

Lighting

Lighting and rendering can be used to evaluate the design proposal and simulate various conditions; both naturalised lighting and artificial lighting can be used. BIM lighting components may have controllable luminosity and specification, allowing a match between virtual and built environments.

Specular mapping is the application of light and dark on a texture surface, which can be painted in.

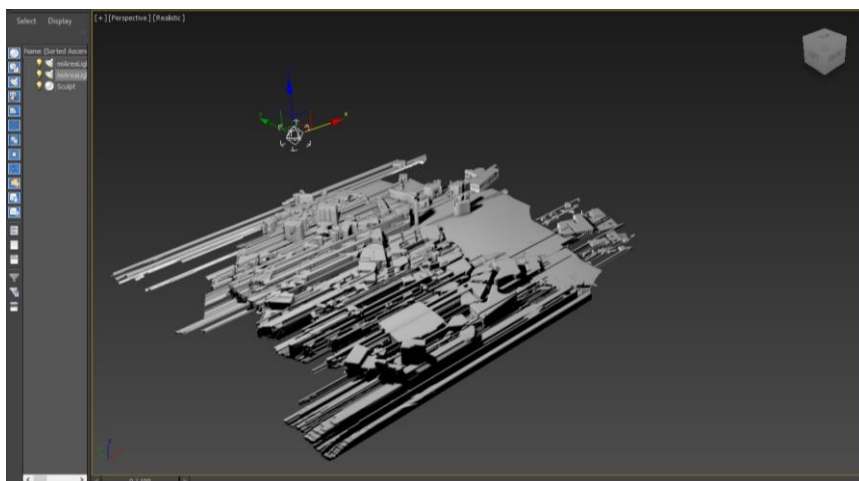
Sky portals define the sky and sun settings within the 3D model. An interior will not render correctly if the sky portal is not in place. Sun positions, strength, size and brightness can all be controlled. Sky portals can sometimes be geo-referenced and seasonal choices and time zones can be applied.

Photometric lights make reference to manufacturers lighting specifications and can be used to add precision to the rendering and allow the simulation of different fixture choices on the design proposal.

Particles can be used to simulate realistic snow, rain and smoke. You can also add physics simulations like avoidance, gravity and bounce.

Software: Autodesk 3DS Max 2016

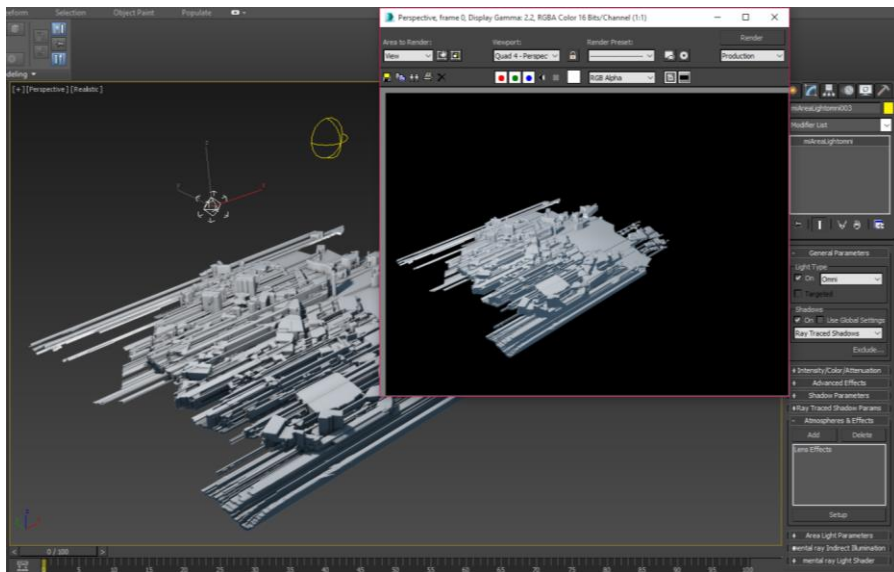
Interoperability note: 3DS Max – if using Mental Ray as a renderer, only use photometric lights in the setup.



