

TURN TOOL

User manual for TurnToolBox2011

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1. Bringing 3D to the Internet

TurnTool is a real time 3D graphics solution targeted at the growing market for 3D on the Internet.

Integrate your 3D visualizations in web pages and other applications for interactive viewing and manipulation - responding to user input from mouse and keyboard. Knock your audience off their feet in amazement!

The TurnToolBox, the part of TurnTool needed to create TurnTool content, is a plugin for 3D Studio Max. If you are familiar with 3D Studio Max then it will be easy for you to create breathtaking interactive 3D visualizations using TurnTool.

For our customers target audience, we make the viewing of this amazing 3D content as easy as pumpkin pie. The TurnTool Viewer is freely available for download from TurnTool's website and supports easy installation when viewing TurnTool content. The compact size of TNT-files makes the download of each 3D visualization painless.

TurnTool takes the lead in online 3D visualization by allowing ultra fast downloads and still preserving a high quality of graphics and functionality.

1.1. *The TurnToolBox and the TurnTool Viewer*

The TurnTool technology consists of two main components: The TurnToolBox and the TurnTool Viewer. The TurnToolBox generates TNT-files. The TurnTool Viewer enables the user to view the TNT-files directly in their web-browser.

TurnTool has been developed by experienced game programmers and is nothing less than a revolutionary contender for the Web3D market. With competing products focusing on either file download size or quality of 3D content, TurnTool sets a new standard in both areas for an unsurpassed experience.

TurnTool presents itself as a convenient solution to all potential web3D content providers - big or small. Both buying it and selling it is easy. Finally, you can devote your attention to what is important: creating great 3D models and worlds for online display.

1.2. Quality and Speed

The TurnTool plug-in and 3D content download sizes are confined to a minimum while preserving a high quality of 3D display. The TurnTool file (TNT file) can be implemented as an integrated part of an overall graphics design.

1.2.1. Easily Integrated

As an ActiveX control, the TurnTool Viewer can be integrated with an endless list of applications. To name but a few: Microsoft Internet Explorer, Microsoft PowerPoint and Adobe Director are examples of these. (See chapter 1 in TurnToolBox Scripting Manual: "Integrating TurnTool")

1.2.2. Easy To Use

TurnTool is easy to use and you do not have to learn an external editor. All editing is done from within the 3D Studio Max interface and TurnTool does the hard work of translating data to the TNT file.

1.2.3. Flexible

TurnTool has been designed with a maximum focus on flexibility. The engine is divided into components, each residing in respective libraries. The hardware abstraction layer provides TurnTool with the capability to support many APIs and driver systems such as DirectX and OpenGL.

1.2.4. Outstanding Quality

TurnTool delivers an outstanding quality of graphics with state-of-the-art antialiasing of objects and a crystal clear display of textures. Using very flexible scripting options, virtually any scene and/or functionality imaginable can be accomplished - ranging from simple product visualizations to full-blown 3D architectural visualizations and even large landscapes.

2. System Requirements

TurnToolBox is compatible with the following applications:

3D Studio Max 9.x, 2008, 2009, 2010 and 2011 (32 and 64 bit)
Autodesk Viz 2008 (32 and 64 bit)

TurnTool Viewer minimum requirements:

- Windows 2000, XP, Vista or 7.
- DirectX 7.0 or later or OpenGL 1.1 or later
- 64 MB system memory or more
- Pentium 3 processor or greater

Browsers supported by the TurnTool Viewer:

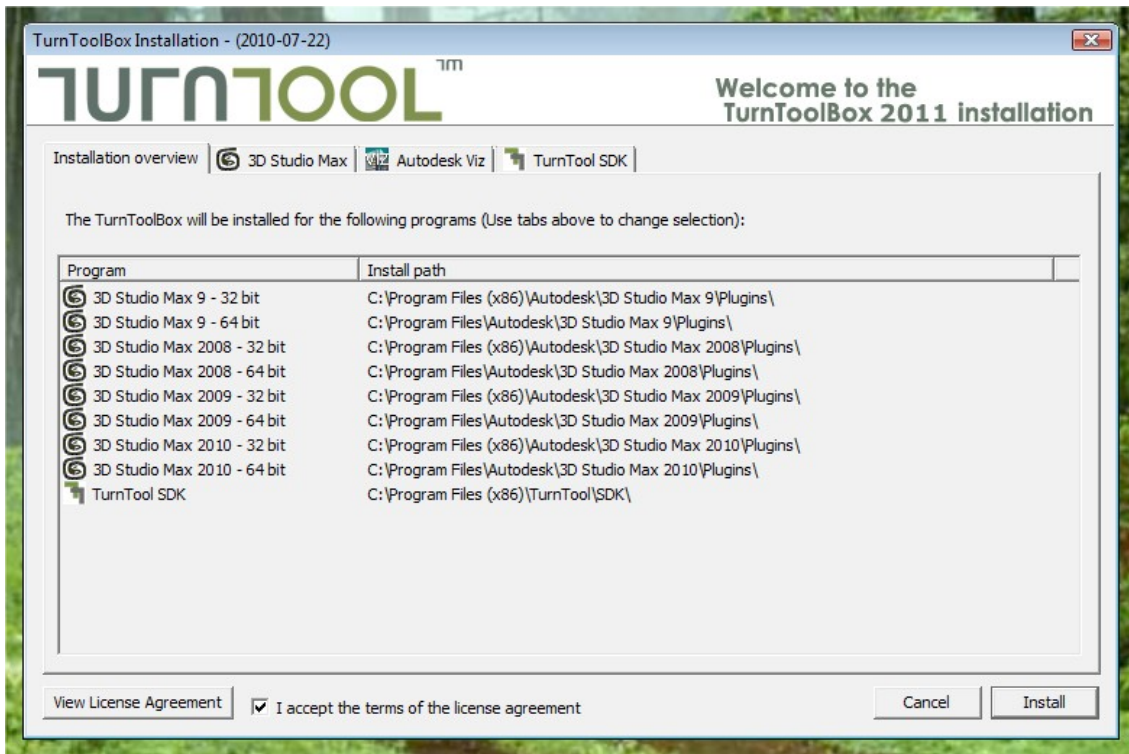
- Microsoft Internet Explorer 5.0 or later
- Mozilla Firefox 3.5 or later

3. Installation

To install the TurnToolBox software, please go to the TurnTool website and download it from there or use the direct link below. That way you make sure you have the latest version.

