PteroEngine II - editor

PteroEngine II Editor is a tool with which you can create scenes for Vietcong.

This editor version is meant only for creation of MP scenes. It doesn't support any vehicles or aircraft.

If you have any questions regarding editor or model prepration in 3ds max, please write us to: editor@pterodon.com. Have fun!

Keyboard Shortcuts
Modeling in 3DS MAX 5.1
Working With Editor

Auto backups

Setting up Auto backups

path : *[game dir]\levels\[map dir]\backup\[sub-level dir]*


Auto backups are created each time a scene is saved. They are stored in:
\levels\[map dir]\backup\[sub-level dir]

The editor keeps three most recent files. This setting cannot be changed by a user.

path   : *[game dir]\levels\[map dir]\backup*
menu   : settings / editor settings / level backuping
hotkey : ctrl + e

In the editor settings dialog, you can specify parameters for backups that are made at certain time intervals. These files are stored in:
[game dir]\levels\[map dir]\backup

There can be up to nine of these files.
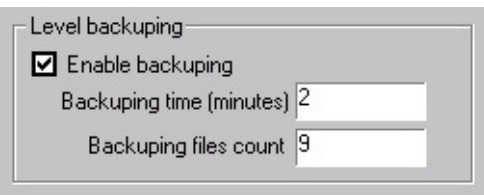
enable backuping	switches the periodic backuping on/off
backuping time	timing for auto backups
backuping files count	number of files kept by periodic backup system

Recovering files form the auto backups

The auto backup files must be moved to the map directory, before editor can read them:
[game dir]\levels\[map dir]

If you don't do this, the editor will have trouble finding the data required for the scene.

Keyboard Shortcuts

Selecting and transforming objects

`	quick selection
C	scale mode
M	move mode
N	move mode - snap
N+shift	snap settings
Q	switches to sub-entity selection mode
R	rotate mode
S	select mode
S / ` +ctrl	add to selection
S / ` +shift	subtract from selection

Dialogs for manipulating with objects in the scene

F	freeze dialog for objects in the scene
F +shift	un-freeze dialog for objects in the scene
H+ctrl	opens the dialog where visibility of object types is set
Home	object selection dialog
Home +shift	object hide dialog
Home +ctrl	object un-hide dialog

Function keys

F1	save Level.tga
F2	save screenshot
F3	toggles on/off drawing of texture #1 (editor only)
F3 +ctrl	toggles on/off drawing of texture #2 (editor only)
F3 +shift	toggles on/off drawing of texture #3 (editor only)
F4	toggles on/off drawing of reflection texture (editing only)

F4 +shift	toggles on/off drawing of water collision scene (in-game only)
F5	toggles between drawing/hiding of objects (in-game only)
F5 +ctrl	toggles between drawing/hiding of "grow" type objects (in-game only)
F5 +shift	toggles between drawing/hiding of characters (in-game only)
F6	toggles between drawing/hiding of collision objects (in-game only)
F6 +ctrl	toggles between drawing/hiding of rain (in-game only)
F6 +shift	toggles between drawing/hiding of FPV (1st person view) weapon (in-game only)
F7	toggles between drawing/hiding of lightmaps (editor only)
F7 +ctrl	fog on/off toggle (editor only)
F8	toggles between game and editor modes
F11 +ctrl	texture filtering toggle (editor only)
F11 +ctrl	mipmapping on/off toggle (editor only)
F12 +ctrl	opens the Script Debug window (in-game only)
F12 +shift	displays player properties (in-game only)

Additional hotkeys

1-0	speed of object transformations
A	associate an object with a sector
C	change camera view (in-game only)
D	duplicate selected
Del	delete selected
E	select current sector
E+ctrl	editor settings dialog
End	pan and rotate camera to the selected object
End +ctrl	rotate camera to the selected object
End +shift	view selected from top

Enter	open Properties tab
Enter num.	Lock camera position for rendering
G +ctrl	toggles AI auxiliary grid
H	hide selected
H +shift	unhide hidden objects
I+ctrl	toggles display of profile info
Insert	Insert a Dummy object and link all selected objects to it
K	open the Database tab
L	auxiliary light toggle (editor only)
L +shift	permit flashlight in the game (development only)
N+ctrl	new scene
O	Placement tool ("placeator")
O+ctrl	open scene
P	link
R+ctrl	reload textures
S+ctrl	save current scene
S +shift	look into the sun
T	parachute
V+ctrl	auxiliary visibility toggle (editor only)
W	wireframe display toggle
W +ctrl	waypoint connections display toggle
Y+ctrl	one step ahead in history
Z+ctrl	one step back in history

EAX presets

0	standard
1	light echo
2	mountains 1
3	narrow space
6	basement
7	dirt tunnel
8	mountains 2
11	jungle
12	canyon
13	tunnel 1
14	tunnel 2
15	tunnel 3
16	tunnel 4
20	water well
23	metal plated room
23	room

Special Object - Sound Switch

Bitmap requirements

Basic types of bitmaps

The supported bitmap file formats are:
*.dds
*.tga
*.bmp

You must use convention of power of two for the bitmap size. Minimal size of the bitmap is 4x4 and maximal 2048x2048 points.
These restriction is due to the use of DirectX technology. This is the reason why you cannot use textures with size for example 640x480.
Possible sizes of textures are:

w\h	4	8	16	32	64	128	256	512	1024	2048
4	■	■	■	■	■	■	■	■	■	■
8	□	■	■	■	■	■	■	■	■	■
16	□	□	■	■	■	■	■	■	■	■
32	□	□	□	■	■	■	■	■	■	■
64	□	□	□	□	■	■	■	■	■	■
128	□	□	□	□	□	■	■	■	■	■
256	□	□	□	□	□	□	■	■	■	■
512	□	□	□	□	□	□	□	■	■	■
1024	□	□	□	□	□	□	□	□	■	■
2048	□	□	□	□	□	□	□	□	□	■

The *.bes files do NOT contain path to the corresponding textures. the textures should be stored in:

[game directory]\levels\[map directory]\tex

When the engine loads textures, it gives the *.dds files priority. This means that if there are two textures of the same name, one in *.dds format and the other in, say, *.bmp format, the engine uses the *.dds.

IFL texture list

The *.ifl file is a text file containing names of textures as well as the #interval parameter.
It should be stored along with textures in the directory:
[game dir]\levels\[map dir]\tex

This file defines the list of files that form an animated textures. The #interval parameter determines time interval of frame change. It can be contained more than once in the list.

The syntax example for voda.ifl (animated texture of water):

```
#interval 0.08

P_X_ALFA0001.TGA
P_X_ALFA0002.TGA
P_X_ALFA0003.TGA
P_X_ALFA0004.TGA
P_X_ALFA0005.TGA
P_X_ALFA0006.TGA
P_X_ALFA0007.TGA
P_X_ALFA0008.TGA
P_X_ALFA0009.TGA
P_X_ALFA0010.TGA
```

#interval float	slide show interval

Using texturing material

Multiplayer mode list

MP game types

ATG	Assaul team game
CooP	Cooperative game
CTF	Capture the flag
DM	Deathmatch
LMS	Last man standing
RW	Real war
TDM	Team deathmatch
TT	Turn Table

MP game scripts

atg_killall_u.c	Assaul team game, the team that survives wins
atg_pilot_u.c	Assaul team game, U.S. pilot must make it to the landing zone (LZ)
atg_usbomb_u.c	Assaul team game, U.S. plant the bomb, VC defends
atg_vcbomb_u.c	Assaul team game, VC plants the bomb, U.S. defend
ctf_u.c	Capture the flag
dm_u.c	Deathmatch
rw_u.c	Real war
tdm_u.c	Team deathmatch

Modeling in 3DS MAX 5.1
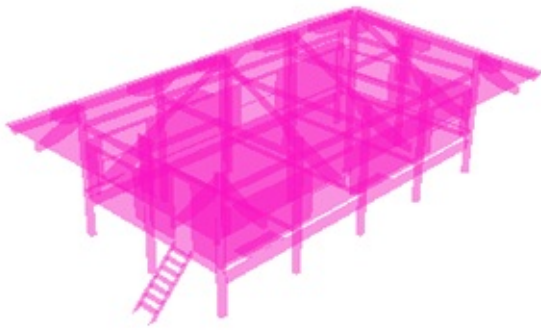
PteroEngine II distinguishes three collision object shape types:
1. automatic
2. defined
3. auxiliary

Automatic collisions

These collisions are created when Phy_colshp and Phy_misshp are set to 1 to 3 or if PteroMat has a collision material assigned.

After the engine loads such model, it computes collision shapes for player movement and bullets.

If PteroMat has a collision material assigned, both created shapes are identical with the actual graphic shape. Here, it is not necessary to set Phy_colshp or Phy_misshp to 2.

For small objects, such as glasses or bottles, we recommend to set Phy_colshp or Phy_misshp to 3. The computation of this collision shape is much faster than regular collisions.
If Phy_colshp or Phy_misshp are set to 1 or 3 it is necessary to assign Phy_defmat.

Example:


```
User Defined Properties:

Phy_colshp=3
Phy_defmat=D-
```

Defined collisions

Object names of defined collision shapes must begin with ^K, ^SF or ^SK.
It is possible to combine automatic and defined collisions. For instance, if you want to create defined collision shape for player, link the ^K object to the main object. The collision shape for bullets will be then automatically created by the engine (but you have to define collision material

in PteroMat).
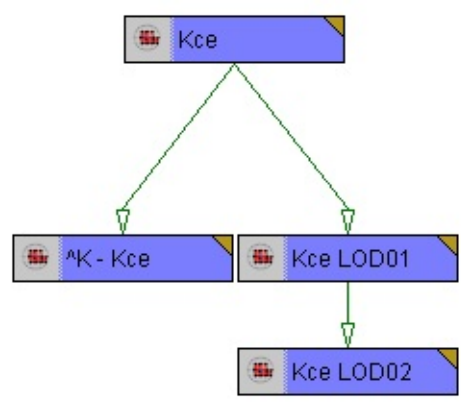
Collisions are created for the main objects only, not for its LoD objects.
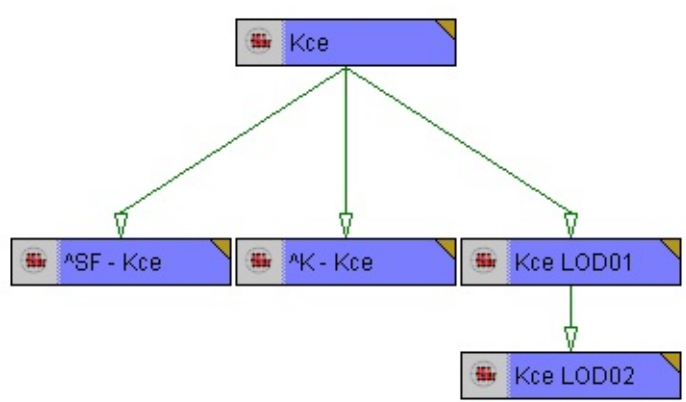
Apply the collision materials to them using PteroMat.

