes a good rendered image

- Scenery can help communicate design ideas and add realism
- Set up a view early on - take time to compose the shot
- Lighting is key to communicating the objects' 3D form – borrow ideas from photography
- Develop a materials and textures library of your own
- Post process can add an extra touch of realism but its not always needed

Working Quickly - Performance

Window size matters (smaller is better)

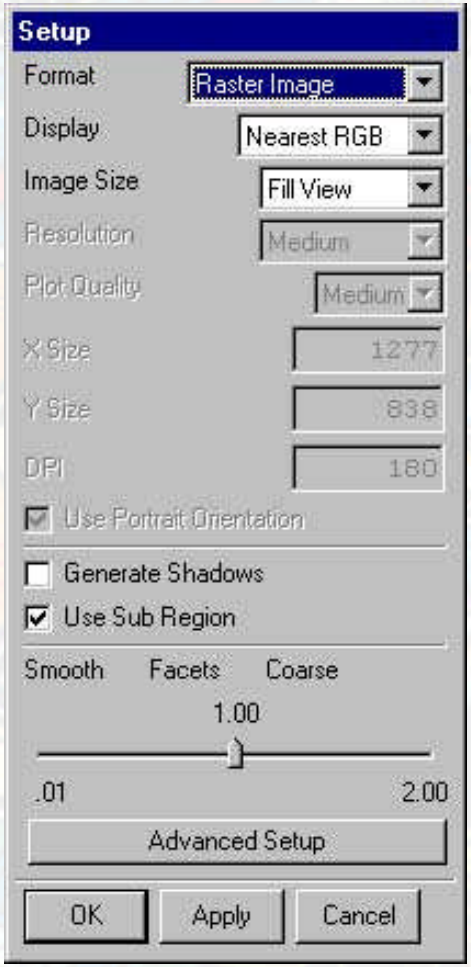
- Resize render window
- Sub-Region rendering

Work with smallest file possible

- Modeling structure has an impact

Rendering control

- Use lowest render mode that allows you to work



View>Visualization>High Quality Image>Setup Shade

Working Quickly - Render Methods

View>Visualization

>High Quality Image

Trade off time against quality

Flat
Gouraud
Phong

Preview renders for modelling verification

Improved
Preview

Higher render modes used to preview materials

Photorealistic

Final render – No RT

Raytrace
Raytrace/FFAA

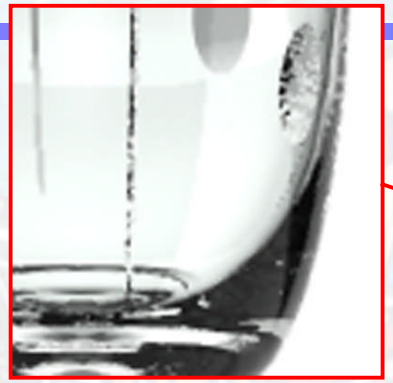
Final render - RT

Radiosity

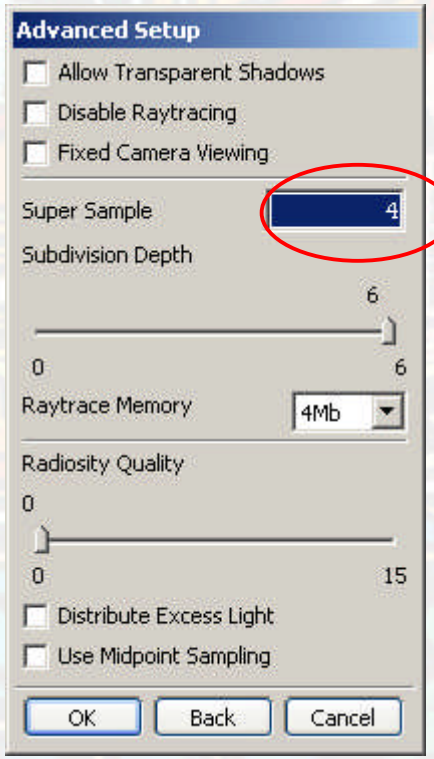
Global Illumination method

Render Methods – Super Sample

- Super sampling internally renders an image *Super Sample parameter* times as large as the output resolution in width and height
- Image is scaled down to output resolution
- Sampling rate effectively increased
- Current render style used
- Can use a lower render mode
- Render time increases exponentially!



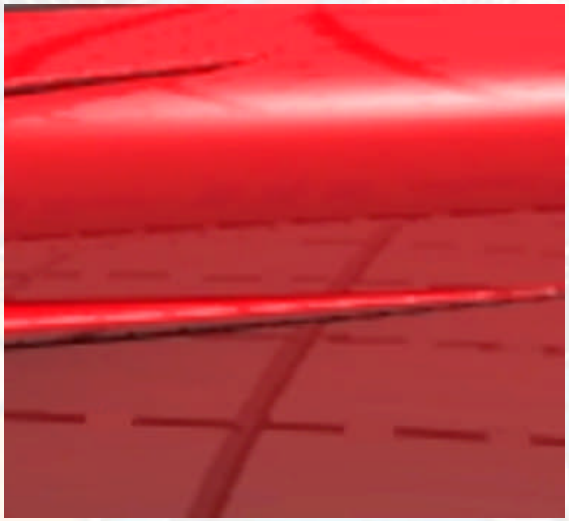
Final image



Render Methods – Raytraced FFAA

- Raytraced render method can suffer from pixel dropout where detailed features fall between samples
- Raytraced FFAA renders the image internally then looks for areas of high frequency change and samples at a higher rate
- This method is more efficient than the super sample technique