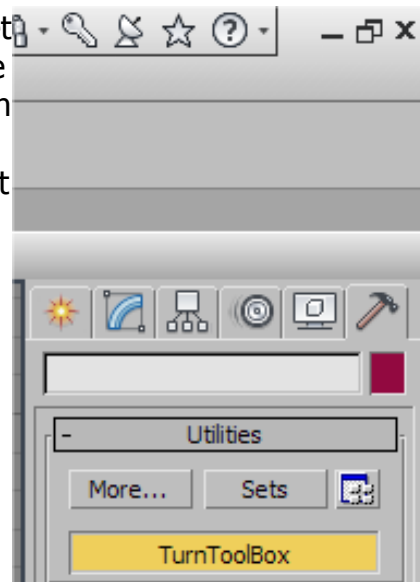
<http://www.turntool.com/ToolboxInstall.exe>

Download and launch the file above. Follow the on-screen instructions to install the plug-in for your 3D applications.



After installation, start up 3D Studio Max. You can now export your file as a TNT file by selecting export from the file menu and selecting TurnTool Export from the File Type drop down menu. Exporting can also be facilitated through the TurnToolBox interface. Description follows:

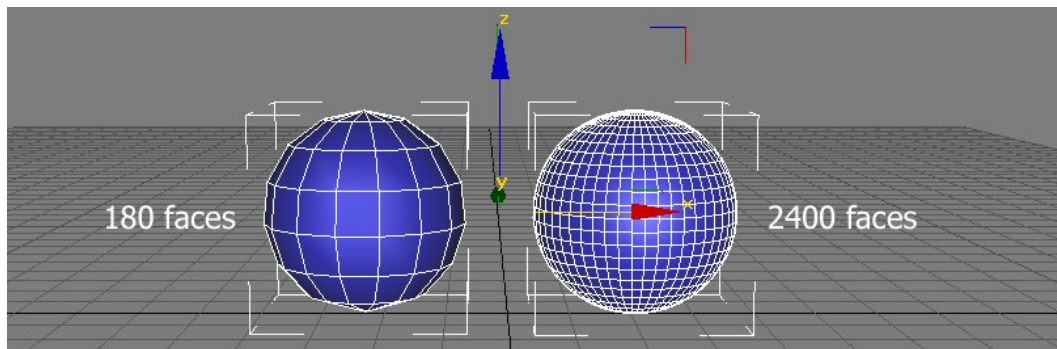
TurnTool properties are manipulated through a set of panels that are located in the utility page of the command panel (see the picture above). You open the TurnTool panels by clicking the button labeled TurnToolBox or by selecting it through the list that appears when clicking the "more" button. If there is no TurnToolBox button in your panel, add the button to the current button set by clicking the "configure button sets" button and drag the TurnToolBox label onto the set. By making this button, you will always have easy access to TurnToolBox.



Creating TurnTool Content

Modeling a 3D scene for real time display with TurnTool is quite similar to using other tools for real time 3D. Follow a few rules of thumb and you are ready to create fantastic real time TurnTool content of your 3D artistry.

Building geometry for real time output requires an attention to mesh resolution. For most scenes, a compromise between mesh detail and file output size must be determined to ensure a good balance of quality versus speed.



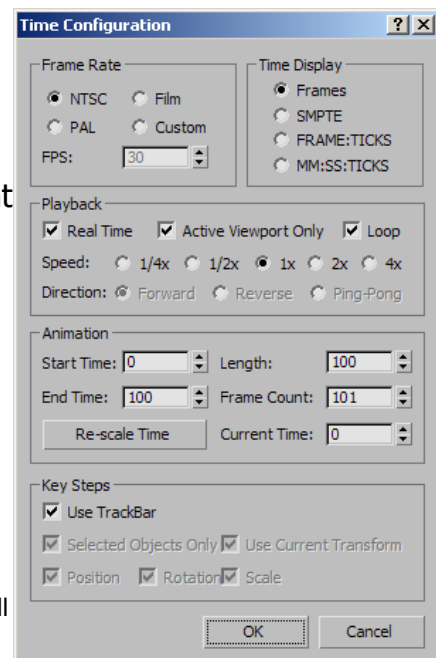
A good rule of thumb, when building a 3D Studio Max scene for TurnTool export, is: the more faces and textures in a scene, the lower the rendering speed. A scene with 200.000 faces or less, and with less than about 128 MB of texture images (uncompressed) will perform well even on systems just barely meeting the minimum system requirements.

This is just a rule of thumb, as you will also have to take into account the number and size of texture maps, and lights used in the scene, as well as the target system. High-end systems will be able to show much more detailed scenes perfectly fluent (500.000 + faces and 200 to 300 MB of textures).

TurnTool presents one of the fastest rendering engines ever created and you will find the performance very good with even large scenes.

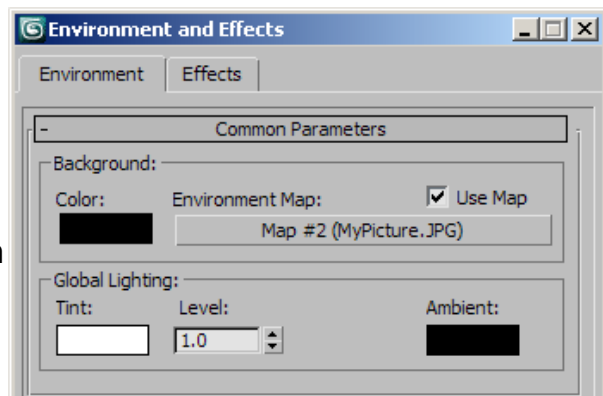
3.1. Time Configuration

In the "Time Configuration" menu in 3DS Max, the exporter uses the Start Time and the Length in the animation section to determine the amount of frames in the animation. If there is no animation in the scene, set Length to one.



3.2. *The Viewport*

The TurnTool Viewport is created from parameters located in the "Environment and Effects" menu. Here it is possible to select a background image in any resolution. If there is no background image then the background color is used. In the "Global Lighting" section, the Ambient and Tint colors can be specified. The Ambient color works as the lowest amount of light in the scene. The Tint color works as the highest amount of light in the scene.

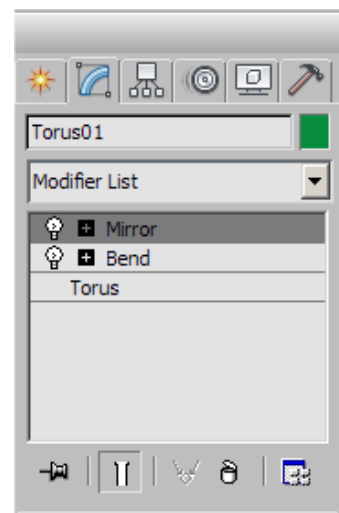


3.3. *Meshes*

TurnTool supports all polygonal objects within 3DS Studio Max. Keep in mind, that most objects qualify as polygonal meshes during export; regardless of the 3D Studio Max labeled "modeling class". To illustrate this, patch objects created with the spline and surface modifiers, will export as polygonal meshes.