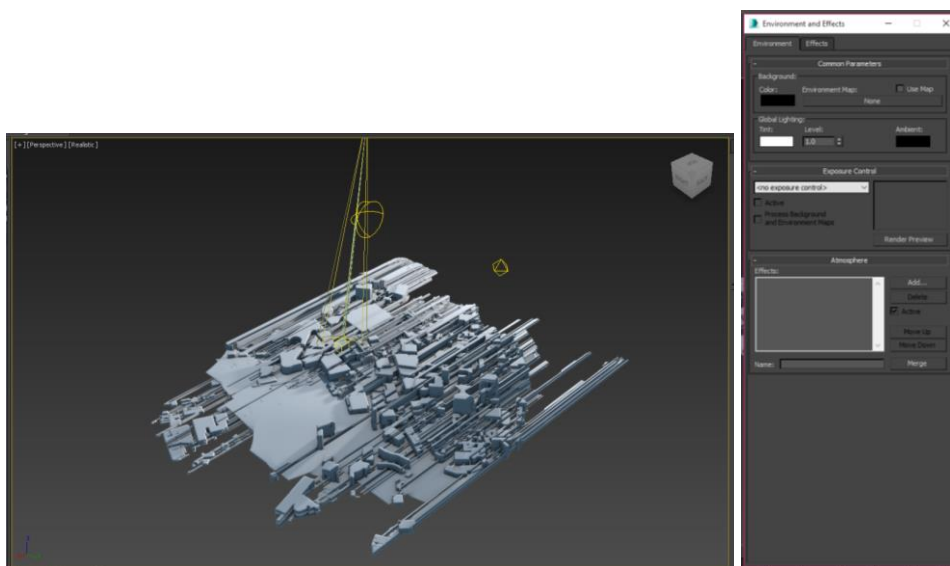
1. There are various standard lights in 3DS Max: target spots, target direct, free spot, free direct and omni-lighting. These lights also appear in similar 3D modelling programs. Load the lighting standard 3DS Max scene file from the Chapter 4 tutorial folder. Maximise the perspective viewport. Go to the *Create* tab on the right-hand side and select the lighting icon. Select *Standard lights* and select *mr Area Omni*. Reduce the perspective window and place a light above the model. You can move the light using the *Move* tool. You can adjust the intensity, size, shadow casts and other parameters in the *Modify* tab to the right.

Strategies for Landscape Representation: Digital and analogue techniques, Routledge. ©2017 Paul Cureton.

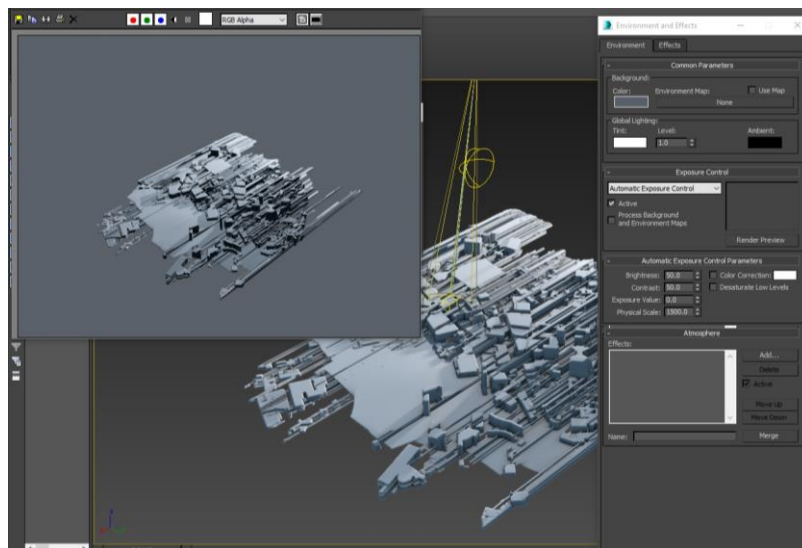
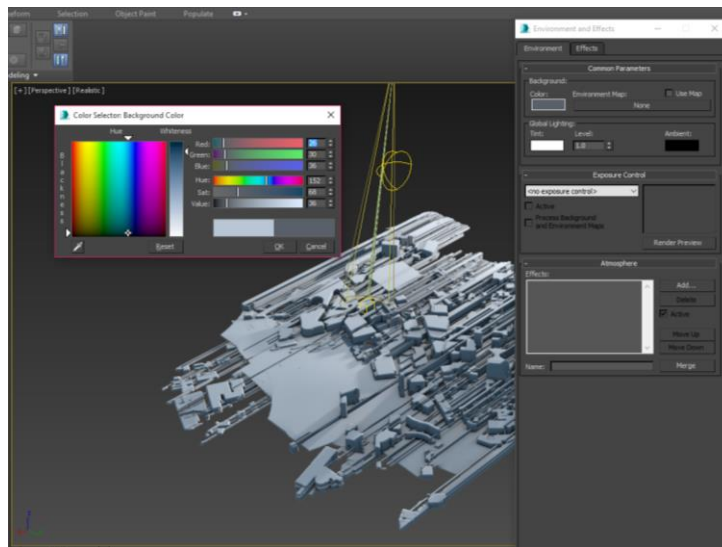
Material to be used for educational purposes and with book companion.