We recommend to create defined collisions for player. This improves performance and speed of the game quite a bit.

Auxiliary collisions

The object names of auxiliary collision shapes must begin with the '!' character (exclamation mark).

Apply the collision materials to them using PteroMat.

Naming conventions for defined collision shapes

^K + text	shape for player

^SF + text	shape for bullets
^SK + text	for dummy only: defines sphere contained in dummy
! + text	auxiliary collision

Collisions - MAX
Using Collision Material

Effect spheres serve as a special collision system. They are used mostly for plants. The spheres make it possible to determine how much a plant or a shrub will slow the player down and other collision properties.
We recommend that you use this system, because it is much faster that the regular collision system.

An effect sphere is created as a sphere within a dummy object.
It cannot be scaled non-uniformly.
The dummy does not need to be linked to anything.

Effect sphere is created using a Dummy object, which name consists of:

@[material][slowdown]- + text

material	two capital letters for material type
slowdown	number between 0-9 0 = no slowdown 9 = almost stops the player

For example, if we use a collision material JL (leaves), and set slowdown to 3, the name will be @JL3-
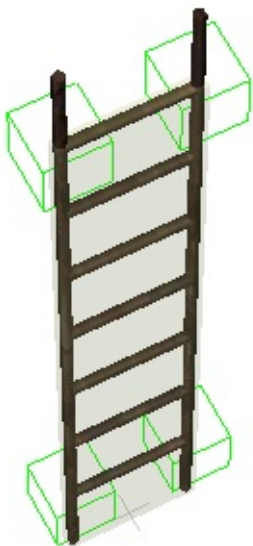
A ladder object consists of the main model, simplified collision model used by characters (^K) and four dummy objects (BL, BR, TL, TR).

The main object has PteroMat defined with collision material, which serves as a collision object for bullets.
The collision object for characters (^K) is a bounding box of a main object, except in its upper end, the collision object to plane must be aligned with the ladder's last step.

This is an example of how the auxiliary objects should be linked to the main object:
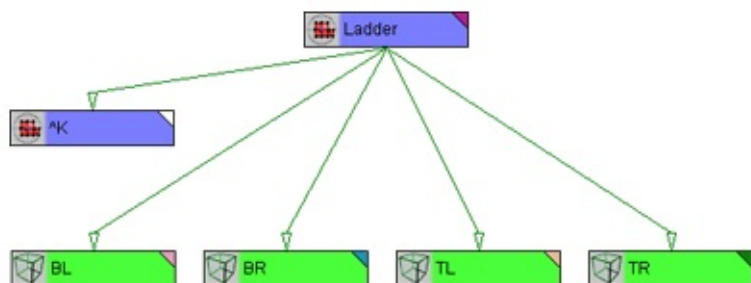
The ladder steps must be 30 cm from each other.

The auxiliary dummy objects determine the position where animation begins (on the first step) and ends (on trhe last step).
These dummy objects must be named according to their position on the ladder viewed in the front view:

BL	lower left
BR	lower right
TL	upper left
TR	upper right

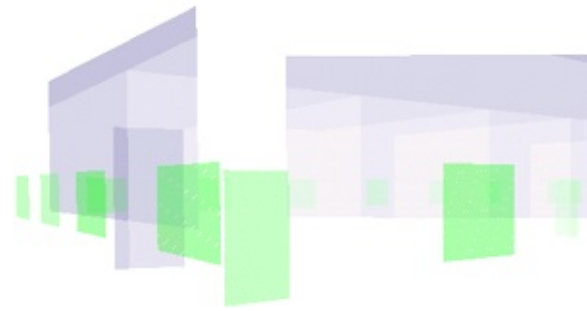In this case, the ladder is meant to be approached from the front side.
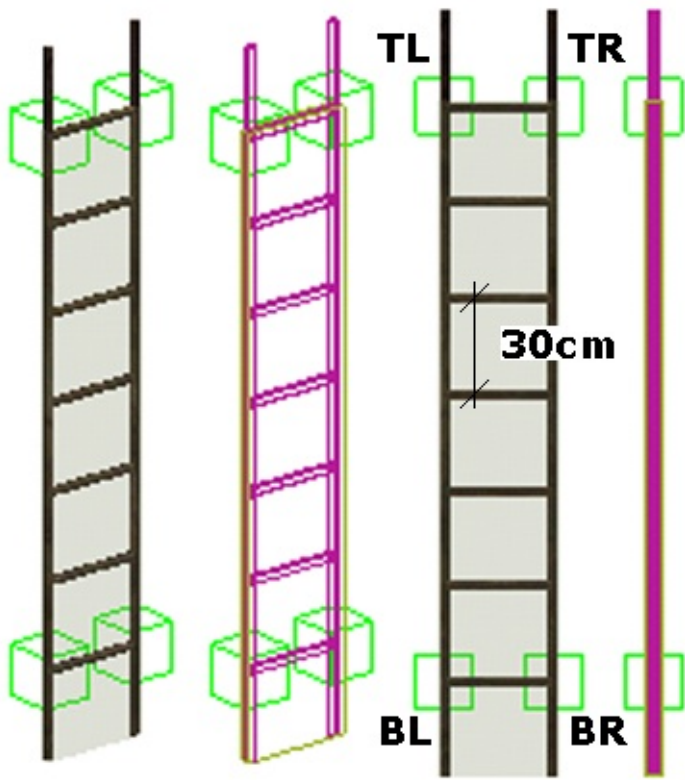
The main object must have this parameter set:

User Defined Properties:

Ladder=1

Creating Collision Objects

Creating sectors

Sector is a limited area which can have specific properties related to both sound and graphics.

It is defined by a geometric shape, normal vectors of which must be oriented inside. Its shape doesn't need to be convex.
It can contain any number of portals and ocluders. Portals must be linked to the sector.

Example of linking sector and portals in schematic view:
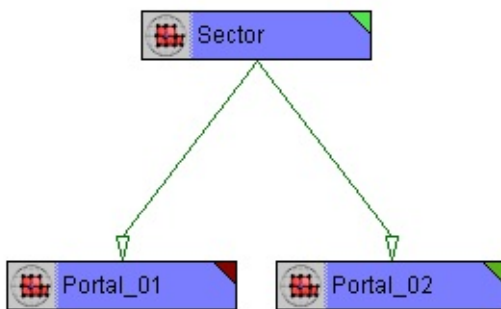
Objects associated with the sector are drawn only when some part of sector's interior is visible. This means that either at least one of its portals must be open, or the camera must be inside the sector.

A Sector object must contain proper values and settings in the Object properties tab:

Creating portals

Portal is a shape consisting of triangles, which must be precisely aligned to the shape of sector. Its normal vectors must point inside and it must be linked to the relevant sector.

A Portal object must contain proper values and settings in the Object properties tab:

```
User Defined Properties:
Portal=30.0,15.0,10.0,0,4,79
```

▮Creating occluders

Occluder is any shape consisting of triangles. It doesn't have to be linked to any objects, but can be linked to d.o. It causes that objects with occluding design set and positioned behind it are not drawn. Portals behind an occluder are not drawn either.

An occluder object must contain proper values and settings in the Object properties tab:

```
User Defined Properties:
Ocluder=1
```

Ocluder, Portal, Sector - MAX
Ocluder
Portal
Sector

Exporting *.bes Files

Before you begin with export, it is necessary to convert all objects into "Editable Mesh", and perform the "Reset XForm" action. "Reset XForm" is found in the Command Panel, Utilities tab. As this is a non-reversible action, we recommend to save the scene before exporting.

menu : file / export... / bes
menu : file / export selected... / bes (*.bes)
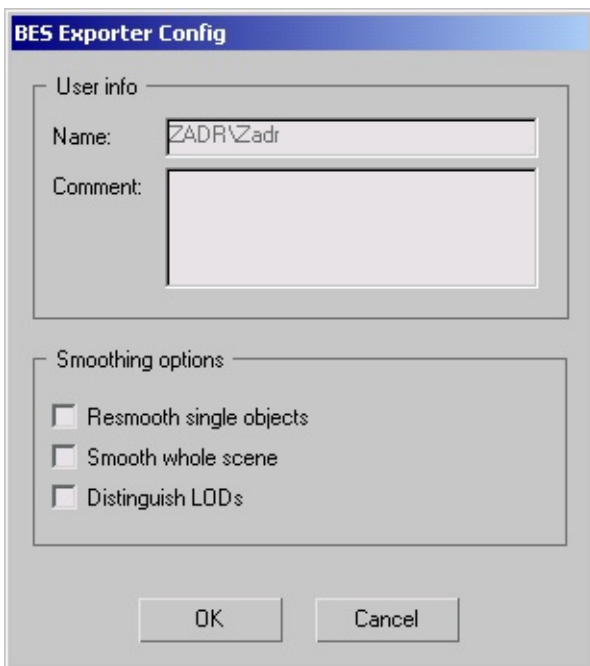
Name	name of the computer and user - cannot be changed
Comment	a comment that can be read in the editor in the Database tab
Resmooth single objects	re-calculation of neighboring normals - not necessary to use
Smooth whole scene	on/off switch for the Smooth parameter in the User Defined object properties
Distinguish LODs	this is used for character export when 'Smooth whole scene' is on

panel : utilities / more... / BES export

Export!	runs the export routine
Run Engine	launches PteroEngine - correct path to it must be set
Resmooth objects	re-calculation of neighboring normals - not necessary to use
Smooth scene	on/off switch for the Smooth parameter in the User Defined object properties
Distinguish LODs	this is used for character export when 'Smooth whole scene' is on
Export selected only	exports only selected objects
Comment	a comment that can be read in the editor in the Database tab
Export filename	entire path with the *.bes name included

Path to engine	entire path to PteroEngine II
Run engine	this switch allows for automatic engine launch and opening the exported *.bes object in it

Level of Detail (LOD) is used for decreasing the amount of graphic detail which significantly speeds up rendering of the game.