Mesh animations are exported as sequences of single frame meshes.

Particle animations are supported as mesh animations as well. Character Studio objects are exported as



hierarchical polygonal 3D characters referring to the biped. The biped is a node-hierarchy, which contains the skeletal animation.

3.4. Light Sources

The light sources illuminate and shade the meshes.

TurnTool supports light sources with different colors. The only type of realtime light source available is an omni or point light. It is possible to animate the position of the light-source, and thereby changing the light on all the 3D objects in the scene.

TurnTool reads and converts the Multiplier setting, which can be used to control the intensity of the light-source.

The light intensity will affect all vertices within the range of the light source. If the light do not use attenuation, the range will be infinite. If the light uses attenuation the intensity of the light will decrease over distance. To control this the Far and Near attenuation is supported.

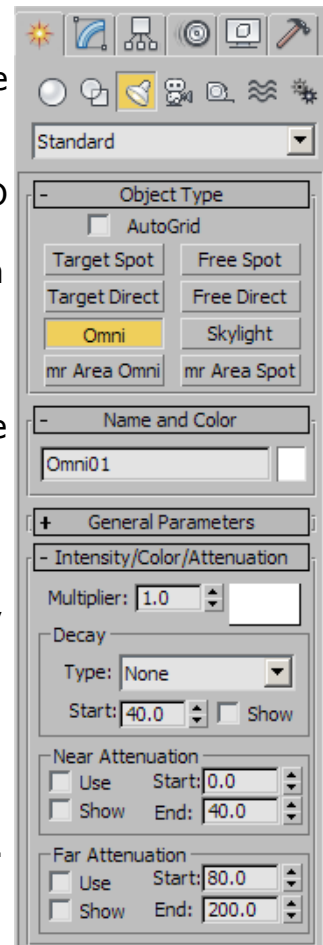
At the "Far Attenuation Start" distance to the light the intensity of the light will be the Multiplier value.

At the "Far Attenuation End" distance to the light the intensity of the light will be zero.

For each vertex, the amount of light will be calculated using both light & material colors, distances and angles. This means that resolution of the light depends on the number of vertices in the 3D object.

It is possible to export a scene without any light sources. This makes sense if the scene either use baked-texture or vertex colors.

The Color, Multiplier and Attenuation parameters can all be animated on the timeline.

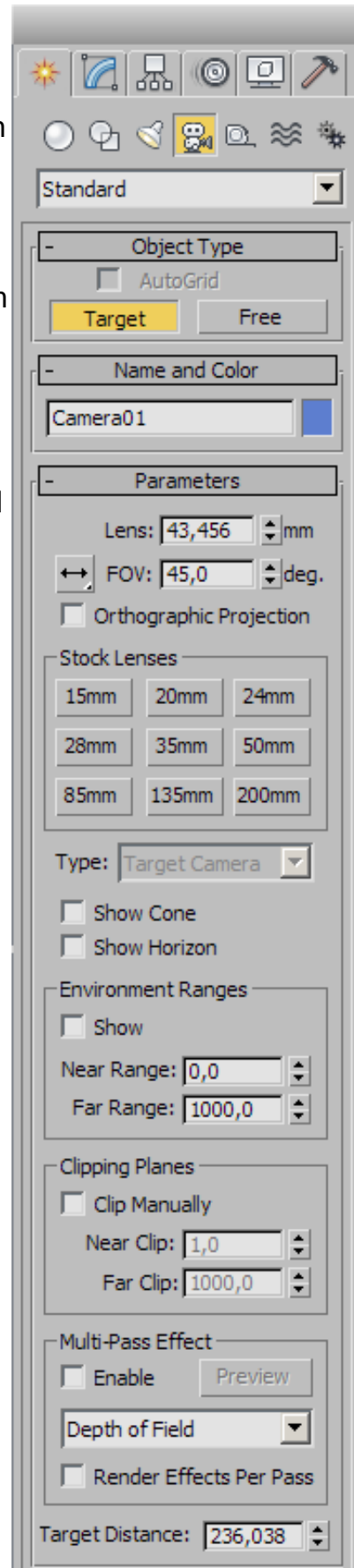


3.5. Cameras

The cameras are the elements in the scene through which you can see your virtual world. TurnTool supports Free & Target cameras.

Each camera has a FOV, short for "Field Of View". TurnTool automatically fits clipping planes to the scene in real time. This behavior can be overwritten by setting the near and far clipping planes manually, but this is an advanced feature best left to experts.

The first camera that the exporter encounters will work as default camera. Unless other camera is selected as the default camera in the Camera panel in the TurnToolBox. Camera position, rotation and the FOV, Far Clip, Near Clip and Target Distance parameters can all be animated over time.



3.5.1. Understanding Camera Control

The two types of cameras available in TurnTool are each useful for different purposes. The difference between the two is in the way it is controlled by the user. It can be summarized like this:

A target camera orbits around a target point in space and is controlled like this:

- Left mouse button & drag: Orbits the camera around the target.
- Right mouse button & drag: Alters the distance from the camera to the target (zooms).
- Both mouse buttons & drag: Moves both the camera and the camera target up, down, left & right.

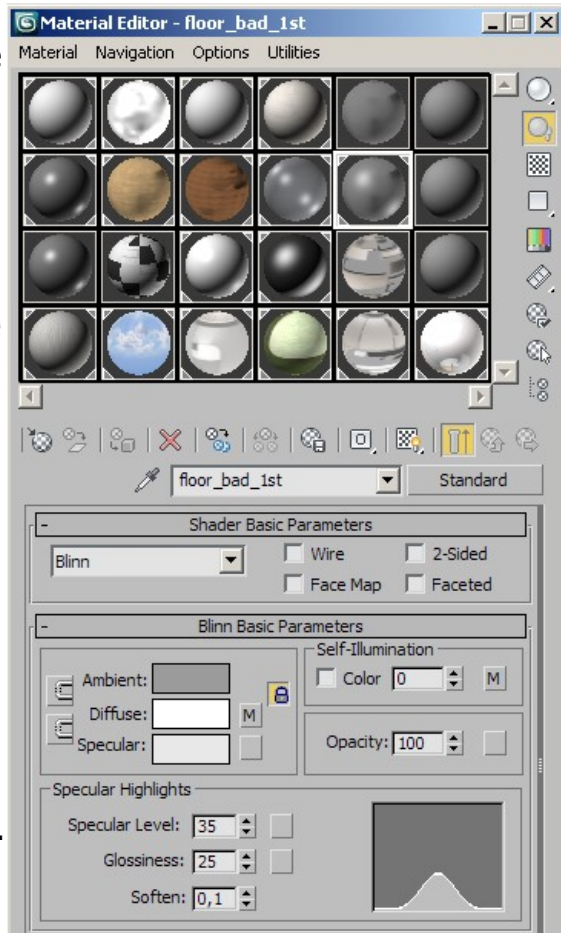
The free camera is moved freely and is controlled like this:

- Left mouse button & drag: Changes the facing of the camera (like looking around).
- Right mouse button & drag: Moves the camera back & forward.
- Both mouse buttons & drag: Moves camera up, down, left & right.
- Arrow keys: Moves camera back, forward, left & right
- Arrow keys + left mouse button: Moves camera up, down, left & right

In scenes with physics, it is probably more desirable to set up a physics controller. In that case, the camera should be linked to the physics object, which in turn is controlled by the user. See the section on physics for more details on setting this up.

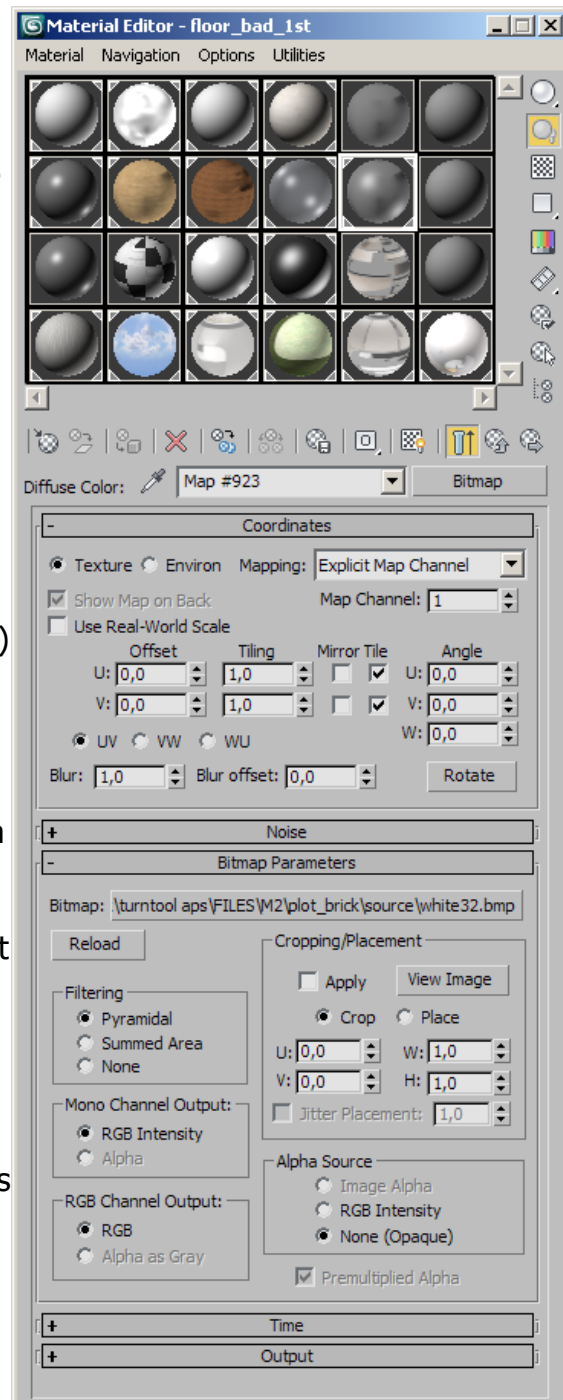
3.6. *Materials*

The materials contain values that define how a surface reacts to the light that it receives. A material is assigned to the surface of a mesh and this surface is illuminated by the light sources in the scene. TurnTool supports the Ambient, Diffuse and Specular colors. TurnTool also converts the Self-Illumination value and color from the Max material. Associated with the Specular color is Specular Level and Glossiness. If Specular Level is zero the Specular Lighting will be disabled for this material. If specularity is not used, it is recommended to set the Specular Level to zero, as you will save time rendering the scene in real time. TurnTool supports the opacity as both value (spinner) and Map. In the "Advanced Transparency" menu TurnTool supports the "Additive" option. This can be used to enable Additive Blending.



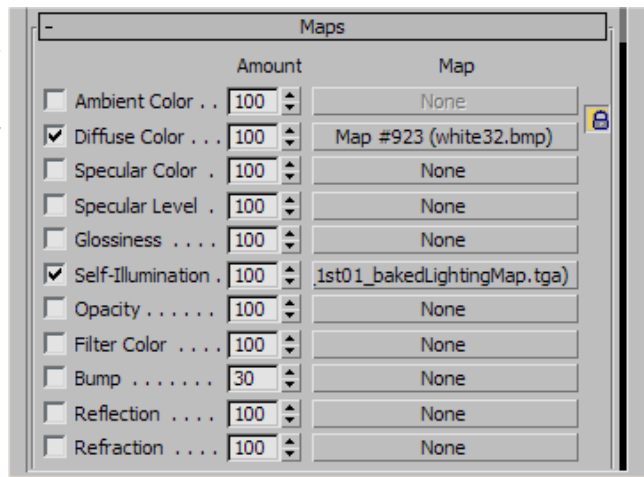
3.7. Texture Maps

Texture maps bring detail to objects by mapping either photos or “handmade” image files to 3D surfaces. The UV Coordinates are indices into the texture. TurnTool supports a range of parameters to control and modify the UV. TurnTool converts the U and V offset, the U and V tiling and the U, V, W angles. These values are converted into a UVW matrix, so animating these values have little impact on real time performance. Most image formats are supported by 3D Studio Max; BMP, PNG, TGA, AVI, IFL, GIF, JPEG, etc. though it is not recommended to use lossy compressed images (such as jpeg) for texture mapping. TurnTool will compress the texture by default. Most 3D hardware is not capable of handling textures with side lengths that are not a power of 2 (2^n , where n is a positive whole number). Resizing the textures used in advance in your favorite paint program will usually result in better shorting export time and quality, however if the textures used are not a power of 2 then the TurnToolBox will resize the textures for you upon exporting the scene. The TurnToolBox exporter software supports the multi sub material. When a multi-sub material is used there is a limit of 64 sub-materials for each multi-sub material.