2. Add a skylight to the model using the same process and in the modify panel change the multiplier to reduce the intensity. You can specify a sky colour or scene environment (press 8 on the keyboard). Render the scene at low resolution to view the lighting effects.



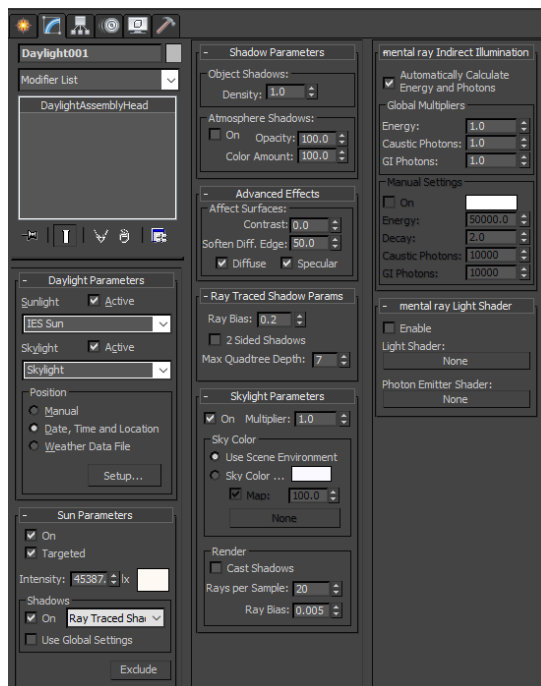
3. Add a targeted spot to the scene and select a key building in the scripted city. Adjust the direction using the *Move* tool. In the *Modify* panel, select *Show cone* and overshoot to get a more diffuse effect to the spot. Render the scene again. This is a variation of a three-light standard system which comprises a key light (primary light), fill light (to enhance shadows) and back light, which is low to the object/model to highlight and give intensity. Creating an accurate sun system is covered in the Environment tutorial in this chapter. Once lighting has been defined, go to the *Create* tab and create a standard camera from view. Setting the perspective view allows adjustments to the lighting scheme. The modelling process is cyclical; once a view is chosen, the scene modelling, texturing and lighting and rendering can all be iterated until a final render is executed.



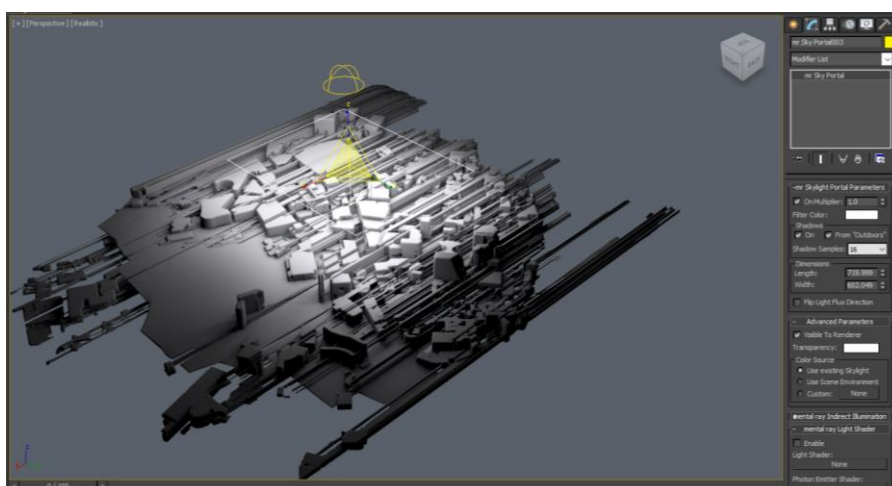
4. To create an ambient light, press 8 on the keyboard. Select the *Colour* tab in the background area and use the selector to define a colour. Add a blue colour hue to create a more naturalised landscape and environment. The exposure control can be adjusted; in this case select *Automatic exposure*. This method creates a simple ambient environment from colour control.