The auxiliary objects that function as LODs to the main object must be linked to the main object according to the graph below which shows a main object with two LOD objects:
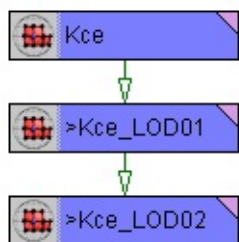
The name of each LOD object must begin with the '>' character.
The position of LOD objects in relation to the main object is determined by their pivots.
We recommend to use 1-3 LODs per object.

The main object must have the Lod (or LastLodAlpha) parameters assigned.
The number of Lod parameters is the number of LOD objects plus one.

When setting the Level of Detail, it is also possible to use the AlphaMult parameter.

Examples of syntax:

This example shows a case, where there is a main object with two LODs. The first one is switched on when viewed from 25m distance (and further), the second one in the 50m distance. The last Lod parameter is set to -1 which means that the last LOD will be displayed until it is within the scene's visibility range.

In this example, the last Lod parameter is set to 75. This means that the object will not be drawn when further than 75m.

```
User Defined Properties:
Lod=25
Lod=50
Lod=75
LastLodAlpha=1
```

Here, we have added a parameter named LastLodAlpha. This means that the last LOD will disappear gradually by becoming more increasingly transparent. Again, it will cease to be drawn entirely when further than 75m.
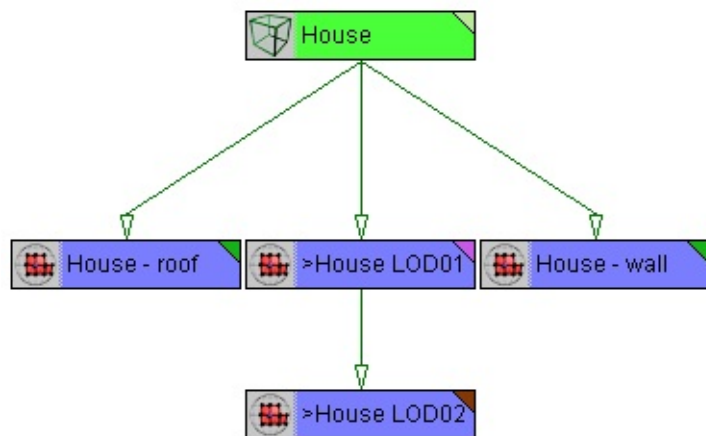

AlphaMult, ClipDist, DoI, DoINoAlpha
LastLodAlpha, Lod
Dummy object in LOD Structure

A Dummy object can be added to the LOD structure in order to make it possible to switch LODs of more mutually independent objects at the same moment.

The main objects must be linked to a Dummy as shown below. The LOD objects are linked to this dummy, too.

This example shows a Dummy named "House", to which graphic objects "House - roof" and "House - wall" are linked. In the User defined properties of the Dummy, there is the following definition:

This definition would normally belong to the main object of a regular LOD hierarchy.
The objects named '>House LOD01' and '>House LOD02' are LOD objects that will be in the defined distance switched to objects without the '>' character in the name.
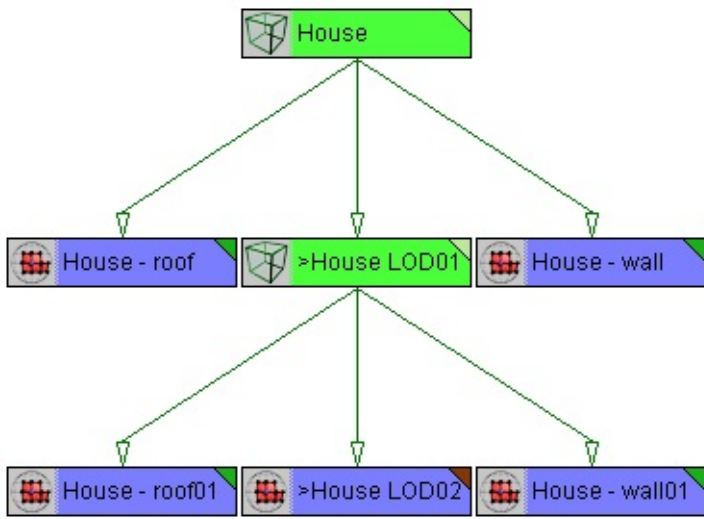
This example shows using a Dummy as both the main and the LOD object. Even a Dummy's LOD can act as a parent to a number of graphical objects.

Creating the Level of Detail (LOD) Structure

User Defined Object Properties

Quad menu : properties / user defined

These parameters serve for setting an object's properties in editor and game. Here, you can set parameters of lighting, physics etc.

AlphaMult, ClipDist, Dol, DolNoAlpha
Collisions
LastLodAlpha, Lod
Lighting, Smooth, TexMove, TexPing, Wobble
Ocluder, Portal, Sector
Physics

AlphaMult, ClipDist, Dol, DolNoAlpha - MAX

Quad menu : properties / user defined

AlphaMult= val

```
User Defined Properties:
AlphaMult=1
```

- multiplier of transparency distance

val	range = 0 až 1 default = 0.8

ClipDist= dist

```
User Defined Properties:
ClipDist=47
```

- sets the object's distance from the camera in meters where it ceases to be drawn including all its subordinate hierarchy
- we recommend to use this parameter for display/scene optimization
- it is possible to use a Dummy for optimization purposes even in 3DS MAX, just like in the editor.

Dol= dist

```
User Defined Properties:
Dol=5
```

- this parameter sets the max. distance between object and camera, in which the object is still fully visible

DolNoAlpha= 1

```
User Defined Properties:
DolNoAlpha=1
```

- the switch for disappearing of an object with the Dol parameter without using transparency

Special Object - Dummy

Collisions - MAX

Quad menu : properties / user defined


```
User Defined Properties:
Phy_defmat=CA
Phy_colshp=1
Phy_misshp=3
Phy_WPObstacle=1
```

■ Phy_colshp= val

- collision shape type for player, AI and physics

0	a linked shape - automatically set, if the export finds a ^K object
1	creates a bounding box around object
2	creates collisions from the graphic shape: automatically set, when collision material is set in PteroMat and 0 has not been set yet
3	creates a bounding sphere around the object

■ Phy_misshp= val

- collision shape type for bullets

0	a linked shape - automatically set, if the export finds a ^SF or ^SK object
1	creates a bounding box around object
2	creates collisions from the graphic shape: automatically set, when collision material is set in PteroMat and 0 has not been set yet
3	creates a bounding sphere around the object

■ Phy_defmat= mat

- collision material type
- it is necessary to fillthis in only when Phy_colshp and Phy_misshp are set to 1 or 3

■ Phy_WPObstacle= 1

- switch for cancellation of waypoint connection with an object

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Creating Collicion Objects

LastLodAlpha, Lod - MAX

Quad menu : properties / user defined


```
User Defined Properties:
Lod=25
Lod=50
Lod=75
LastLodAlpha=1
```

LastLodAlpha= 1

- switches gradual disappearance of last LoD through transparency.

Lod= dist

- this enables LoD switching based on the distance of objects from the camera

dist	distance, in which object switches to its next LoD, if dist=-1, the last LoD is never turned off

Creating the Level of Detail (LOD) Structure

Quad menu : properties / user defined

Lighting= ambient_mult, directional_mult, r, g, b

User Defined Properties:

Lighting=0.5,0.5,243,212,158

- all of the object's vertices have the same lighting
- this lighting is calculated as the multiple of ambient + multiple of directional light+color
- this is necessary to assign for Grow type objects

ambient_mult	multiplier of sector's ambient light
directional_mult	multiplier of sector's directional light
r, g, b	color elements of light

Smooth= angle, group1, ..., groupN

User Defined Properties:

Smooth=83.0,1,21,30

- this is used for smoothing of shared edges of different objects with the same group index
- the calculation is carried out when exporting into the *.bes format

angle	angle for normal smoothing
group1, ..., groupN	object groups

TexMove= tex_id, delta_u, delta_v

User Defined Properties:

TexMove= 1,0.012,0.017
TexMove= 2,-0.012,-0.017

- texture shift on the object
- can be set for individual textures

tex_id	texture IDs: 0 - diffuse #1 1 - diffuse #2 2 - diffuse #3
delta_u, delta_v	shift along u, v axes per second

▋TexPing= tex_id, u_time, u_min, u_max, u_soft, v_time, v_min, v_max, v_soft

- texture shift on the object: ping pong type
- can be set for individual textures

tex_id	texture IDs: 0 - diffuse #1 1 - diffuse #2 2 - diffuse #3
u_time, v_time	time of one shift there and back for u and v axes
u_min, u_max, v_min, v_max	shift interval for individual axes
u_soft, v_soft	direction change can be either smooth (curve) or hard (linear): 0 - 0 - hard change of direction 1 - soft change of direction

▋Wobble= AltX, AltY, AltX, SpeedX, SpeedY, SpeedZ

User Defined Properties:
Wobble=0.2,0.2,0.2,5,5,5

- this parameter makes it possibkle for objects to move around its pivot
- it is used mainly for plants
- recommended values can be for instance: 2.8, 3.1, 2.5 , 2.1, 1.6, 2.2

AltX, AltY, AltZ	wobble deflection in degrees
SpeedX, SpeedY, SpeedZ	wobble speed

Ocluder, Portal, Sector - MAX

Quad menu : properties / user defined

Ocluder= 1

User Defined Properties:
Ocluder=1

- an object with this parameter is an occluding object for portals and render objects
- for instance, it can be used inside a sector in the walls

Portal= active_dist, half_dist, fade_dist, r, g, b

User Defined Properties:
Portal=30.0,15.0,10.0,0,4,79

active_dist	distance from a portal to camera, to which it remains open
half_dist	distance from a portal to camera, to which only those objects are drawn that had been linked to the sector in 3DS MAX
fade_dist	distance from a portal to camera, in which the portal starts changing color, if set to 0, the portal is closed without changing color
r, g, b	color of the closed portal

Sector= 1

User Defined Properties:
Sector=1

- an object with this parameter demarcates sector boundaries

Sub-entity - Ocluder
Sub-entity - Portal
Sub-entity - Sector

Quad menu : properties / user defined

User Defined Properties:
Phy_density=0.1
Phy_moment=0.2
Phy_status=2
Phy_weight=0.1

For proper function of the physics module, it is necessary to fill in all the parameters.