3.8. *Map Channels.*

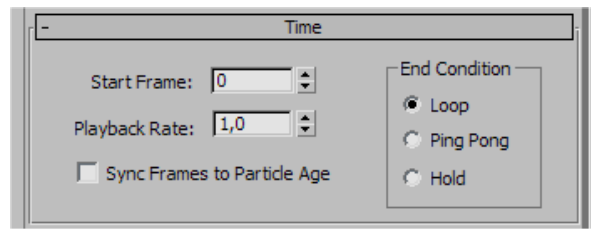
The TurnTool exporter reads information from Diffuse, Opacity, Self-Illumination and Reflection map-channels in Max. In addition, the opacity map if used, must reside in the alpha channel of the bitmap. It is not possible to use RGB pixels as Alpha pixels in the opacity channel. Any map assigned in the Self-Illumination channel will be used as a light-map inside the TurnTool scene. The Self-Illumination should only



be used as a second layer of texture where the diffuse map is the first layer. Keep in mind that textures are a big part of the scene size-wise. Using smaller textures can save a lot of download time and make the scene perform better.

3.9. *Animated Textures*

If a Texture Map uses an animated format such as AVI or ILF, it is possible to animate the texture map over time. To control the texture map animation TurnTool supports the Ping Pong, Looped, Hold, Start Frame and Playback Rate. These parameters work just as they do inside Max.



4. TurnTool Properties

TurnTool exposes a number of properties related to different export, rendering and controlling aspects of the scene. These properties are manipulated through a set of panels that are located in the utility page of the command panel.

You open the TurnTool panel by clicking the button labeled TurnToolBox or by selecting it through the list that appears when clicking the "more" button. If there is no TurnToolBox button in your panel, add the button to the current button set by clicking the "configure button sets" button and drag the TurnToolBox label onto the set. By making this button, you will always have easy access to the TurnToolBox.

Which objects are affected?

The current selection of objects in max determines which panels are visible, and properties will affect applicable objects of the current selection. E.g. the camera panel will be visible if at least one object of the current selection is a camera object. Changes to camera properties only affect cameras in the current selection.

4.1. Scene Export Panel

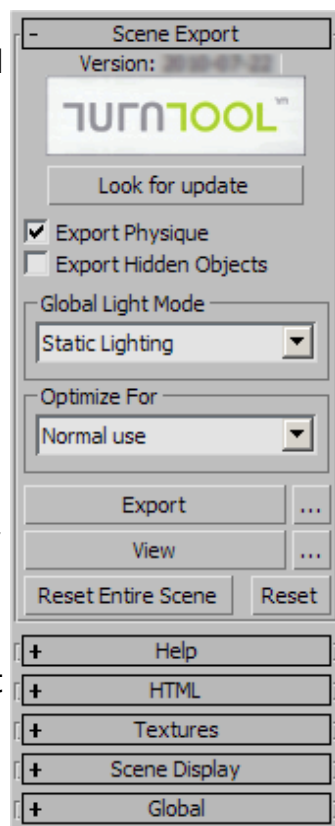
The scene export panel contains export parameters and buttons to actually export and view the result. This panel is always available.

Export Physique: Determines whether to detect the Physique plug-in for Character Studio. When using the Physique plug-in, TurnTool will export your character mesh once. All deformation of the character will be carried out using the rotation of the nodes in the biped. Disabling this feature while using animated characters will produce large files.

Export Hidden Objects: When this option is selected, hidden objects are exported as if they were not hidden.

Export: This buttons exports a TNT file. The default filename is identical to the name of the max file (except for the extension), but you can change this by clicking the "..." button right next to it.

View: With the default settings, this button launches the html document with the same name as the TNT file exported (except for



the extension). You can change this to any file you want, by clicking the "..."
button next to it.

Global Light Mode: Sets the global default value of the property "Light Mode"
found in the Miscellaneous Panel.

Optimize For: This combo box allows you to select how you want TurnTool to
optimize the scene when exporting. Possible selections are:

- *Normal Use:* Gives a good all-round optimization of the exported file.
- *Fast Export Time:* Gives a faster export times at the cost of larger file sizes. This is useful when viewing work in progress, but is not recommended for final exports.
- *Extra Small File Size:* TurnTool will optimizes the file size as much as possible without cosidering how long it takes to export the scene.
- **No Compression:** This option will completely disable all methods of compression. This will produce large TNT files.

Reset Entire Scene: This button will reset all TurnTool settings in the entire scene to their default values. Use with caution.

Reset: This button will reset the values of this panel to their default values.

4.2. HTML Panel

The HTML Panel is used for configuring the characteristics of the HTML file generated along with the TNT file. This panel is always available.

Generate HTML: If this is not checked, no HTML file will be generated

Width: This sets the width in pixels of the TurnTool control.

Height: This sets the height in pixels of the TurnTool control.

Color: If the control is not transparent, this is used for setting the color of the control before the scene is loaded.

Template: This sets the template that is used for generating the html. It is possible to choose from the following:

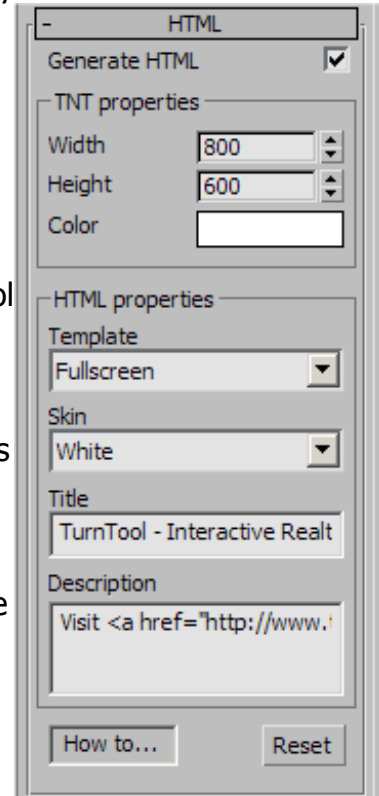
- **Default:** A standard template with options that enable to play animations, change texture, hide and unhide objects.
- **Fullscreen:** This template will display your scene using the full size of the browser window.
- **Multiple Instances:** This template opens two instances of TurnTool. Having two instances of the TurnTool Viewer can in some cases be very useful.

Skin: This sets the color theme for the html.

Title: This sets the title of the html document.

Description: This sets the description/title of the TNT scene.

How to...: This will show the online templates help page.



4.3. *Texture Panel*

The texture panel is used for configuring TurnTool related properties of textures. The textures appearing in the list are the textures of the selected objects. The Global Default entry is special, and represents the settings for all textures with no settings of their own. This entry is always available.

Use Global Default: When this is checked, the selected textures use the settings that are configured in the "Global Default" entry in the list.