Raytraced



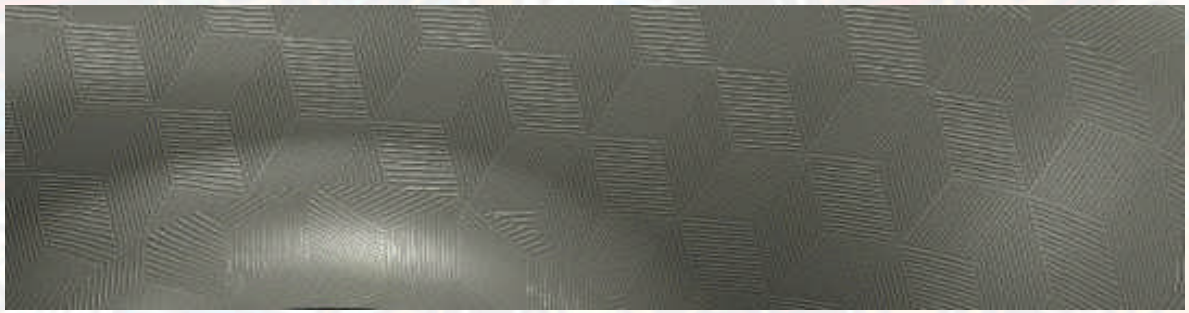
Raytrace FFAA

Render Methods – Glass Example

Photo-real | Raytraced | Super Sample x4 | Raytrace FFAA

Render Methods– Detailed Bump maps

"Photo-Realistic"



"Ray-traced/FFAA"

"Photo-Realistic" + super-sampling * 4

Render Method - Output Options

Render method

- No ray-traced reflections/shadows
  - use *photo-realistic*
- Scene contains Ray-traced shadows or reflections
  - use *Raytraced*
  - Where very fine detail is lost with other render modes use *Raytraced/ffaa*
- Rendering detailed bump maps
  - Use Raytraced/ffaa or *Photorealistic* with Super sampling

Shadow Maps

- Set shadow *detail* to *Extra Fine*

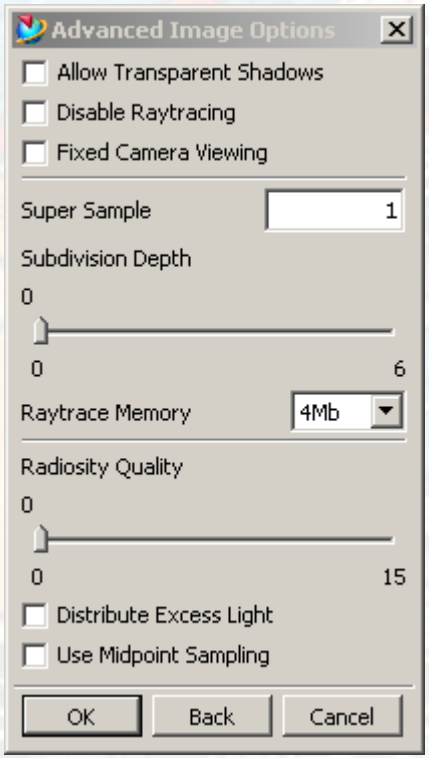
Raytrace optimisation - Options

Subdivision depth

- Default 0
- Use higher values when looking at a small part of a large model where raytrace materials are used

Raytrace Memory

- Memory allocated for the raytrace octree data
- If this memory is exceeded the octree data will be regenerated. For large models this can happen often and have a big impact on render time.
- Increase this to 128Mb for large models



File output

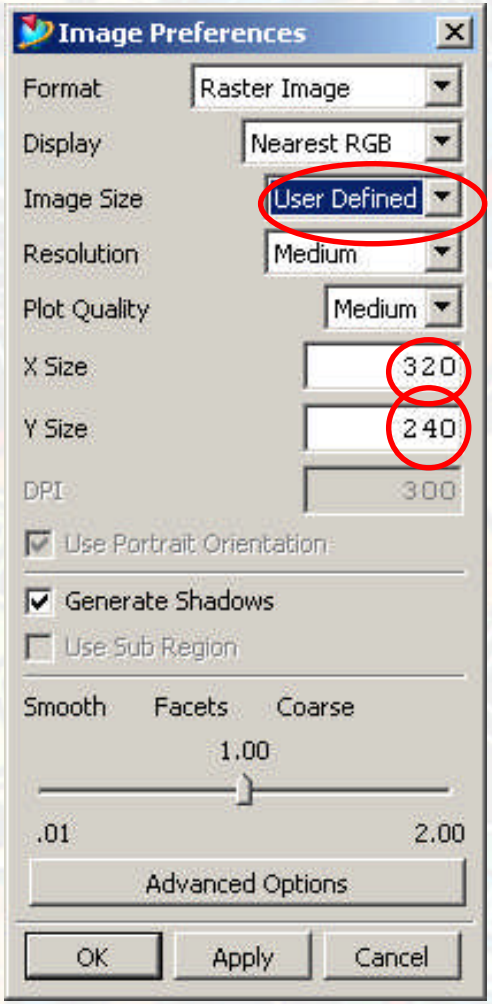
Tiff files at user defined resolution

- Image size – defaults or user defined
- Format = raster image
- Render then save file

QTVR panorama

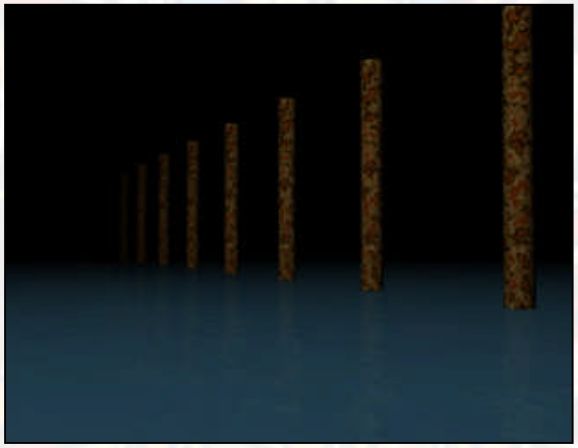
QTVR Object Movie

- High or low quality settings
- Number of images around the object
- Increased smoothness of movement