Photometric lights and sky portals

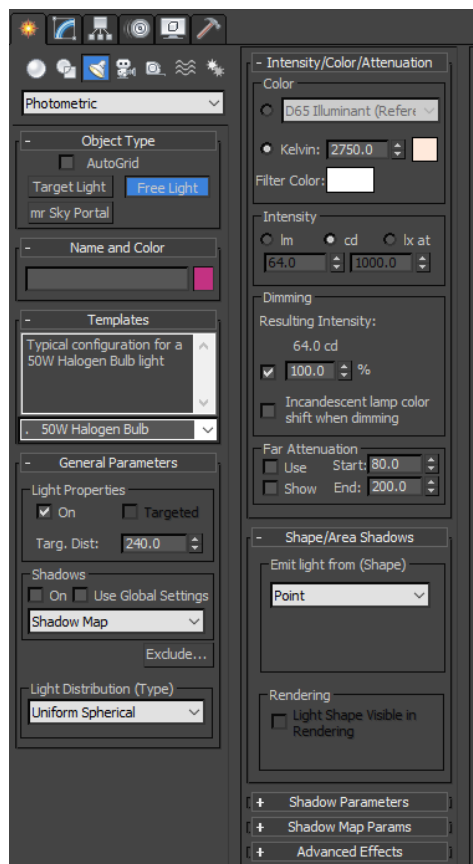
Photometric lights are real-world references to energy values and luminance of natural and artificial lights. These can be used and specified in Revit and rendered within 3DS Max. Sunlight and daylight systems are also part of the photometric system in 3DS Max. To create a daylight system select the render tab on the top toolbar, select *Lighting analysis* and create a daylight system.



1. Daylights system. Click the daylight position and define the height of the light system. The *Modify* panel will appear. The date, time and location, northern direction and latitude longitude can be defined. A daylight system is a skylight which is non-directional light (IES skylight, mr skylight) combined with sunlight (which is either IES sun or mr sunlight or skylight).



2. Sky portal. Create a standard skylight above the model. Create a sky portal above the model and position and scale it. In the *Modify* tab, set shadows to on and from outdoors. In the advanced parameters, select *Visible to renderer*. You can use sky portals for interior scenes to enhance features.



3. Free light. Select *Free light* to position artificial lighting. Select a template to define a specific luminance; you can adjust kelvin and shape of the light source, among other options.

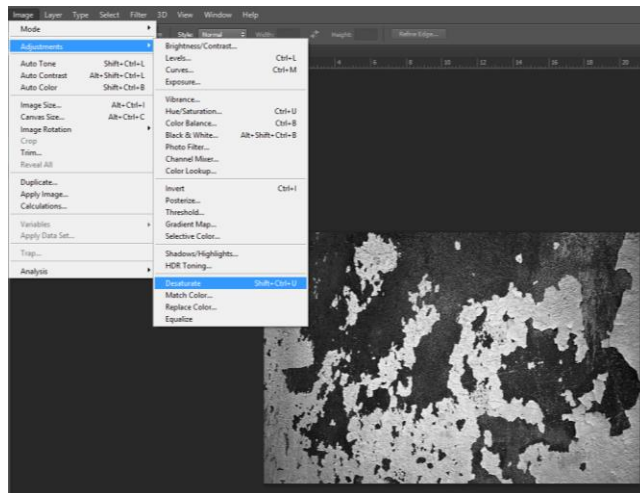
Additional links

Daylight system: <http://help.autodesk.com/view/3DSMAX/2016/ENU/?guid=GUID-DC2CF460-BE73-409B-8A3D-8ECE9CB47EC1>

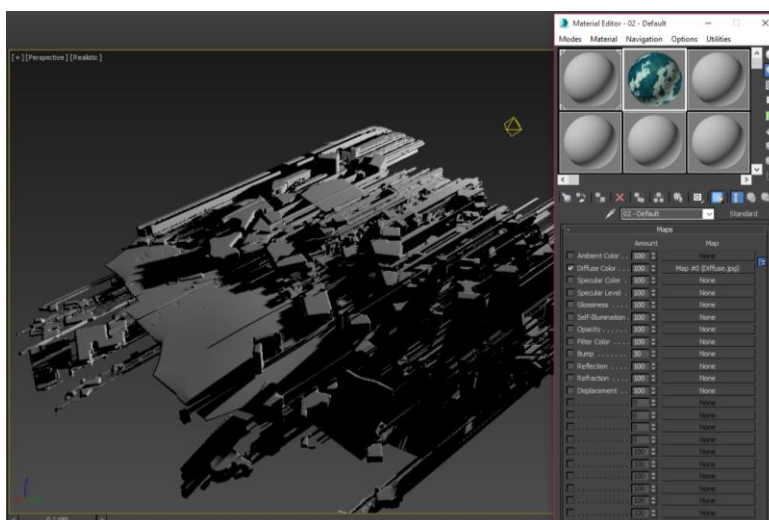
Photometric lights: <http://help.autodesk.com/view/3DSMAX/2016/ENU/?guid=GUID-E337DCA6-6B8D-4689-BCB8-6A6EEF06E6EE>