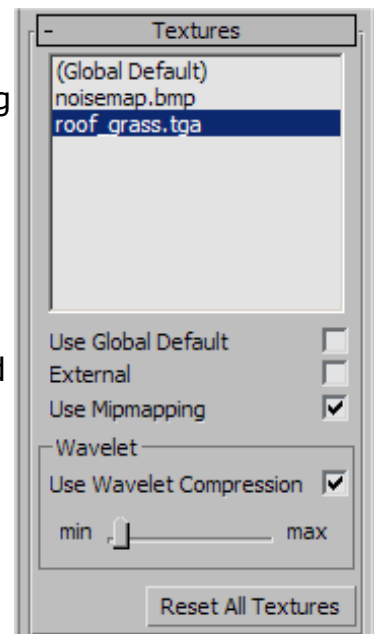
External Texture: When this is checked, the selected textures are not included in the TNT file, instead the textures are saved beside the TNT file. The textures are saved either in the PNG or JPG file-format.

Use Mipmapping: When this is checked, the selected textures will use an advanced rendering technique called mipmapping. Briefly explained, this means that textures use multiple levels of detail. This can improve both performance and rendering quality, the expense being an increase in the usage of video memory (33% increase). Best used with high detail textures that are seen from both near and far distances.

Use Wavelet Compression: When this is checked, the selected textures are compressed using a wavelet algorithm (very small file size, but lower quality). Use the slider to set the level of compression. The higher the compression, the smaller the file size and the lower the quality and vice versa.

NOTE: The level of compression does not change the amount of video memory consumed by a texture. The dimensions of the image in pixels alone determine this.

Reset All Textures: This button will clear all texture properties in the scene to their default values.



4.4. *Scene Display Panel*

The scene display panel contains control buttons that affect the display of the scene. This panel is always available.

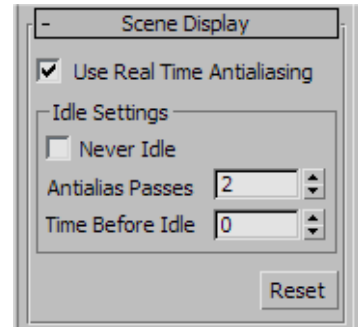
Use Real Time Antialiasing: If checked, the scene will be rendered using the real time 2x2 antialiasing.

Never Idle: If no changes to the scene have been made in some time TurnTool will detect this and go into idle mode to release processor time for other applications. Before TurnTool idles the antialiasing passes will be carried out. If the 'Never Idle' checkbox is checked the scene will never enter idle mode.

Antialias Passes: This spinner sets the number of Antialias passes to perform. The higher this is, the better the quality of the antialiased result will be. A value of 1 will result in 2x2 antialiasing. While a value of 2 will give you 4x4 pixels antialiasing of the rendered image.

Time Before Idle: This is the number of milliseconds to pass since the last activity in the scene and until antialiasing begins and idle mode is entered.

Reset: This button will reset the values of this panel to their default values.



4.5. Object Settings Panel

The control buttons of this panel are used for setting various general properties for the current selection of objects. This panel is available when at least one object is selected.

Visible: If the Visible parameter is set to 'No' the object will not be visible. As default a object is Visible and this means that it will be rendered on the screen.

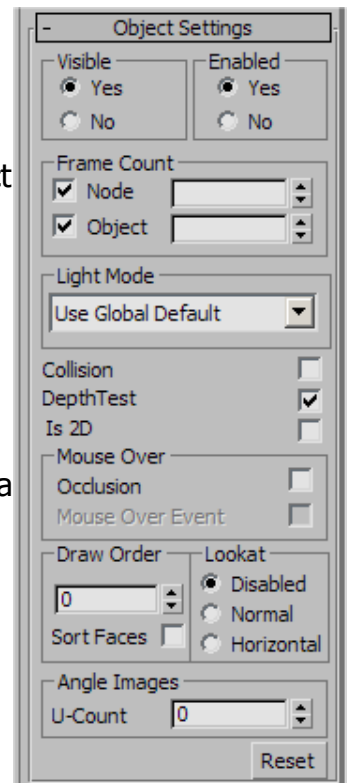
Enabled: If the Enabled parameter is set to 'No' it will be like the object do not exist in the scene. As default a object is Enabled and this means that the object will function in the scene as the type of object it is. If an object is Enabled = 'No' then for a Mesh this means that it will not be rendered, for a Light sources it means that it will not illuminate, for a Physics object it means that it will not calculate physics and so on.

Frame Count-Node: This number specifies how many frames of animation that will be exported for the node. If set to a lower number than the actual number of frames, only the specified number of frames will be exported. Node animation affects the position, rotation and scale or the object.

Frame Count-Object: This number specifies how many frames of animation that will be exported for the object. If set to a lower number than the actual number of frames, only the specified number of frames will be exported. If set to zero then this object will not be exported at all. Object animation contains everything about the object that can be animated except position, rotation or scale. For a Mesh object animation could deform the mesh over time. For a Camera the FOV parameter could be animated for instance and finally for a Light source the color and attenuation could be animated.

Light Mode: Determines how lighting calculations for the object should be performed. Possible selections are:

- *Use Global Default:* Uses the settings of "Global Light Mode". This is the default value.
- *Dynamic Lighting:* Lighting is calculated dynamically when viewing the scene. This allows lights and objects to move relative to each other.
- *Static Lighting:* Lighting is calculated once when the scene loads. This has the benefit of much better performance. Drawbacks are slightly longer loading time and lighting may look wrong if an object is moved. It is ideal for large static scenes. No vertex colors are exported because the calculated light would replace them.



- *Vertex Colors*: TurnTool performs no lighting calculations but exports a color for each vertex instead. This can be used for pre-generating more advanced static lighting using built-in functions of max or third party plugins (vertex color "baking").
- *Baked Textures (No Lighting)*: TurnTool performs no lighting calculations. This is useful when using textures "baked" with pre-calculated lighting.

Collision: If checked, the selected objects are objects, with which physics objects should interact. The ground and walls are good examples of objects, which should have this property checked when you have a physics object in your scene.

DepthTest: When an object is rendering on the screen the depth of each visible pixel is tested against the depth buffer (Z buffer) to determine whether or not the pixel is in front of the pixel that already has been rendered. A new pixel will only be drawn on the screen, if this pixel is in front of the pixel that already exist at this position on the screen. This process is the normal behavior when rendering each pixel of an object. If you wish all pixels of the object to be rendered regardless of the depth then you can remove this DepthTest flag. Removing the DepthTest flag will force all pixels of the objects to be rendered always.