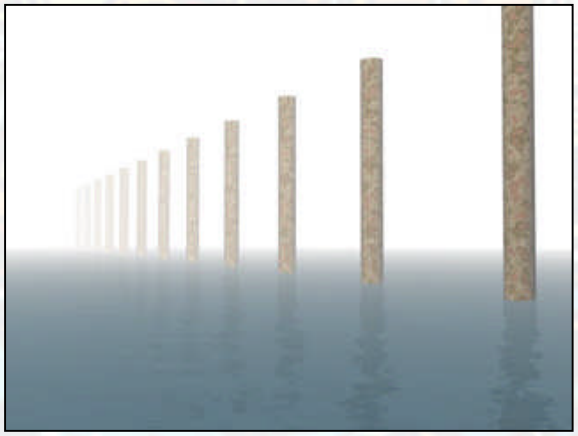
Foregrounds

- Fog
- Ground Fog
- Snow
- TIF Image
- Light Scatter
  - Slower, but more accurate
- Depth Cue
  - Useful for fades

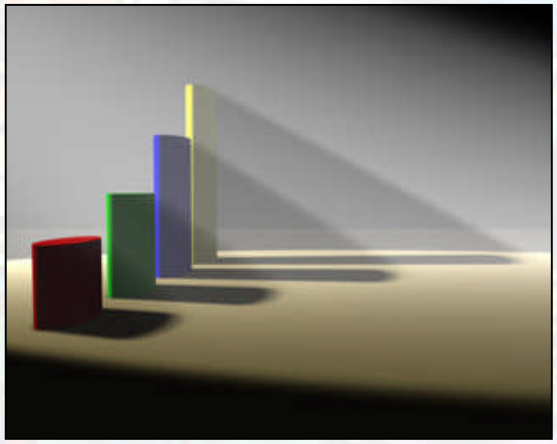


Depth Cue

Ground Fog



Fog

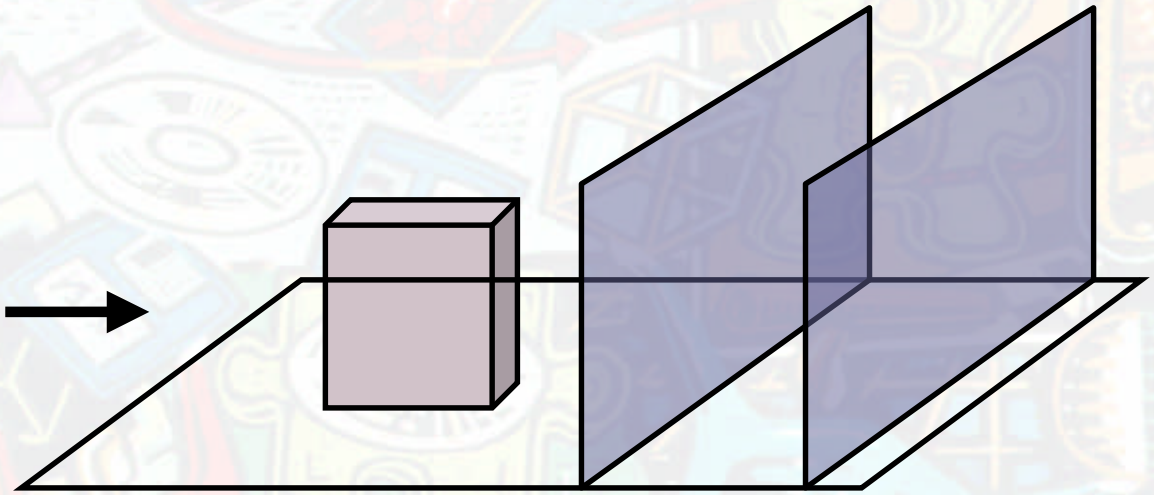


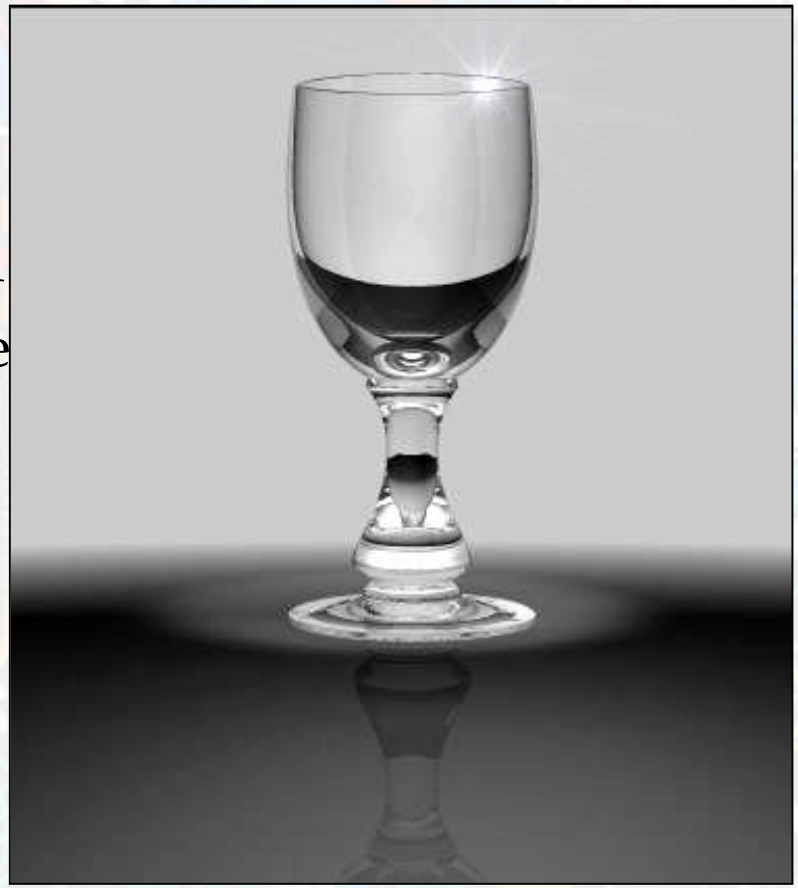
Light Scatter

Foregrounds - Depth Cue Fades

Depth Cue can be used to hide scene geometry edges

- Near and Far distance parameters
- Set Near distance to beyond the model
- Set Far distance to before far clip plane