Phy_density= val
- object density

Phy_moment= val
- inertia momentum

Phy_status= id
- the type of object's physical properties

id:

0	object collides, it is not synchronized in multiplayer
1	object collides, it is synchronized in multiplayer
2	object does not collide with physical objects, collides with players and AI, it is synchronized
3	object does not collide and it is not synchronized

Phy_weight= val
- object weight

Using PteroMaterial

Standard Material Properties

Material color: [   ] c   Opacity: [100] ☐ Faceted

PteroCollisions Properties

Collision Material:
A-, pracovni material (nepuzivat pro vyslednou hru) ▼ ... r
Grow Type: [ ]   Grass Type: [ ]

PteroMaterial Properties

Used textures
[1] [2] [3] [L] [E]

Type of transparent: ☐ 2-Sided
- none - (opaque) ▼

+	Diffuse #1 - Ground
+	Diffuse #2 - Multitexture
+	Diffuse #3 - Overlay
+	LightMap
+	Environment
+	About

   PteroMaterial is a plugin for 3DS MAX 5.1 which makes it conveniently possible to assign objects materials with all kinds of information for PteroEngine II. In principle, this is an extension of standard texturing material.

Using texturing material
Using Collision Material

Using Collision Material
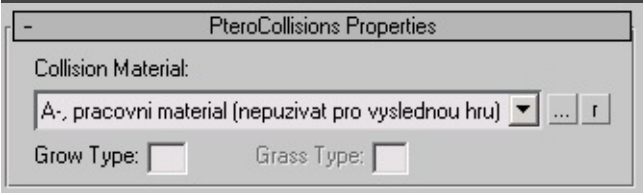
PteroCollision - properties

1. **Collision material** - a library of materials used for collision type detection (for sounds etc.). The default material is set to A, but this should never remain for final models

2. **Grow** - this is a one letter name of a directory in *\[game directory]\levels\[map directory]\data\[sub-level directory]\grow*
3. **Typ trávy** - not supported yet!

...	opens the "browse" dialog for new path to the collision material database
r	reloads database

Using texturing material

PteroMaterial Properties

Used textures
1 2 3 L E

Type of transparent: ☐ 2-Sided

- none - (opaque)   ▼

Diffuse #1 - Ground

E M U V   Ch: 1
i   NAH_kerikfikus2 #9419
u r Size: 256 x 256   s a t
Path: E:_WORK\V...illbase\TEX_OLD\

Diffuse #2 - Multitexture

E M U V T: 1   Ch: 2
i   TLH_SW_HLINADNO #1068
u r Size: 512 x 512   s a t
Path: E:_WORK\V...illbase\TEX_OLD\

Diffuse #3 - Overlay

LightMap

Environment

E M 1 2   Ch: 3
i   BOURETOP #3032
u r Size: 512 x 512   s
Path: E:_WORK\V...illbase\TEX_OLD\

About

PteroMaterial - properties

1. **Used textures**
   - **1** - switches texture No.1 on/off; this is the base texture
   - **2** - switches texture No.2 on/off, this is the high-detail texture
   - **3** - switches texture No.3 on/off, this is an overlay texture with alpha channel
   - **L** - toggles Lightmap on/off

   - **M** - toggles Environment on/off

2. **Transparency types**
   - **žádná** - opaque

   - **typ 0** - transparent, stored in Z-buffer, sorted
   - **typ 1** - transparent, stored in Z-buffer, sorted, 2-bit Alpha channel
   - **typ 2** - translucent, NOT stored in Z-buffer, sorted
   - **typ 3** - transparent, stored in Z-buffer, NOT sorted, 2-bit Alpha channel
   - **typ 4** - translucent, added to background, NOT stored in Z-buffer, sorted

3. **Using both sides for rendering**

Textures No. 1, 3 and lightmap

E	toggles texture usage on/off
M	toggles distance-determined texture degradation (mipmaping)
U	toggles texture tiling along U axis
V	toggles texture tiling along V axis
Ch	mapping channel number (1-99)
i	cancels texture instance
u	cancels texture
r	reloads texture
s	toggles texture rendering on a model (on/off)
a	toggles texture's alpha channel rendering on a model (on/off)
t	toggles transparent texture rendering on a model (on/off)

- note: the `s`, `a` and `t` buttons will work only if the "Show Map in Viewport" button of Material Editor is on (🧊)

Texture No.2

E	toggles texture usage on/off
M	toggles distance-determined texture degradation (mipmaping)
U	toggles texture tiling along U axis
V	toggles texture tiling along V axis
T	tile count (1-999)
Ch	mapping channel number (1-99)
i	cancels texture instance
u	cancels texture
r	reloads texture
s	toggles texture rendering on a model (on/off)
a	toggles texture's alpha channel rendering on a model (on/off)
t	toggles transparent texture rendering on a model (on/off)

- note: the `s`, `a` and `t` buttons will work only if the "Show Map in Viewport" button of Material Editor is on (🧊)

Environment map

E	toggles texture usage on/off
M	toggles distance-determined texture degradation (mipmaping)
1	standard use
2	the map is applied according to its Alpha channel
Ch	mapping channel number (1-99)
i	cancels texture instance
u	cancels texture
r	reloads texture
s	toggles texture rendering on a model (on/off)

- note: the `s` button will work only if the "Show Map in Viewport" button of Material Editor is on ( )

Using Collision Material
Bitmap requirements

Creating a new Scene

panel   : file / new scene
hotkey : ctrl + n

Before you can create a new scene, you will need to create a new directory for that scene that will contain the *.bes files of terrain and sky.

[game directory]\levels

Scene name must contain no spaces.

Also, you can immediately create the subdirectory Tex that will contain textures in *.dds, *.tga or *.bmp formats. When finalizing the scene, the textures should be converted into the *.dds format, with the exception of sky textures that can be left as *.bmp.
Data files utilized in scripts, such as objects and sounds must be stored in the directory named ForScripts found in Sub-level directory.

The data prepared in this way should look like this:
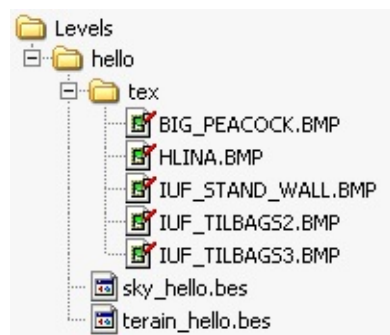
Additional files of 3D models can be stored in the Objects sub-directory.

Once all the necessary data are in place, you can start the New Scene Wizard.

Here, you select the directory you had created and enter the map name. The name for the data directory will be automatically created from the map name. This name can be later changed through Scene tab in the Editor panel.
In the next dialog, you select the files for terrain and sky from the list.

Once that is done, the basic scene has been created and can be modified further on.
The resulting directory structure for scene finalization can look something like this:
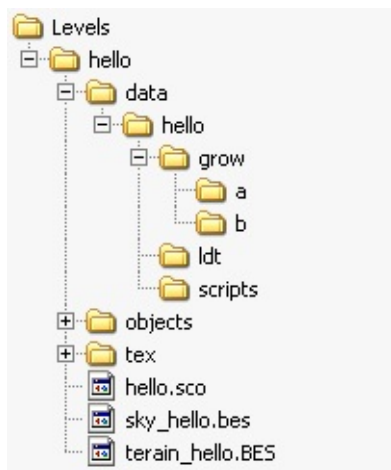
File naming conventions

scene terrain file	\[game directory]\levels\[map directory]\terrain_[jméno].bes
scene sky file	\[game directory]\levels\[map directory]\sky_[jméno].bes
scene initialization file	\[game directory]\levels\[map directory]\data\[sub-level directory]\level.ini
data bitmap	\[game directory]\levels\[map directory]\data\[sub-level directory]\level.tga
thumb	\[game directory]\levels\[map directory]\data\[sub-level directory]\thumb.bmp
main script of the scene	\[game directory]\levels\[map directory]\data\[sub-level directory]\scripts\level.c

File location conventions

basic scene files	\[game directory]\levels\[map directory]
directory containing other geometry files	\[game directory]\levels\[map directory]\objects
directory containing all texture files	\[game directory]\levels\[map directory]\tex
data directory	\[game directory]\levels\[map directory]\data\[sub-level directory]
grow objects directory	\[game directory]\levels\[map directory]\data\[sub-level directory]\grow
scripts directory	\[game directory]\levels\[map directory]\data\[sub-level directory]\scripts
directory containing data utilized in scripts	\[game directory]\levels\[map directory]\data\[sub-level directory]\forscripts
light map directory	\[game directory]\levels\[map directory]\data\[sub-level directory]\ldt

Scene Initialization Files
Database tab
Special Object Types

path : *[game dir]\\levels\\[map dir]\\data\\[sub-level dir]\\mapfpv\\map.dds*

You can view the FPV map in the game by pressing M key.