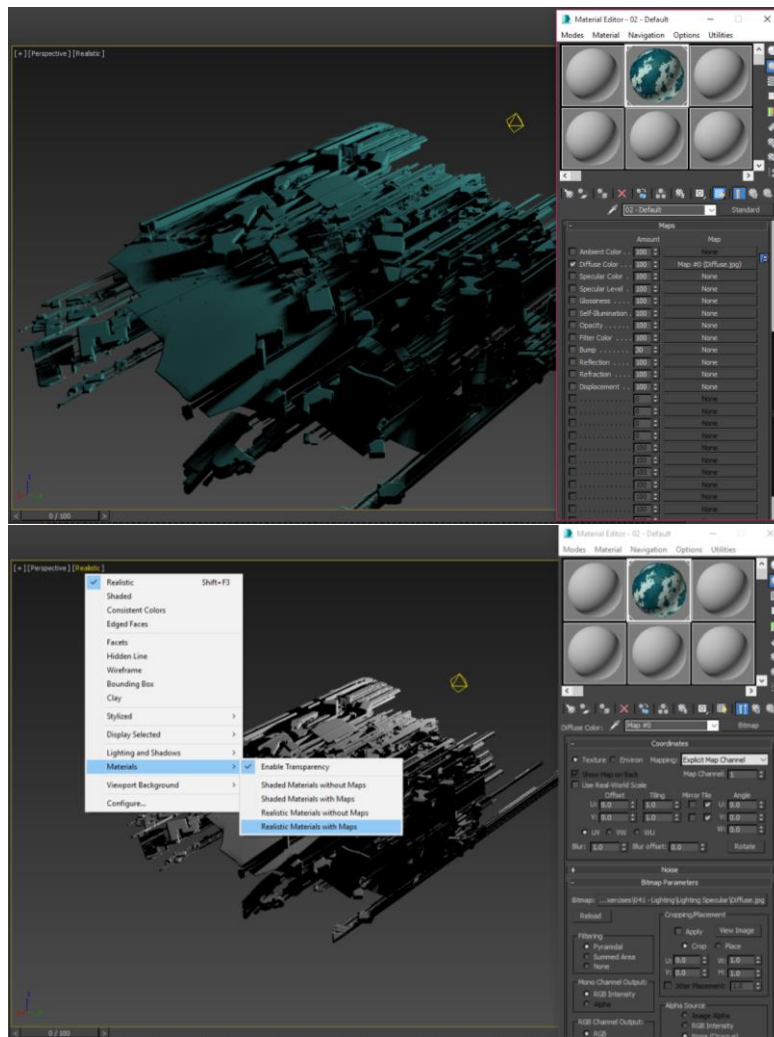
Specular maps

Specular level affects the intensity of highlights, while specular colour alters the colour of highlights. The process for each is the same in 3DS Max.

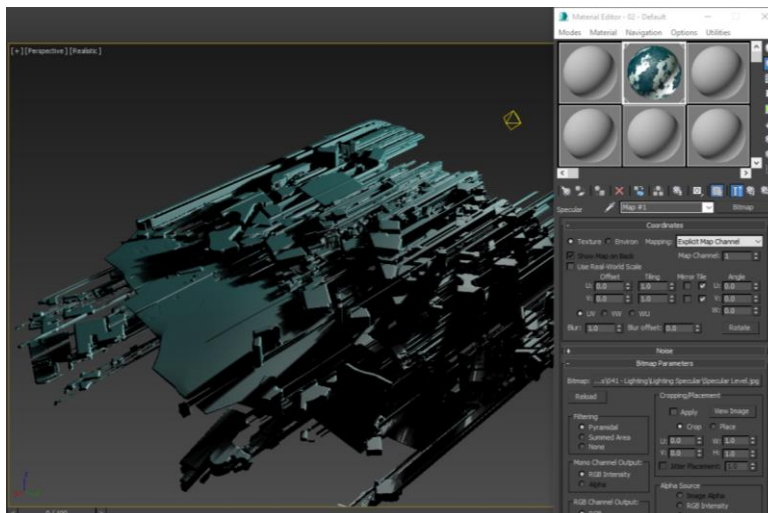


1. To set-up a specular level map, load Photoshop and the texture image you wish to use; either copy an existing texture or create a blank canvas. Desaturating the image will provide the best effect for specular level, while using Photoshop levels (Ctrl + L) will allow a high contrast between highlights and shadows. Adjust the sliders to ensure a high contrast. Save the image as a BMP or JPEG file. If a specular colour is required, increase the vibrance and add a photo filter, specifying a mono colour.