View > Visualization > Visual Effects > Foreground

Backgrounds

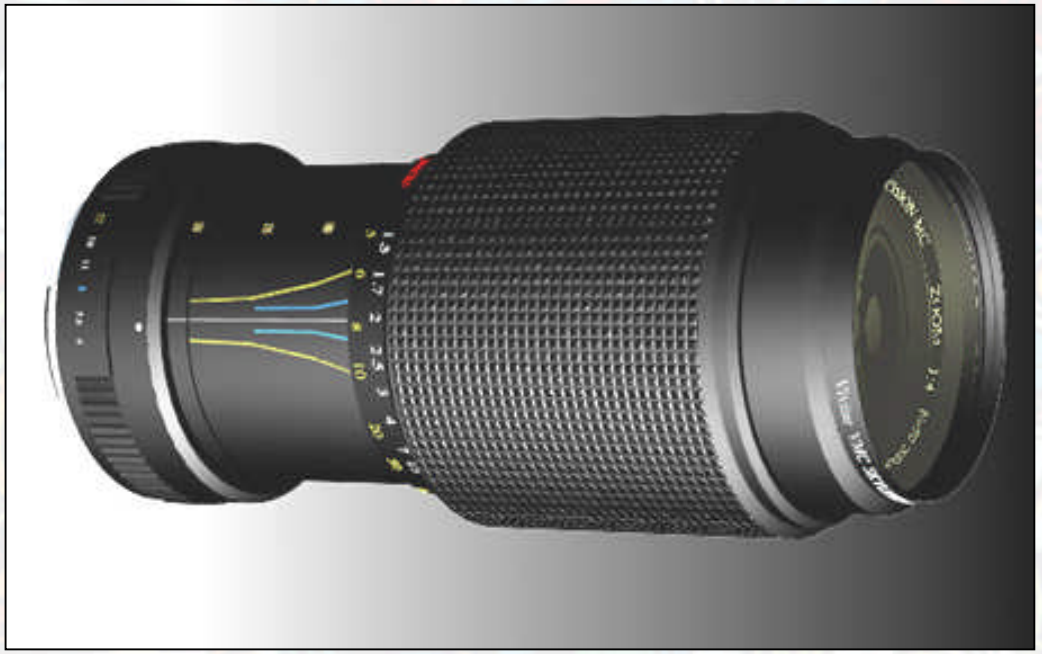
- Clouds
  - Set Detail high
- Graduated
- Plain
- TIFF Image
- Ray Cube and 2 planes
  - Important for RT reflections

View > Visualization > Visual Effects > Background

Post Process

Features relating to photographic lenses.

- Depth of field
- Lens Flare

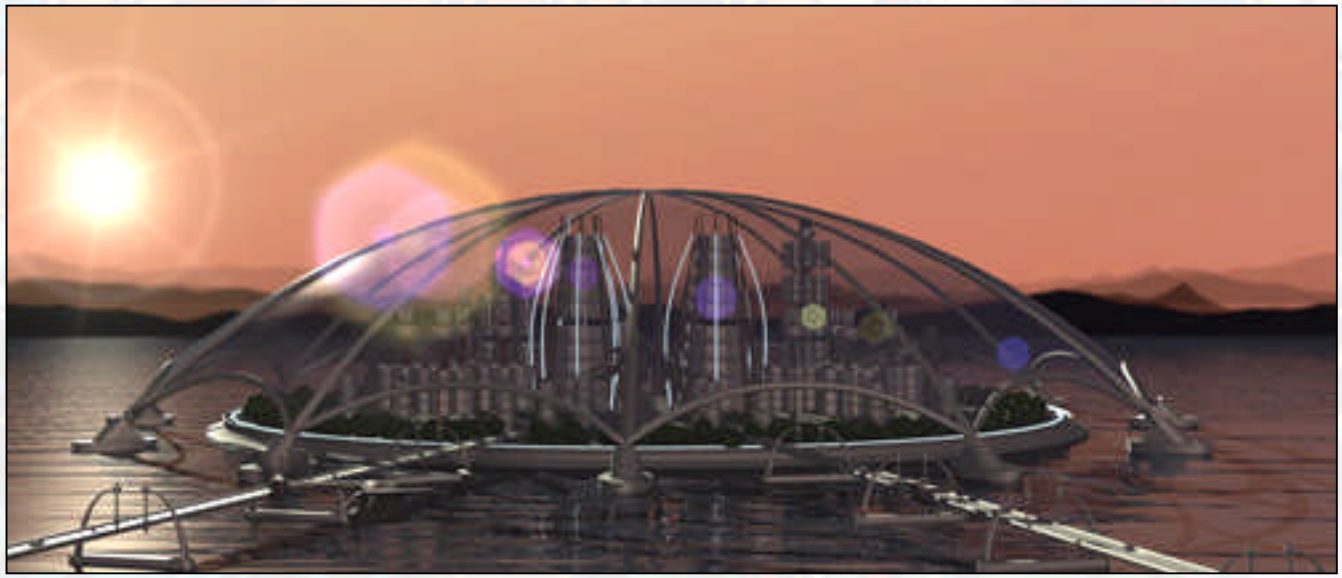


View > Visualization > Visual Effects > Special Effects

Post Process

Lens Flare

- Burst of light caused by photographic optics
- Works well with animation
- Consider compositing afterwards for still images