This bitmap is created in the editor using Level map view tool.

menu :   menu \ level map view

When this tool is activated, the scene is viewe in top view, with blue plane that denotes the boundaries of the future map. You will need to align the view with these borders before exporting.
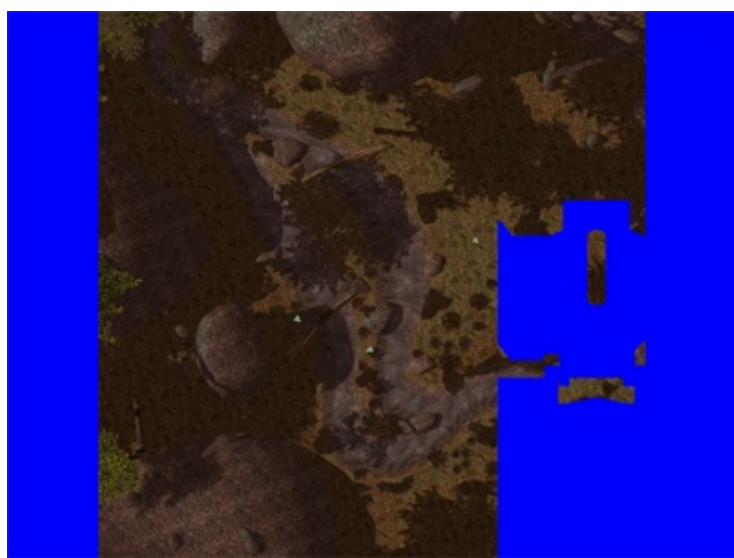
You can move the scene in the viewport using the arrow keys, as well as zoom in and out using +/- keys. When the scene is positioned and zoomed correctly within the viewport, press Spacebar to save the bmp. The file is save in the *.bmp format.

hotkey :   spacebar

Once you have saved the bitmap named map.bmp, you can go back to editor: - menu \ editor \ level map view.

The bitmap can be firther processed in a paint program.
The final texture must be saved in the *.dds format and its dimensions must comply with DirectX texture size requirements.

Example of map.bmp:
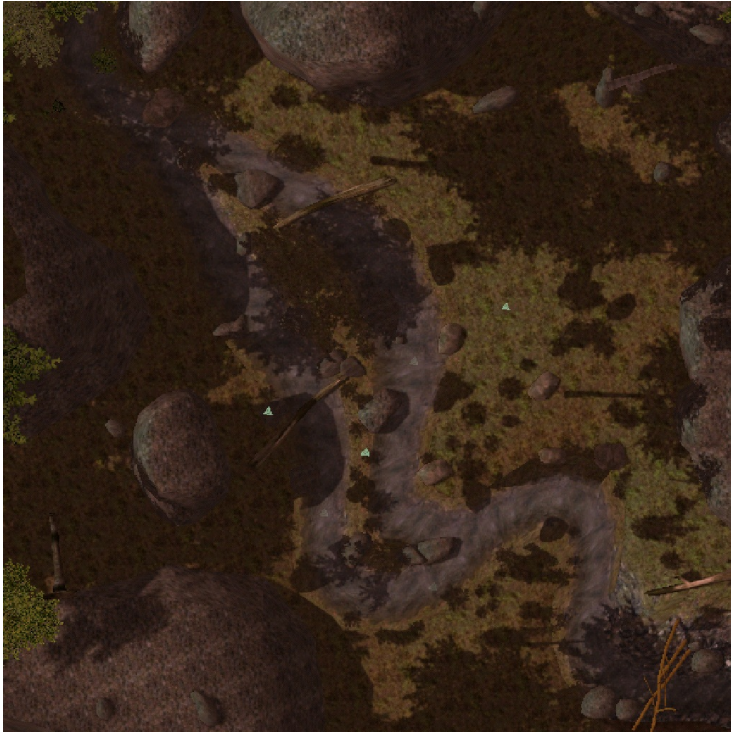
Example of map.dds:
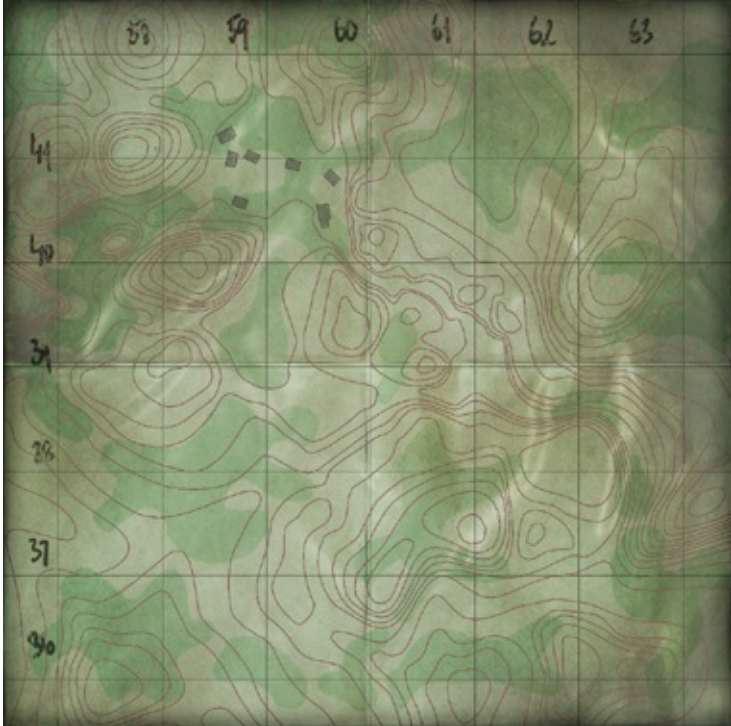
Contour lines

menu :   menu \ countour lines (on/off)

When this tool is activated, a dialog is displayed where you can set altitude difference between contour lines for selected objects.
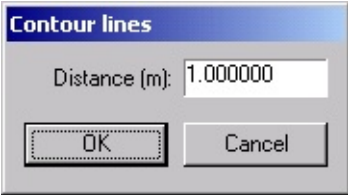
distance	altitude difference for neighboring lines on selected objects

This tool can be deactivated in: menu \ editor \ countour lines (on/off)

Bitmap requirements

Lighting and Fog

Scene lighting

A scene can be lit in two ways:

1. Each sector in the scene contains its own settings for ambient and directional lights and fog.

2. Besides that, you can use Omni and Spot light objects World sector is the basic component of every new scene.

Background lighting

The lighting of background is set in the properties of the Background Sector. Select this sector in the Select window (hotkey Home).

Backgroud Sector is automatically created in every new scene.

Basic properties in the Properties tab

Color	click here to open the color selection dialog, *pressing Shift and right-clicking on a color acts as an eyedropper*
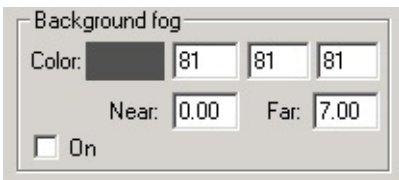
Color	click here to open the color selection dialog, *pressing Shift and right-clicking on a color acts as an eyedropper*
Near	the distance from camera in which the fog begins
Far	the distance in which the fog ends
On	fog on/off switch

Light
Sub-entity - Sector

Scene Initialization Files

   A scene draws some general info from two initialization files. These files are not necessary for proper function of neither graphic nor gameplay functions of a scene.

Bitmap Level.tga

path : \[game directory]\levels\[map directory]\data\[sub-level directory]\level.tga

   This bitmap must be created in editor using Level Bitmap View tool.

menu :   editor \ level bitmap view

After launching this tool, the scene is shown in the top view. The cursor keys move the scene, while +- keys zoom in/out. Position the whole scene within the view and zoom in as much as possible. After that you can save the bitmap (in the *.bmp format) and return back to editor by the same menu item.

menu   :   editor \ save level.bmp
hotkey :   f1

After the bitmap has been exported, it is necessary to save the scene!

The texture needs to be processed in a bitmap processing program that supports the *.tga file format. The editor uses separate color channels, each of which has a different function.

The bitmap contains one pixel with RGB values of 255,255,255 which marks the absolute zero (the beginning) of the scene's coordinates system. This pixel has to be preserved even in the processed version of the bitmap! The bitmap can be cropped, but its scale has to remain unchanged!

An example of Level.tga:

Color components of Level.tga and their functions

green	Determines changes of visibility and fog in per cent. G=100 equals 100% visibility in editor, lower values decrease visibility, higher increase. Maximum value is 254.
blue	Determines index of rain area.

▌Level.ini initialization file

path : \\[game directory]\\levels\\[map directory]\\data\\[sub-level directory]\\level.ini

This file contains some other scene properties.

RAIN_visibility= dist

dist	distance in meters default = 10 recommended range = 5 to 15 no rain = 0

RAIN_density= val

val	distance between raindrops

	default = 1
	recommended range = 1 to 5

RAIN_area= area_id, appear_up, around_tolerance, wind_x, wind_y, wind_rnd, speed, intensity, drop_len, drop_width, color_r, color_g, color_b, color_a

area_id	blue channel intensity of level.tga recommended range = 0 to 254
appear_up	this value determines how high above the camera the raindrops are generated light sky = cca 6 dark sky = cca 10
around_tolerance	amount of drop variance
wind_x, wind_y	wind direction along x and y axes recommended range = -0.08 to 0.08
wind_rnd	randomness of wind influence on individual raindrops recommended range = 0 to 0.1
speed	speed of raindrop fall default = 20
intensity	rain density count of raindrops per RAIN_density area unit
drop_len	raindrop length default= 1 recommended range = 0.5 to 1
drop_width	raindrop width default = 0.01
color_r, color_g, color_b	raindrop color default = 190, 190, 190
color_a	raindrop transparency default = 100

VIS_use= val

val	on/off switch for green channel of level.tga determining visibility 0 = off 1 = on

VIS_ext= back, zmin, zmax

back	toggles use of the level.tga green channel for background visibility 0 = off 1 = on
zmin	lower limit for map usage 0 = use to negative infinity
zmax	upper limit for map usage 0 = use to positive infinity

WATER_fog= material_name, fog_r, fog_g, fog_b, fog_start, fog_end, backgrnd_fog_start, backgrnd_fog_end, max_water_depth

material_name	collision material name, e.g. HB for muddy surface
fog_r, fog_g, fog_b	fog color
fog_start	distance at which the fog starts
fog_end	distance at which the fog ends
backgrnd_fog_start	distance at which the background fog begins
backgrnd_fog_end	distance at which the background fog ends
max_water_depth	maximum depth of water

WATER_sound= material_name, sound

material_name	collision material name, e.g. HB for muddy surface
sound	sound ID 2205 = still water 2236 = running water

PL_noshoot_light= val

val	this switch determines if the object will receive light from weapons default = 0 0 = receives light 1 = doesn't receive

PL_shad= type, alpha

type	cast shadow type of a player default = 2 0 = none 1 = circular 2 = projected
alpha	shadow transparency range = 0 to 1

Align

toolbar : align
hotkey : ctrl+a

 This function allows you to align selected objects. You can align transformation, rotation and scale.