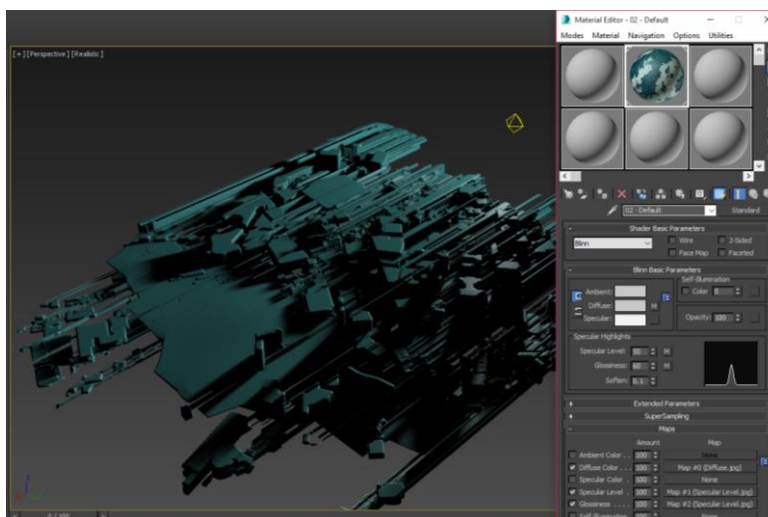




2. To assign a specular map, load the *Compact material editor* and select a blank slot. Go to *Maps* and expand the section. Select the *Diffuse* area and click where is states 'none'. Load the diffuse texture in the tutorial folder. Select *Bitmap* as the type of material state. Assign the material to the selection by dragging and dropping onto the object. In the perspective viewport, right-click on *Realistic*, select the *Materials* pull out and select *Realistic with maps*. This provides a realistic view with the assigned materials.



3. Navigate to the default area of the material and return to the maps section. You can now add the specular level of the texture by clicking 'none', selecting a bitmap format and loading the file. Repeat again for maps, this time adding the specular level image to the glossiness section of the maps.



4. Navigate to the default area of your material in the *Compact editor*. An area titled *Specular highlights* provides the intensity and glossiness setting with which the material reflects.

Additional links

Specular maps: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2017/ENU/3DSMax/files/GUID-0CEDBCDF-7AD6-4C42-A44B-03DF9E35771B-htm.html>

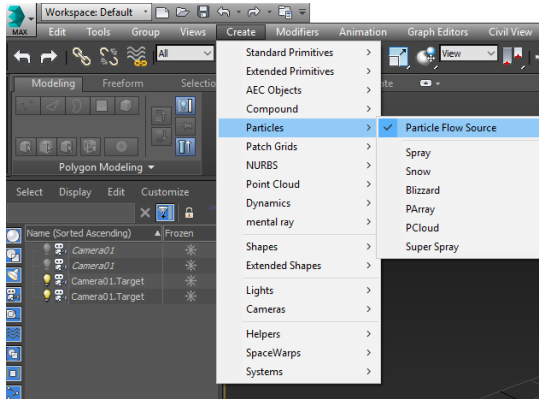
<https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2017/ENU/3DSMax/files/GUID-0CEDBCDF-7AD6-4C42-A44B-03DF9E35771B-htm.html>