Post Process – Depth of Field

Depth of field

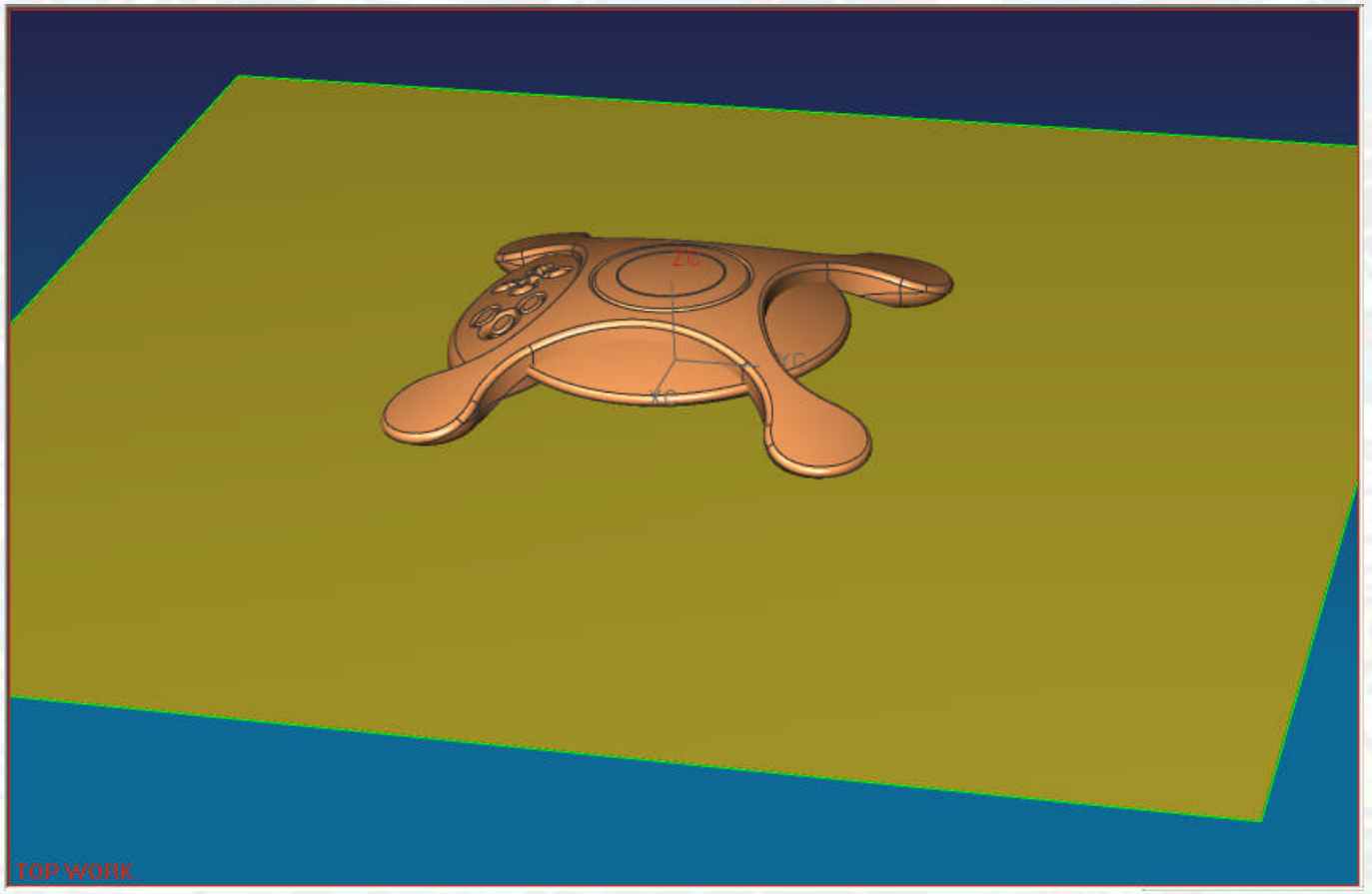
- Image is blurred based on depth
- Simulation of real photographic lenses
- Focus plane can be defined

Compositing models in photographs

Shadow catcher can be used to composite a model into a photographic image

Compositing models in photographs

Create a bounded plane underneath your model



Compositing models in photographs

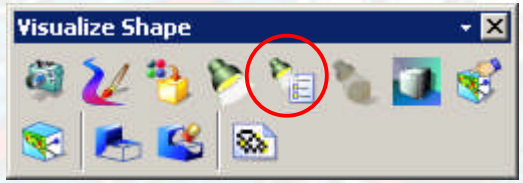
Set a tiff image background using a photo of a scene