After you have activated the Align function, you need to select the master object to which the selected obejct will be aligned.
Once you have chosen the master object, a alignment dialog is displayed.
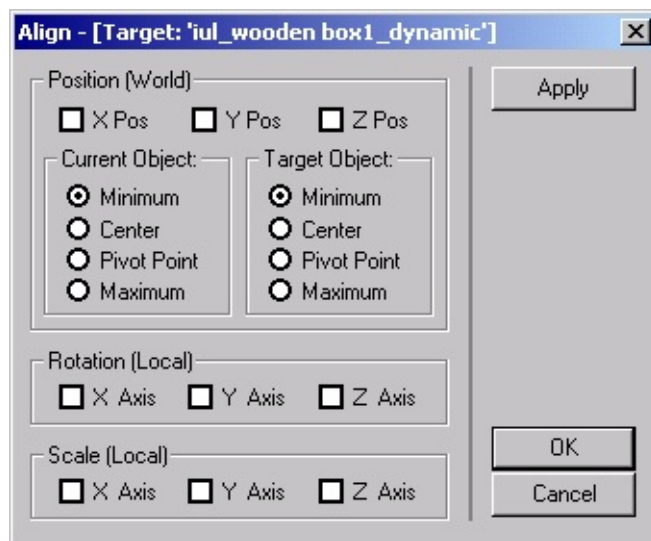
Selecting an object

toolbar : associate

hotkey : a

The Associate function makes it possible to associate selected objects with sectors. Select the objects you want to associate, activate the Associate function, and Left-Click anywhere in the sector.

The association can be also made in the Editor panel, Properties tab.

Sector affiliation

! World sector !

Set/Add   Remove

Selecting an object

toolbar : duplicate selected
hotkey : d

Duplicate function serves for duplication of selected objects in the scene.
Quick duplication is activated by the Middle Mouse Button (MMB).

When this function is active, the selected objects are copied by moving the mouse along X, Y and Z axes. By default, only movement along the X and Y axes is possible. Use the following keys to change axes or constrain movement:

Shift	X axis
Ctrl	Y axis
Shift + Ctrl	Z axis

Selecting an object

Linking

toolbar : link at
hotkey : p

The Link function allows for creation of hierarchies that can be useful e.g. for scene optimization.
After the Link function has been activated, selected objects can be linked to some other ones. The objects the have a child-parent relationship, where the child is the dependent object.

Each child can have only one parent object. This means that if you try to link one object to more parents, the engine will "remember" only the last linking action performed.

Unlinking

toolbar : unlink

The Unlink function cancels the Child -> Parent link.

Navigating the camera in editor

Camera movement

Use cursor keys to move the camera.

The speed of camera movement can be set using NumPad +/- keys.

Camera rotation

Hold down the Right Mouse Button (RMB) to activate the camera rotation function. Move the mouse to rotate the camera around its axis.

Camera rotation - orbit

Hold down the Righ Mouse Button (RMB) and Alt key to activate the camera orbit function. When this function is activated the editor finds a point or an object at the intersection between camera direction and the window center, which then serves as the center of orbiting-rotation.

Object transformations

Move function

menu   : edit / transform / move
toolbar : move selected
hotkey : M

When the Move function is selected, it is activated by pressing and holding down the Left Mouse Button (LMB).

Then, it is possible to use the mouse to move an object along the x, y and z axes. By default, only movement along x and y axes is possible. To constrain the movement to one axis, press and hold down the following keys:

Shift	X axis
Ctrl	Y axis
Shift + Ctrl	Z axis

The Snap functionality is a part of Move function. It is activated with N key. using this feature you can snap objects to grid or vertices, edges or faces of both selected and unselected objects.
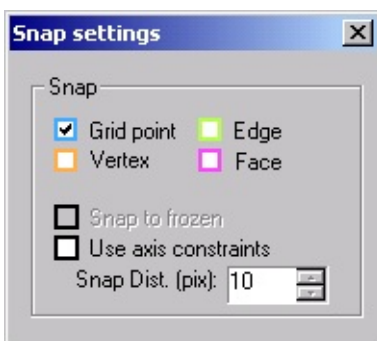
Grid point, Vertex, Edge, Face	types of snapping
Use axis constraints	switches axis constraints for snapping
Snap Dist.	distance in pixels, to which snapping reacts to types

You can set speed of object movement in scene with keys 1 to 0.

The transformation (position) of selected objects can be also entered numerically in the Transform tab. The measurements are in meters.

Rotate function

menu   : edit / transform / rotate
toolbar : rotate selected
hotkey : R

When the Rotate function is selected, it is activated by pressing and holding down the Left Mouse Button (LMB).

Then, it is possible to use mouse movements to rotate selected objects along x, y and z axes. By default, you can rotate only around the z axis. In order to switch to another axis, use the following keys:

X	X axis
Y	Y axis
Z	Z axis

There are hotkeys for added functionality:

Ctrl	switches between rotation along a shared axis and individual axes
Shift	switches between using global and local axis for rotating
,	rotates the selected object 45° counter clock-wise (CCW) along the currently set axis, it is not necessary to have the Rotation function selected in order for this hotkey to work
.	rotates the selected object 45° clock-wise (CW) along the currently set axis, it is not necessary to have the Rotation function selected in order for this hotkey to work

Rotation
X: 0.0000
Y: 0.0000
Z: 0.0000

Rotation of selected objects can be also entered numerically in the Transform tab. The

measurements are in degrees.

Scale function

menu   : edit / transform / scale
toolbar : scale selected
hotkey : C

When the Scale function is selected, it is activated by pressing and holding down the Left Mouse Button (LMB).

After it has been activated, it is possible to alter the scale (size) of selected objects. You can scale either uniformly (along all axes), or you can constrain the scaling operation to an individual axis. By default, uniform scale is applied. To constrain scaling to a certain axis, use the following keys:

U	uniform scale
X	X axis
Y	Y axis
Z	Z axis
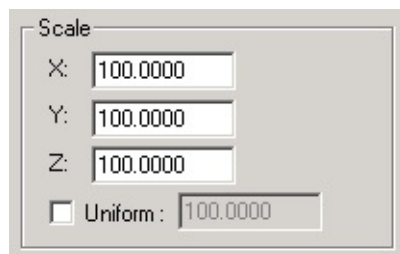
The object scale can be also entered numerically in the Transform tab. Enter the values in per cent here.

Selecting an object

Placing objects - Parachute

toolbar : parachute
hotkey : t

The Parachute function is used to "drop" objects onto other objects in the scene.
The objects are "dropped" from the maximum height of the scene and fall down until they collide with the scene.

Landing selection group	selection of a named object group, if this is "none" the calculation is made for all the objects in the scene
Sink in	transformation of a placed object along the Z axis

Selection groups
Selecting an object

Placing objects - Place (a.k.a. "placeator")

toolbar : placeator

hotkey : o

The Place function is used for placing new objects into a scene.
When active, the Editor panel switches to the Place tab. After the parameters have been set, use the Left Mouse Button (LMB) to place objects into the scene.

Ruler

toolbar : ruler

panel   : help / ruler

This tool serves for measuring distances in the scene. Right-click to begin measuring and move to the destination. The measured distances are shown in the Help tab of the editor panel.
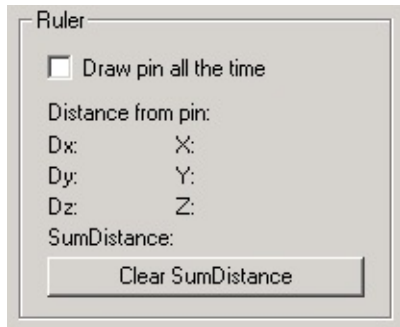
Draw pin all the time	causes the ruler to be functional even in the game mode
Dx, Dy, Dz	distance from the last measurement point along X,Y,Z axes
X, Y, Z	ruler location in the scene
SumDistance	sum of all measured distances
Clear SumDistance	clears the sum of measured distances

Selecting an object

Selected objects can be stored in a selection group with a unique name.
Use these groups in order to simplify and speed up your workflow.

Using mouse to select objects

toolbar : select
hotkey : S

 When in Select mode, you can use Left Mouse Button (LMB) to select an object that you wish to edit.
Hold down and drag the mouse in window to select more objects simultaneously. This selects every object within the selection rectangle.

Quick selection using mouse

hotkey : `

The Quick selection function is turned on by pressing and holding down the "`" key. This function can be used without leaving the currently active editor mode. Use Left Mouse Button (LMB) to select object(s) you wish to edit.
Hold down and drag the mouse in window to select more objects simultaneously. This selects every object within the selection rectangle.