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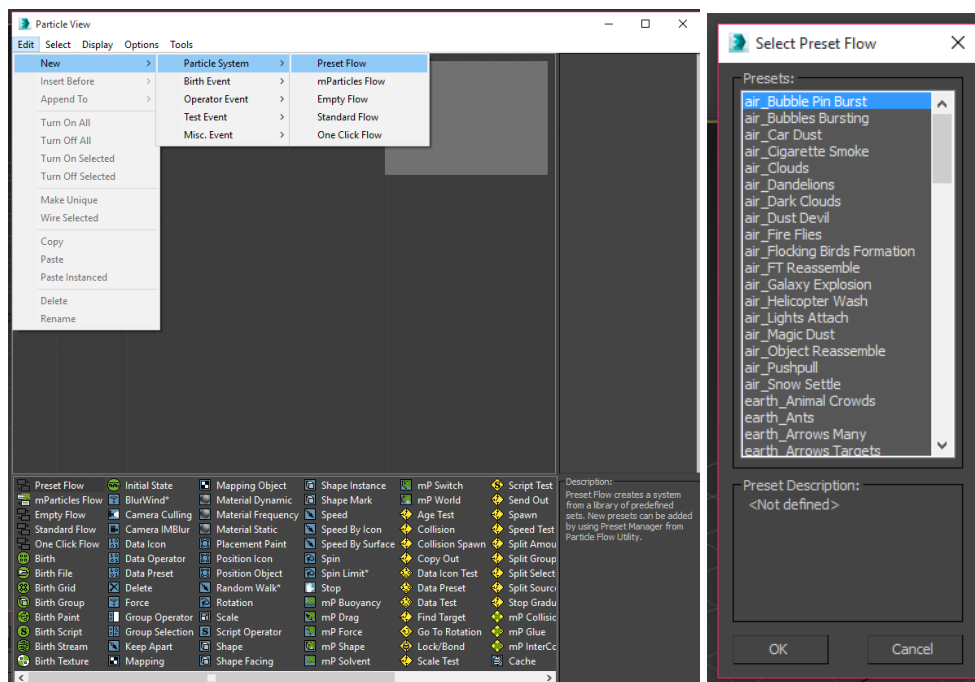
Material to be used for educational purposes and with book companion.

Particles

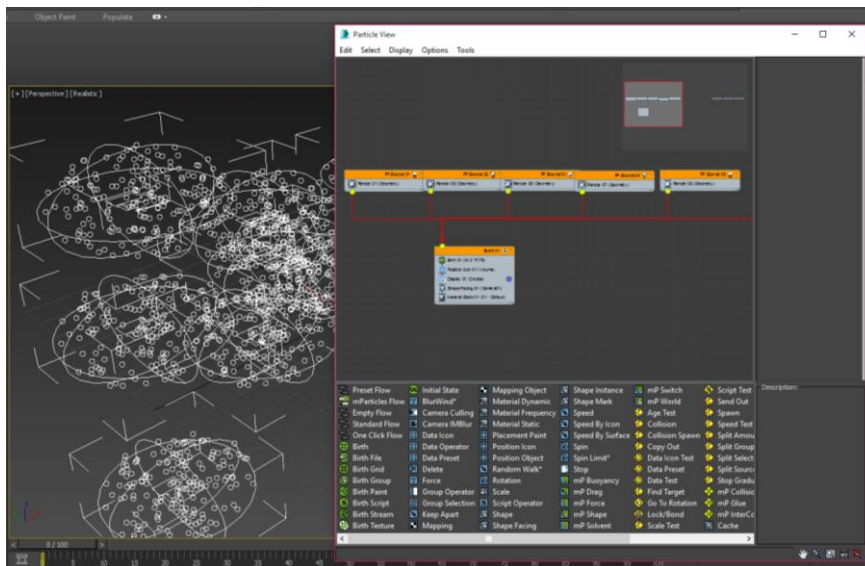
3DS Max has over 100 default particle operatives to utilise, created by the VFX artist Allan McKay (www.allanmckay.com). Primarily designed for visual effects, particle systems can add naturalising dynamics that would be a difficult and time intensive modelling task. The 3DS Max particle system can be used with other software such as Fume FX (www.afterworks.com/FumeFX/Overview.asp).