Compositing models in photographs

Adjust the view to match the photo

Compositing models in photographs

Apply shadow catcher to the surface



Compositing models in photographs

Set up lights that cast shadows

Try to approximate the light in the photographic background

Non-photorealistic Rendering

Artistic Image

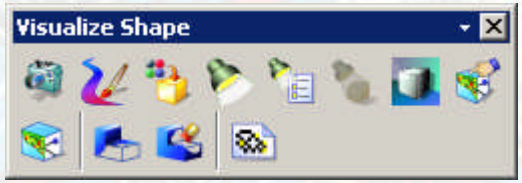
8 styles with user parameters

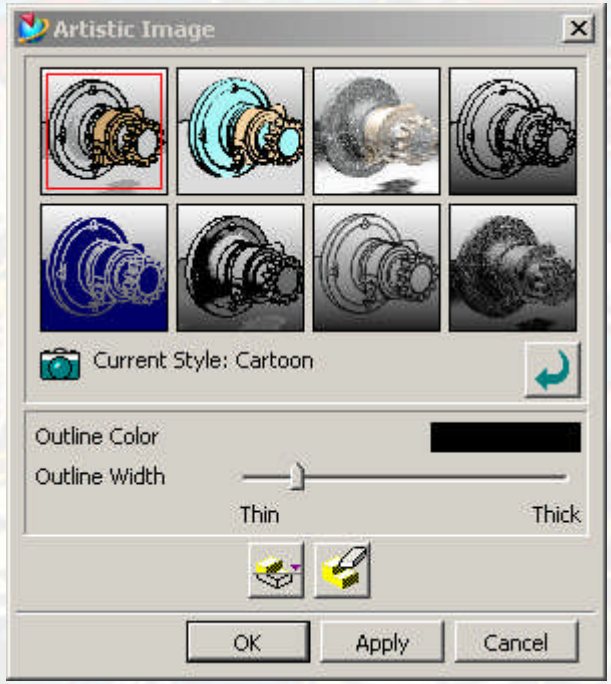
- Cartoon
- ColourWash
- Pencil Shade
- Hand Drawn

Solid styles

- Ink Print
- Lines and shadows
- Rough Pencil
- Stipple

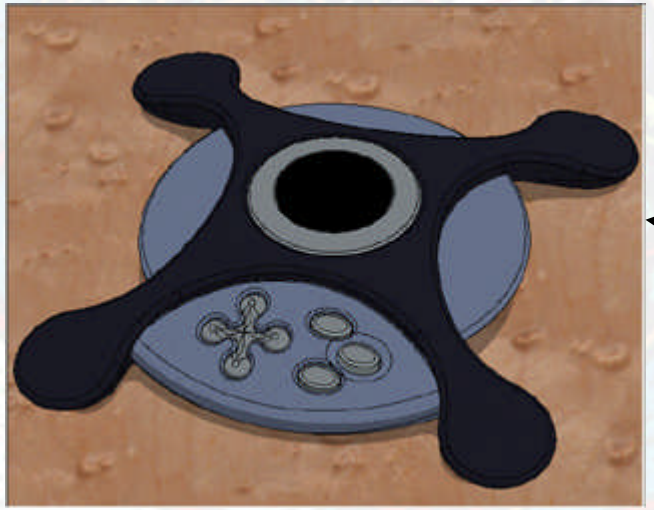
Vector Styles – Background shows through