Select by name

menu   : edit / select dialog
hotkey : HOME

For searching by name, you can use asterix (*) as wildcard character. When searching for object 'NJK_licuala01', you can use 'NJK_lic*' or simply '*licuala*'.
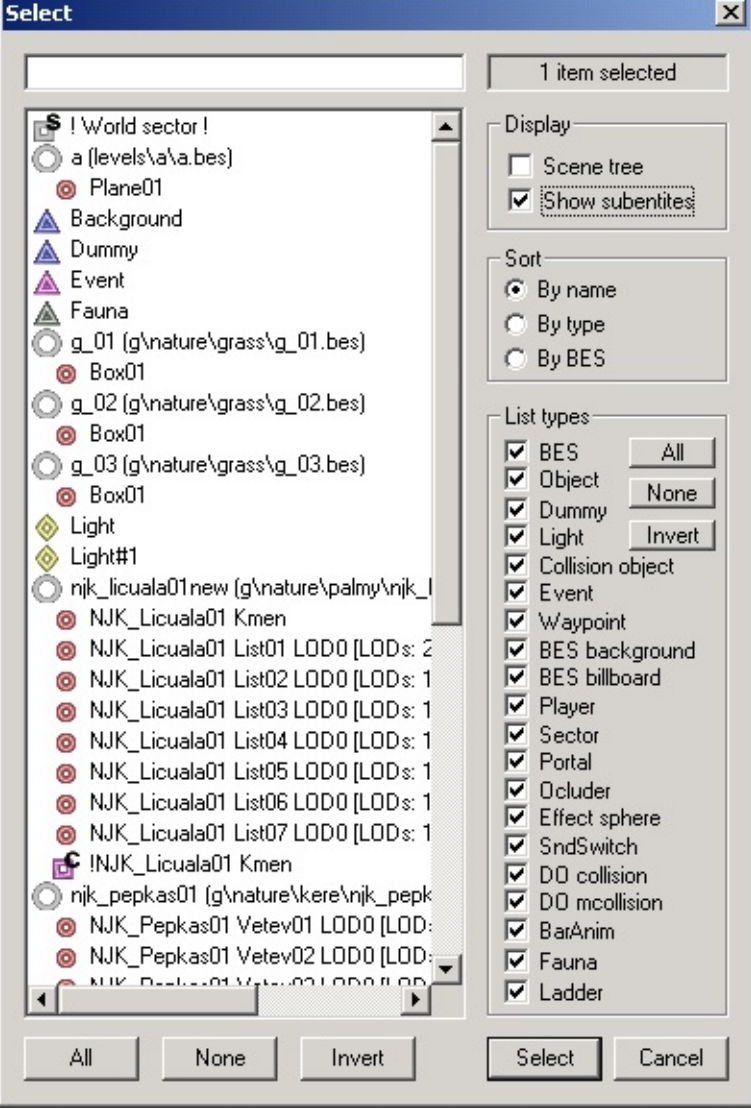
Selection groups

BES Object Types

panel : database / current level (⊙)
panel : database / package (⊙)

    BES objects are created in and exported from 3DS MAX. They contain graphical data (geometry etc.) of a model.

    It is possible to select BES objects only when the Entity/Subentity toggle ⊙ (hotkey Q) is off.

Basic properties in the Properties tab

Entity name	object name shown in the editor

Clip Distance	distance within which the object is drawn (in meters)
Current	sets the current distance between the camera and the object center

Is Background	toggles object placement between scene and background, icon: ⊙

Bilboard XZ	object will rotate along X and Y axes to face the camera, icon: ⊚
Bilboard Z	object will rotate along Z axis to face the camera, icon: ⊚
No cut by visibility	object will be drawn even when out of the visibility limit (thi is set in the Scene tab)
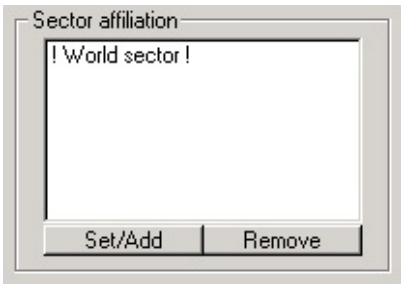
Set/Add	opens the dialog for sector associations
Remove	remove the associations of selected sectors

Sub-entity

icon : ◎

Sub-entity objects are components of a BES file.

It is possible to select Sub-entities only when the Entity/Sub-entity toggle ◎ is on (hotkey Q).

Basic properties in the Properties tab
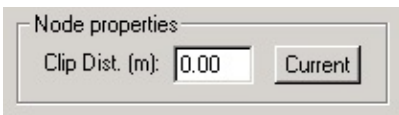
Clip Distance	distance within which the object is drawn (in meters)
Current	sets the current distance between the camera and the object center
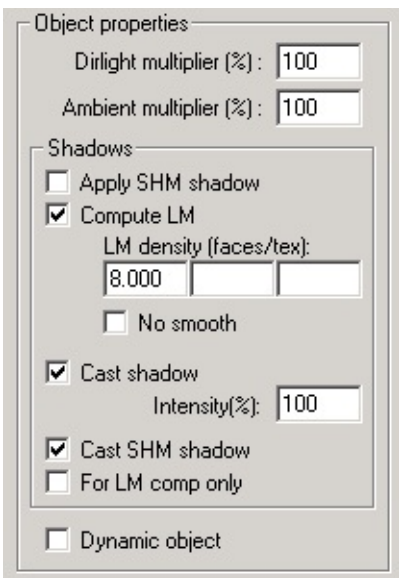
Dirlight multiplier	directional light multiplier
Ambient multiplier	ambient light multiplier

Apply SHM shadow	aplly shadow tree data to the object
Compute LM	compute lightmaps for the object
LM density	level of lightmap detail for individual LOD (Level of Detail) objects, the number denotes polygon count per texture
No smooth	do not apply smoothing to lightmap textures
Cast shadow	object casts shadows
Intensity	cast shadow intensity
Cast SHM shadow	object is taken into shadow tree calculation
For LM comp only	the object serves only for LM calculation, i.e. it isn't drawn in the game
Dynamic object	dynamic/static object switch

Object occludding design

None
None
Particled
Boxed
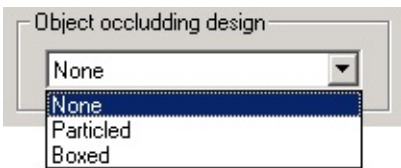
Object occludding design	shape use for "hide" calculation (an object can be hidden out of a portal or behind an occluder)

"Particled" shape is a rectangle that always rotates to face a camera and always occludes the whole object.

"Boxed" shape is a cubic boundig box. This shape returns more accurate, but slower calculation.
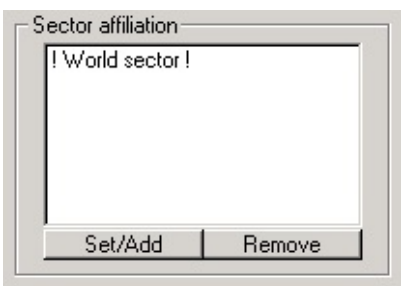
Set/Add	opens the sector association dialog
Remove	removes the associations for selected sectors
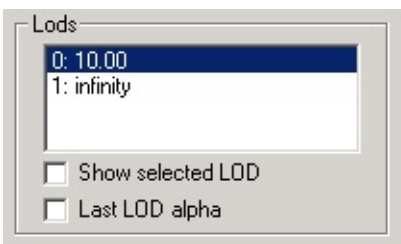
List	list of distances for LOD (Level of Detail) objects switching, edit distances by double-clicking on the numbers (LMB)
Show selected LOD	switches drawing of the selected LOD only - functional in editor only
Last LOD	

alpha	switch for the last LOD to disappear into transparency

Set new LOD distance

Dist: 10.00 Set current

OK Cancel
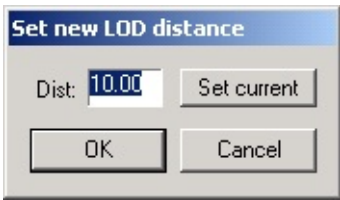
Dist	distance for LOD switching, if you want the last LOD not to disappear, enter -1
Set current	sets the current distance between camera and the object center

BES

Sub-entity - Ocluder

icon :
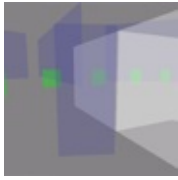
Ocluder serves for hiding (occluding) portals and render objects. It is used e.g. inside a sector for walls etc.

This object has no editable properties.

---

icon :

Portal serves for passage between sectors and for visibility setting of objects associated with these sectors.

Each portal has to have its double. If a portal leads into the world sector, the double is created automatically.

Basic properties in the Properties tab
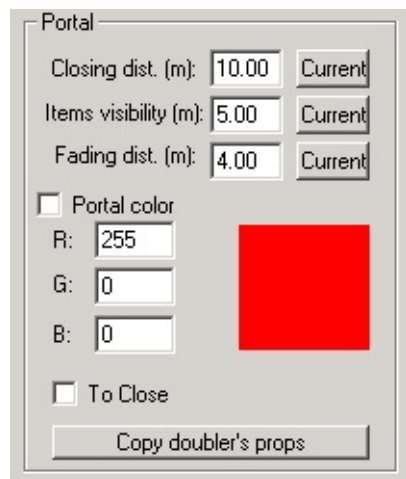
Closing dist.	distance from camera in which the portale "closes"
Current	sets the current distance between camera and the object center
Items visibility	distance between camera and portal - when exceeded, only the objects linked to the sector in 3DS MAX are drawn.
Current	sets the current distance between camera and the object center
Fading dist.	distance between camera and portal where the portal color begins to fade
Current	sets the current distance between camera and the object center
Portal	

color	portal color fade switch
R, G, B	portal color, click on color to open the color selection dialog *Holding down Shift and right-clicking on a color acts as an eyedropeer*
Copy doubler's props	sets the values identical to the portal's double

Stand-in:
Portal - World portal!
Change to   Select into
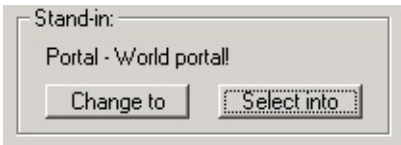
Portal	double's name
Change to	sets selection to the double
Select into	selects both portals

BES
Sub-entity - Ocluder
Sub-entity - Sector

Sub-entity - Sector

menu   :   edit \ select \ current sector
hotkey :   e
icon   :
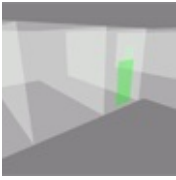
Sector is a restricted space that demarcates a part of the scene. It serves optimization purposes.