Is 2D: When the "Is 2D" flag is checked the object will be rendered as if it was a 2D object. An object having this Is2D property must be inside a worldspace bounding box with these coordinates lower left corner (-1,-1,-1) Upper right corner (1,1,1). Object having the Is2D flag will always be at the same position on the screen relative to the size of the screen. The Is2D property is very useful when making menu systems inside TurnTool.

Occlusion: When occlusion for an object is checked, each polygon of the object will be checked for intersection with a ray that has the position of the mouse-pointer as starting point. This process is processor time expensive, so only give objects the Occlusion flag when it is absolute necessary. Occlusion is a part of the Mouse Over Event system in TurnTool. Objects that need to generate the mouse-over event must have the Occlusion flag as well. When an object only has the occlusion flag and not the MouseOver Event the the object can cover or occlude other objects so the "Mouse Over Event" only will be generated when looking at the object from a certain angle or position.

Mouse Over Event: To enabled this Mouse Over Event check-box then Occlusion check-box must be enabled first. Objects that have the Mouse Over Event will generate a JavaScript event called "OnMouseEnter" when the mouse pointer is over the object and another JavaScript event called "OnMouseExit"

when the mouse pointer leaves the object.

Draw Order: The number indicates in which order objects should be rendered. A lower numbered object is rendered before a higher numbered one. The allowed value range is +32767 to -32767.

Sort Faces: When rendering, objects with transparency are sorted by their pivot points and rendered back to front. For objects with a lot of overlapping transparent faces, this may not look right. This can be corrected by checking off this property. This means the object's faces are also sorted by depth and rendered back to front. This face sort process can be very processor time expensive, so only give objects the Sort Face property when it is absolute necessary.

Lookat: When set to normal, this causes the object to be rendered as always facing the viewer, very useful for billboard vegetation and tool tips. The "Horizontal" value makes this work in the horizontal direction only.

Angle Images - U Count: This parameter should only be given to objects that have a sequence of different textures defined on the timeline as an animated texture. The U Count parameter define how many different angle images that exist for this object. If the U Count parameter is set to a value higher than 1 then the Angle Image process will be enabled for this object. To determine which angle image that will be shown the x and y position of the camera and the object used to calculate the angle. If U Count is set to 32 then there will be $360 / 32 = 11.25$ degrees between each image. In other words: when the angle between the camera and the object is in the range 0.0 to 11.25 then the first image will be shown. If the angle is between 11.25 and 22.50 then the second image will be shown and so on. This technique of changing the texture of an object according the angle between the object and the camea is sometimes refered to as RPC.

Reset: This button will reset the values of this panel to their default values.

4.6. Camera Panel

The properties in this panel are used for controlling the behavior of the selected cameras. This panel is available when at least one camera is selected. The properties in this panel affect only cameras.

Camera Movable: When set to Auto, animated cameras will not be movable by user input while non-animated cameras will. Values of Yes and No, forces one of these conditions regardless of animation.

Move Speed: Number describing the move speed of free cameras and the panning speed of target cameras. Negative values reverse the direction of movement as well.

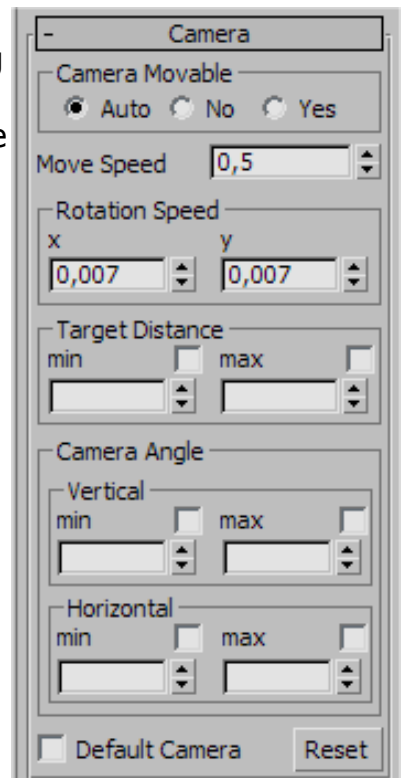
Rotation Speed: Number describing the speed with which the camera rotates when moving the mouse pointer. Negative values reverse the direction of movement as well.

Target Distance: These values can be used for restricting the distance from the camera to its target point, by setting a minimum and/or maximum distance.

Camera Angle: These values can be used for restricting the angle of rotation a camera can attain in the four directions respectively, measured in radians.

Default Camera: When checked, the selected camera becomes the default camera of the scene. The scene is initially viewed from this camera. Only one camera in the scene can have this property checked.

Reset: This button will reset the values of this panel to their default values.



4.7. *Physics Panel*

The properties of this panel determine how physics objects interact with their surroundings. As only sphere primitive objects can be physics objects. This panel will only be visible when at least one sphere object is selected and its properties affect only spheres. Experimentation is encouraged with these properties.

Physics Object: If this is checked, the selected spheres will be physics objects.

Gravity Force: Describes how much gravity affects the object. The higher this number is, the higher the gravity.

Mass: Describes how heavy the object is (how difficult to move). The higher this number is, the harder the object is to move.

Friction: Describes the object's ability to slide on other surfaces. The higher this value is, the higher the friction.

Angle Friction: Describes how sloped surfaces and walls affect the friction. Setting this value to 0.0 will give you the same friction on all surfaces regardless of the angle to the gravity vector. A value that is higher than 0.0 will make it more difficult to move in any direction on this surface.

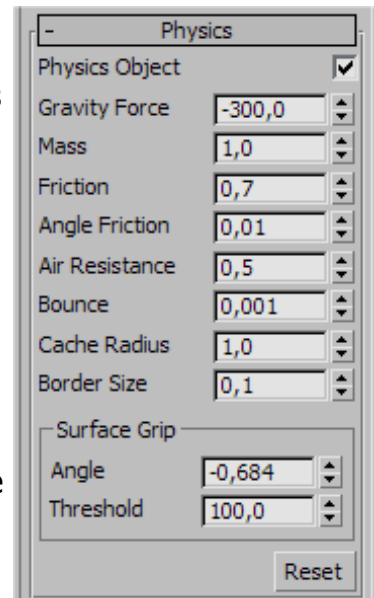
Air Resistance: Describes how much the air will slow the object. The lower this number, the denser the air.

Bounce: Describes how much the object will bounce when hitting a collidable object.

Cache Radius: This is the caching radius for collision geometry. Units are the radius of the physics sphere, considering border size.

Border Size: Describes how near a physics object have to be to collision geometry before "colliding". Setting this too low may cause problems. Too high values look wrong.

Surface Grip Angle: Describes how steep a surface the object can rest on without sliding.