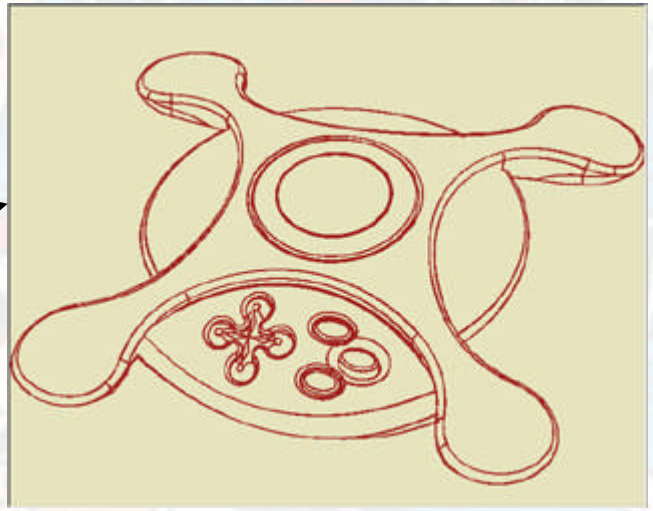


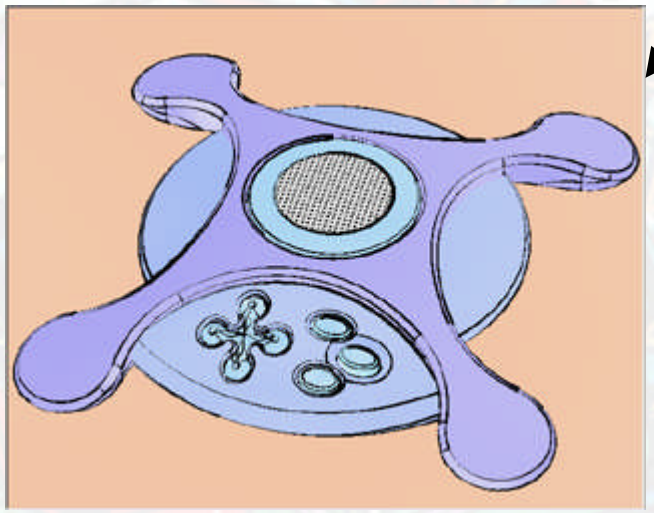


View->Visualization->Artistic

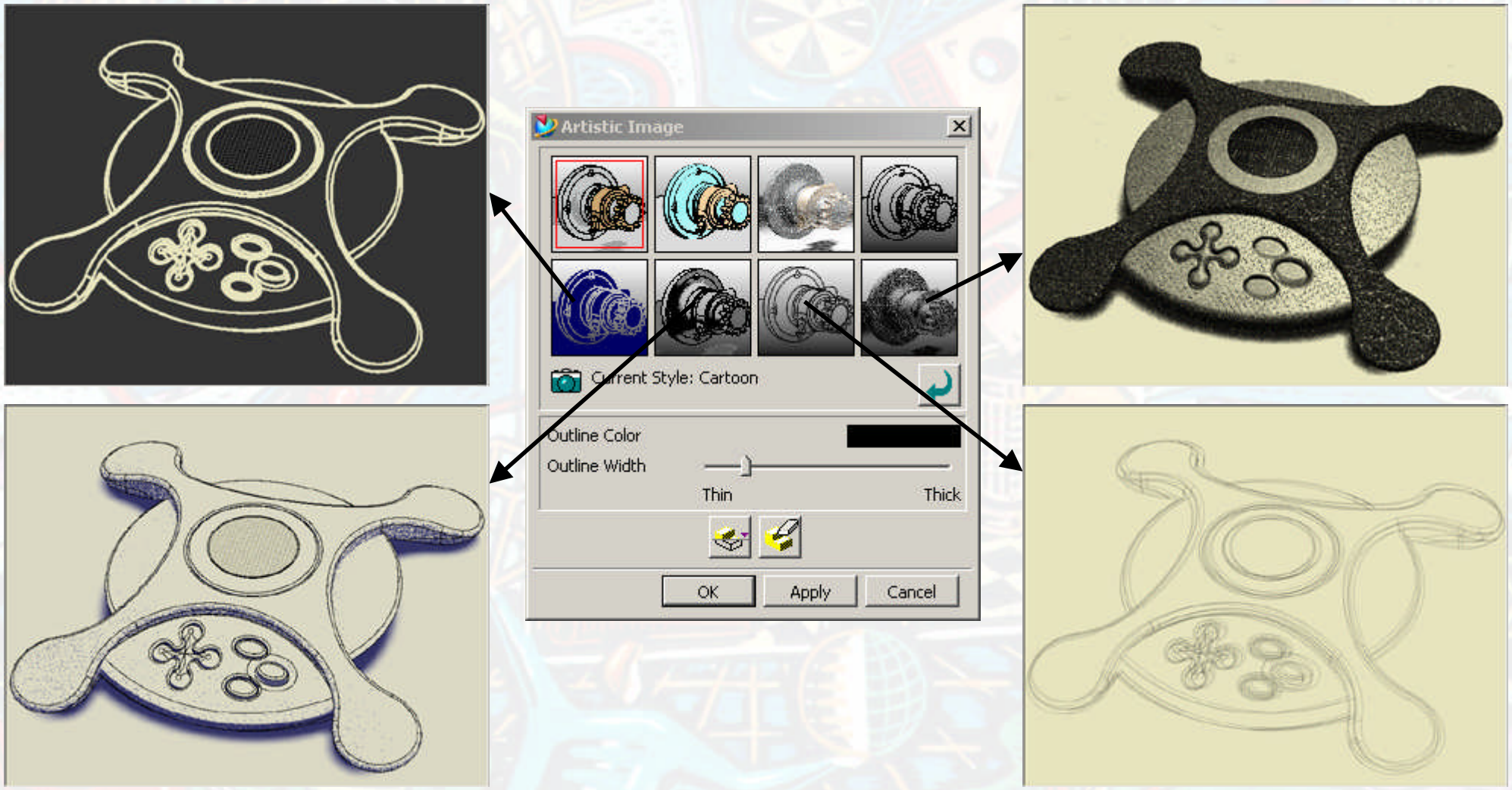
Non-photorealistic Rendering







Non-photorealistic Rendering



Radiosity

- Radiosity is not a render method it is a lighting pre-processing step.
  - 1. Light is emitted from the light sources to the surfaces in the scene
  - 2. The light from all of those surfaces is then emitted into the scene
  - 3. Step 2 is repeated until the required accuracy is reached
- Radiosity is suitable where large areas of the model are lit by secondary light (bounced off other surfaces)
- Not suitable for models floating in space as it requires surface to bounce light between
- Diffuse light only is considered so it is not suited to scenes where the majority of the materials are highly specular
- Radiosity is compute intensive

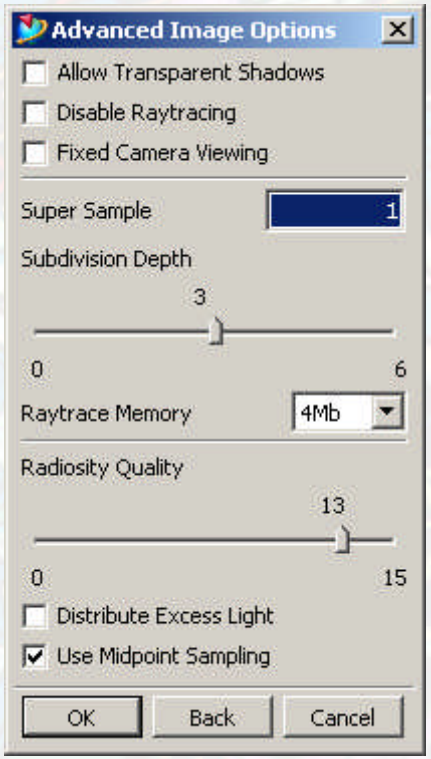
Radiosity

Set up lights as normal but with no ambient – radiosity calculates this accurately