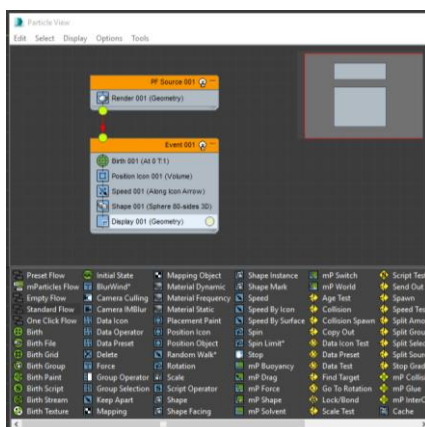
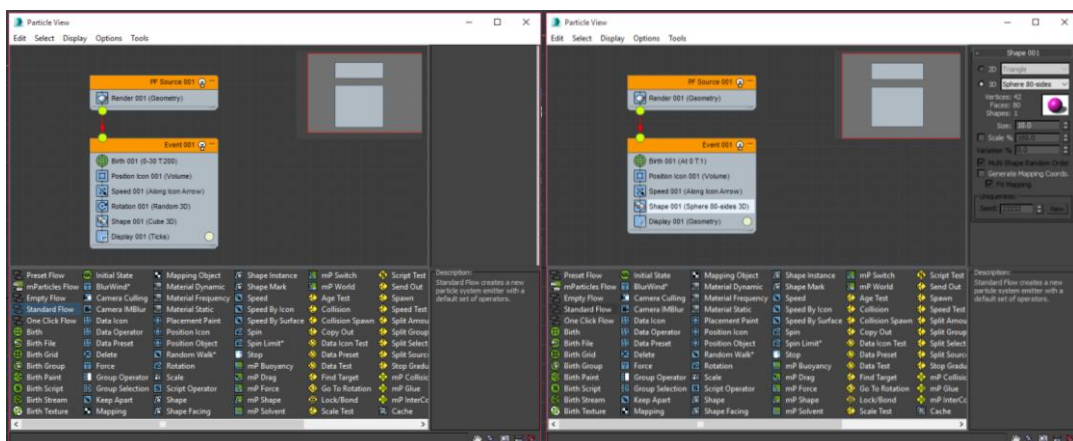
1. To access flow pre-sets, load 3DS Max and create a new scene. Go to *Create > Particles > Particle flow source* (or click the *Create* tab > *Helpers > Particle flow*). The *Modify* panel will appear on the right. Click *Particle view* in the *Setup* section (6 on the keyboard).

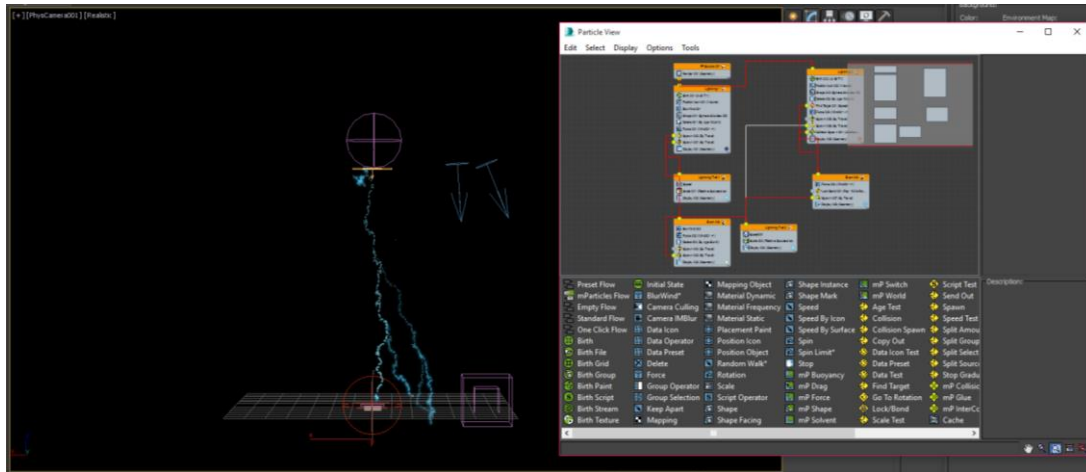


2. Select *Edit > New > Particle system > Pre-set flow*. A new window appears with pre-set particle systems. Select *Dark clouds* and a number of nodes will appear in the particle viewer, and bounding boxes and shapes in the perspective viewer. Render a draft view to see the particle pre-set. All behaviours can be changed; geometry, seed and many other options can be set to the particles in the viewer.



3. Load the particle system 3DS Max scene. Three clouds from the pre-set flow have been added to the scripted city FBX file, which has been imported into 3DS max. The particles visibility node has been adjusted so that various cloud transparencies appear. Two omni-lights have been added. A gizmo box has been added to the base, and a fog atmospheric effect has been added. This basic set-up shows the efficiency of the particle system.





4. Particle flow can be used to generate lightning, and this can be modelled from scratch from a standard flow. The final animation can be analysed in the tutorial folder; move the timeline to watch the strike. This is derived and adapted from the operator set-up from a tutorial by PSkull.

Additional links

Particles: <https://knowledge.autodesk.com/support/3ds-max/getting-started/caas/CloudHelp/cloudhelp/2015/ENU/3DSMax-Tutorial/files/GUID-230E6DB4-199C-4210-9979-630B9AF61C93-htm.html>

Arnold for Maya: www.solidangle.com/home

FumeFX: www.afterworks.com/FumeFX/Overview.asp

Allan Mckay: www.allanmckay.com

PSkull: www.pskull.com/tutorials/particle-flow