Surface Grip Threshold: Minimum speed before the object is considered stationary and stops moving. A 'Surface Grip Threshold' value at 10% of the 'Move Speed' value will be suitable in most cases.

Reset: This button will reset the values of this panel to their default values.

4.8. *Controller Panel*

Physics objects are also controller objects and can be controlled by the user. The properties in this panel are used for defining how control of the physics object should work. As with the physics settings, experimentation is encouraged. This panel is only available when at least one physics object is selected and its properties affect only physics objects.

Movement Speed: Specifies how fast the object can move.

Movement Enable Angle: Describes how steep a surface the object can ascend.

Jump Force: Specifies how high the object can jump.

Jump Scalar: Describes how much the movement speed affects the jump of an object.

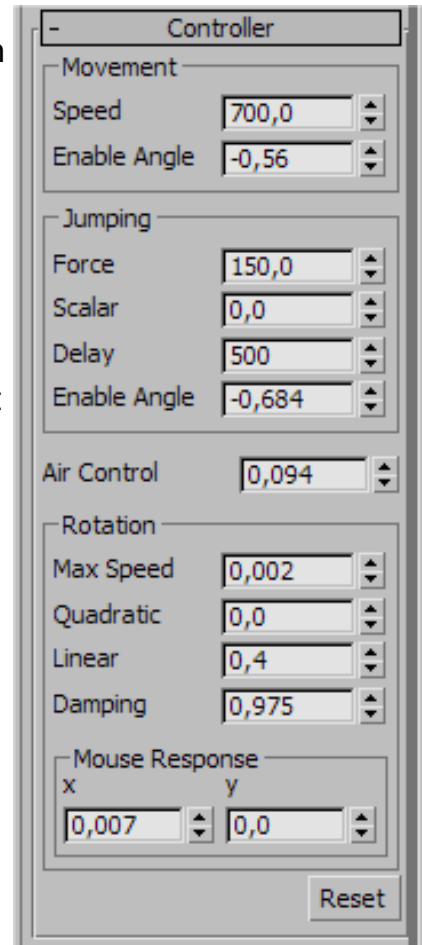
Jump Delay: This is the minimum time interval between two jumps.

Jump Enable Angle: Describes from how steep a surface the object can jump.

Air Control Factor: describes how much control the object has while in the air. A value of 1 gives the same control as on the ground (it can be higher).

Rotation Max Speed: Describes the maximum rotation speed an object can attain.

Rotation Quadratic & Rotation Linear: These are both numbers and part of the equation, which describes rotation acceleration and deceleration.



Rotation Damping: This describes how fast rotation ceases when input stops.

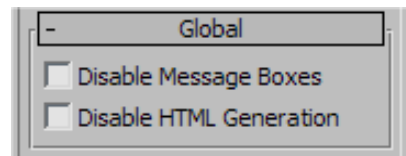
Mouse Response: Describes how fast the object rotates in response to mouse input (mouse sensitivity).

Reset: This button will reset the values of this panel to their default values.

4.9. *Global Panel*

All settings that can be configured with the TurnToolBox are saved into the 3D Studio Max file. The only exception for this rule are the settings in the Global panel. The settings in the Global panel saved locally on the computer.

Disable Message Boxes: Specifies whether to display Message Boxes. If checked no message boxes will be displayed. This can be very useful when exporting many TNT files using a max script.



Disable HTML Generation: Specifies whether to generate HTML. This settings overwrites the "Generate HTML" setting in the HTML panel. If checked no HTML files will not be generated. This can be very useful when exporting many TNT files using a max script.

5. Getting Physical

In some scenes, it may be desirable to use the physics features of TurnTool to make the experience of viewing the scene more real. Exploring a scene in first person using the mouse and/or keyboard to move around will excite many viewers.

What the physics in TurnTool can do is to handle a sphere primitive with any radius and collide it against any object that consists of polygons in a physical correct manner. In doing so the Physics calculations will take parameters like friction, gravity, mass and air resistance into account.

In addition to the descriptions below, it is recommended to check out some of the example max files from the TurnTool website. It is sometimes easier to understand something if an example is available. Here are direct links to a few of them:

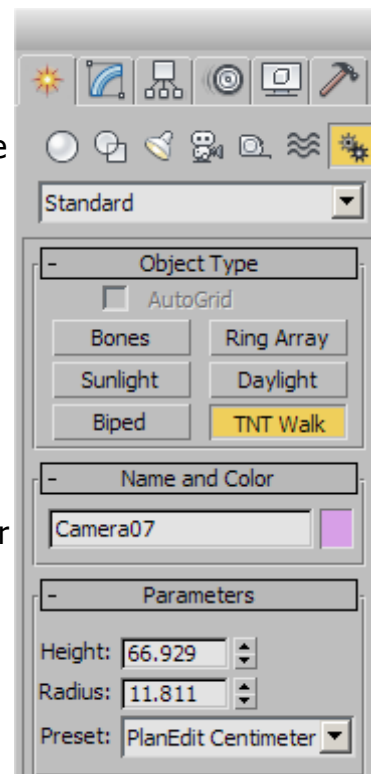
http://www.turntool.com/examples/az_house.zip

http://www.turntool.com/examples/m2_house.zip

5.1. TNT Walk Primitive.

To make it easier to setup a fully functional Walk Object that works with TurnTool, a primitive called TNT Walk have been created. The TNT Walk primitive is available under Create → Systems → TNT Walk. To use the TNT Walk primitive it must be selected and you must click in the viewport to create a TNT Walk primitive object. Change the Height and Radius parameter until the size of the TNT Walk object fits correctly into your scene. The TNT Walk primitive the automatically create a Physics Object and a Camera and link them together correctly.

When the Preset dropdown is used the predefined Physics and Controller parameters will be specified for the selected TNT Walk object.



5.2. *The Physics Object*

Only sphere primitives can be physics objects. For a sphere primitive to be regarded as a physics object it must have the physics object property checked. Once this property is checked the physics object will be affected by gravity and fall downward. Therefore, the next thing we need is something on which the physics object can land. For this reason we have collision objects. A collision object can be any polygonal object in max and they become collision objects once they have the collidable object property checked in the TurnToolBox interface.

5.3. *Collision*

To make the physics object interact with the scene, all objects which the physics object should not just pass through must have the "Collision" property checked. The "Collision" property is located in the "Object Settings" panel. How the collision objects and the physics object interact is solely dependent on the properties of the physics object.

Performance note: A lot of performance can be gained by optimizing the collision objects. Often simple geometric boxes or planes can handle collision for large parts of a scene; this saves many calculations. Complex shapes can be handled easily by surrounding them with a collidable and permanently invisible box.