Set render method to Radiosity

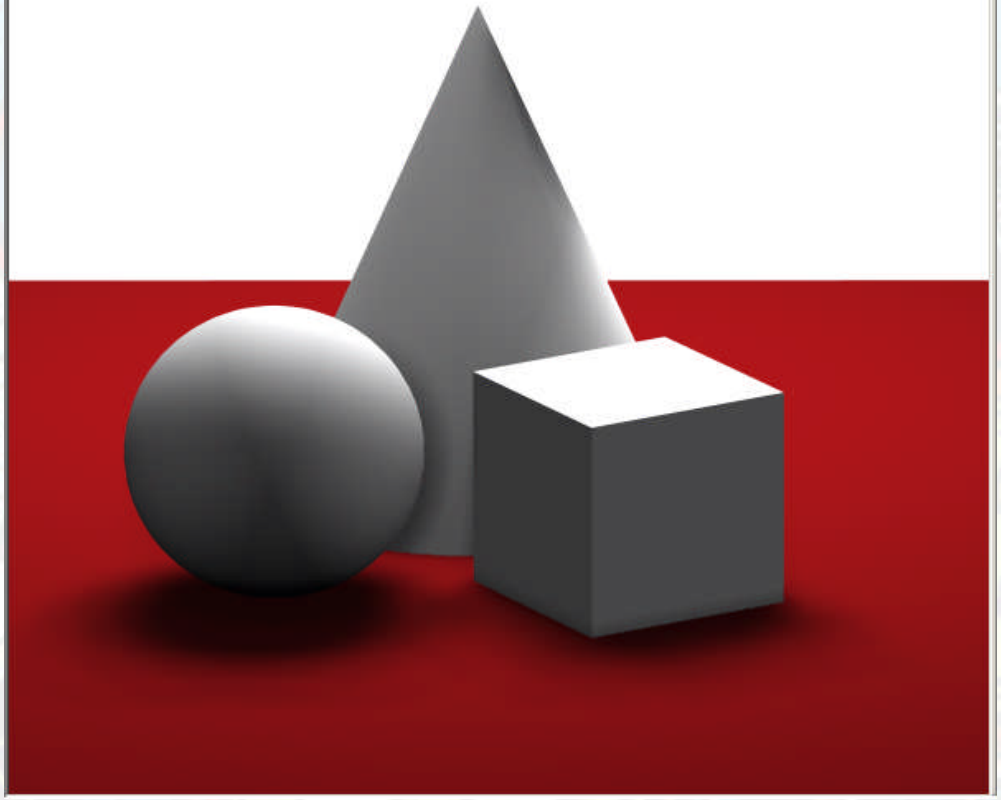
Advanced Image Options – Radiosity settings

- Always tick "Use Midpoint Sampling"
- Start with low Radiosity Quality and work upwards
- Distribute excess light will add in illumination that hasn't been computed - like an ambient light. As the solution progresses and becomes more accurate this effect is reduced

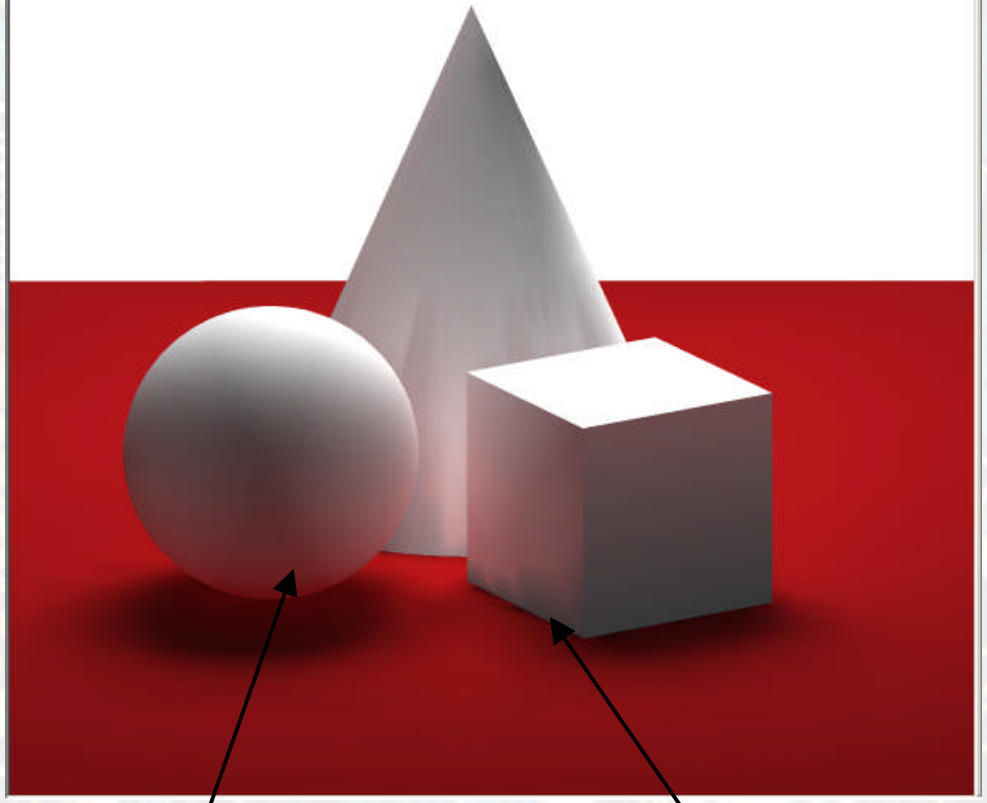


Radiosity

Standard render



Radiosity

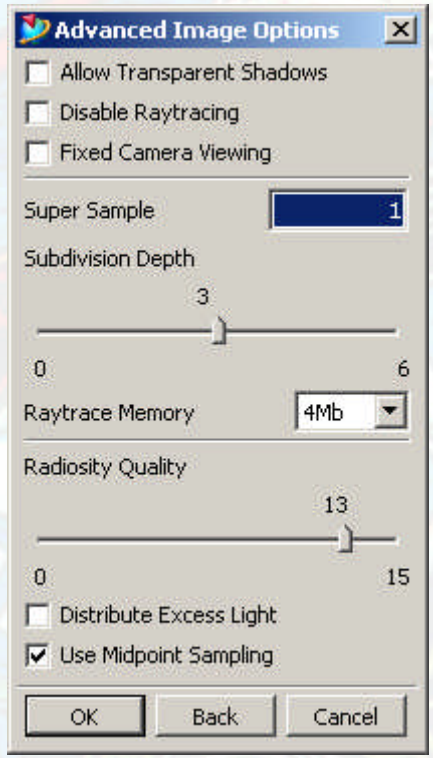


Reflected red light from the base

Shadow artifacts

Hybrid Radiosity

- Set render method to Hybrid Radiosity
- Hybrid radiosity calculates a solution for bounced light then removes the direct light
- Direct light and shadows are rendered in the normal way
- This avoids shadow artifacts while still giving secondary (bounced) light



Hybrid Radiosity