The passage between sectors is made possible by the Portals. The Portals also determine which objects associated with individual sectors should be drawn.

The current sector (i.e. the one in which the camera is currently located) can be selected by pressing E. The information regarding the current sector is listed on the right hand side of the status line.
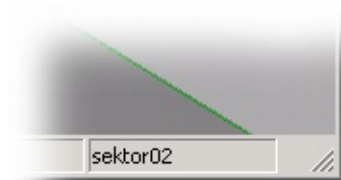
Each scene contains at least two basic sectors - World and Background.

Basic properties in the Properties dialog
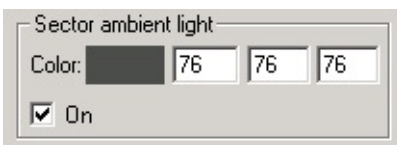
Color	click on color to open the color selection dialog, *holding down Shift and right-clicking on a color acts as an eyedropeer*
On	switch for usage of ambient light
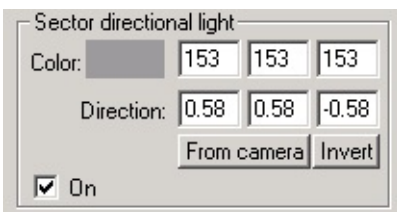
Color	click on color to open the color selection dialog,

	holding down Shift and right-clicking on a color acts as an eyedropeer
Direction	direction of light in radians
From camera	sets the light direction according to current camera orientation
Invert	inverts the direction of light
On	switch for usage of directional light

Color	click on color to open the color selection dialog, *holding down Shift and right-clicking on a color acts as an eyedropeer*
Near	near clipping distance for fog (i.e. where fog starts)
Far	vzdálenost do které se aplikuje mlha
On	fog draw on/off toggle

BES
Sub-entity - Ocluder
Sub-entity - Portal

menu : **view \ editor panel \ database**

panel : **database**

hotkey : **k**

This tab is used for inserting objects into the scene.

The list is divided into three parts:
- current level: contains model files of the current scene
- special objects: special objects library
- package: files of models from Vietcong

The model database is not updated automatically, except for its "Current level" part, which is automatically updated evrey time the scene is opened. Update the database by clicking on "Refresh".
Clicking on "Rebuild TexDB" updates the texture database. This database needs to be updated everytime a texture file has been added.

Models can be inserted into the scene by double-clicking on a file in the database, by pressing Enter or from contextual menu opened by Right Mouse Button(RMB) click.

If you want to exchange an existing model in the scene for some other from the database, or all models of one kind, do so by selecting the object and opening the contextual menu using Right Mouse Button click.
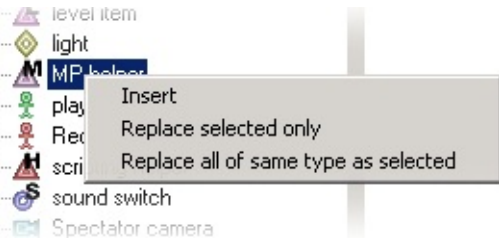
Special Object Types

panel : place

This tab sets parameters for the Place function ("Placeator").

New	create new group
Delete	delete the current group
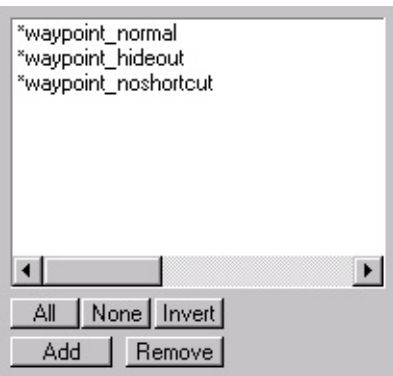
All	select all objects in the list
None	cancels selection
Invert	inverts the selection in the list
Add	opens the dialog for adding objects to a group
Remove	deletes an object from the list
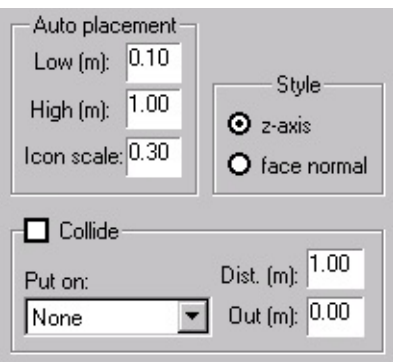
Low	minimum distance of an object placed by dragging the mouse
High	maximum distance of an object placed by dragging the mouse

Icon scale	cursor size, 1 = 100%
z-axis	objects are always left standing erect
face normal	objects will be rotated to accomodate the normal of the face they are on
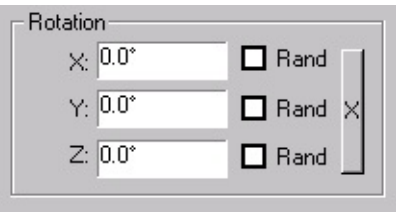
X, Y, Z	rotation along individual axes
Rand	switches random rotation between the extremes of -n to +n
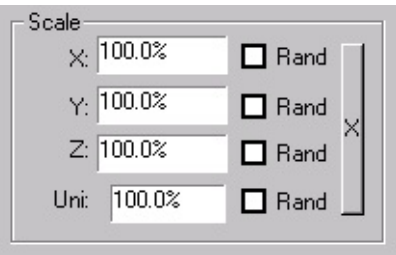
X, Y, Z	scale along individual axes
Uni	uniform scale
Rand	switches random scale between the extremes of -n to +n

X, Y, Z	transform along Z axis
Rand	switches random transformation between the extremes of -n to +n
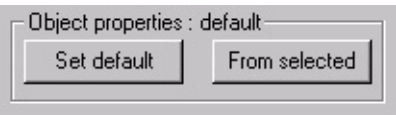
Set default	sets default properties of the placed objects

From selected	sets properties of the placed objects according to the selected sub-entity

---

Placing objects - Place (a.k.a. "placeator")

Properties tab

panel : properties

hotkey : enter
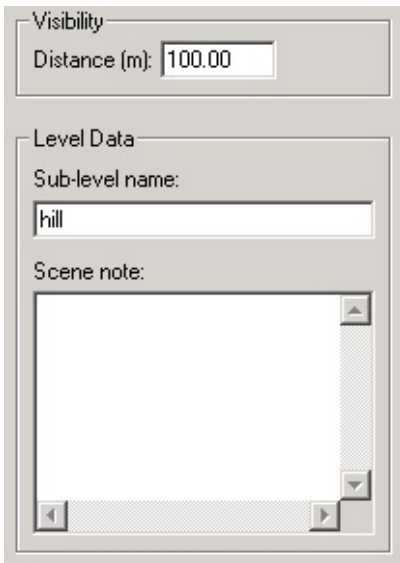
This tab contains editable information on objects in the scene.

BES Object Types
Special Object Types

panel : scene

This tab contains the basic settings for a scene.

Distance	"far" clipping distance (visibility) of a camera in the scene
Sub-level name	name of the directory that holds data for the scene *[game directory]\levels\[map dir]\data\[sub-level name]*
Scene note	a note that is displayed in a dialog box on opening the scene

panel : transform

In this tab, you can enter numerical values for object transformations.

Object transformations

panel : help
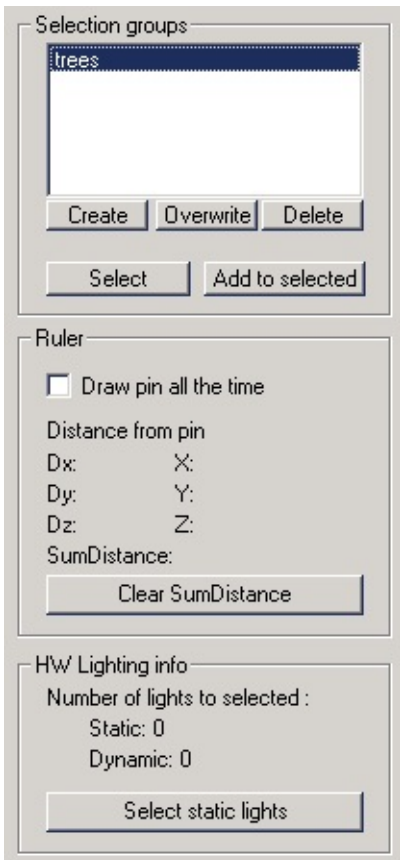
This tab contains additional useful tools.

The Selection groups sub-group is used for storing of selection groups for later use.
The Ruler sub-group serves as an info tab for the Ruler tool.
HW Lighting Info sub-group shows how many lights light the selected object.

How to use lights
Ruler
Selection groups

How to use lights

panel : help / hw lighting info

This tool is used to trace the number of static and dynamic lights that light the selected object. Ptero-Engine II does not support SW lighting, i.e. it needs to use a video card with HW lighting support. A single object can be lit by the maximum of 8 lights at a time. The static lights are drawn with higher priority. Because of this, it might happen that in a scene lit with a large number of static lights, a flashlight does not work in certain locations. This tool serves to track down the objects that might be lit by too many lights and fix the problem.

HW Lighting info
Number of lights to selected :
Static: 0
Dynamic: 0

Select static lights

Static	number of static lights lighting the selected object
Dynamic	number of dynamic lights lighting the selected object
Select static lights	selects all the static lights that shed light on the selected object

Special object - Light

panel : help / selection groups

Selected objects can be stored in a group with a unique name.
Use these groups in order to simplify and speed up your workflow.

Create	creates a group from the selected objects
Overwrite	overwrites the existing group with the currently selected objects
Delete	deletes a group
Select	selects all objects belonging to a group
Add to selected	adds the objects belonging to the group to the current selection

Placing objects - Place (a.k.a. "placeator")
Placing objects - Parachute
Selecting an object

LMs (Lightmaps) tab

panel : lms

This tool serves for lightmap and shadow tree calculations.

Regenerate	refreshes the data for lightmaps
Compute selected	opens the dialog for lightmap calculations for selected objects
Compute all	opens the dialog for lightmap calculation for the entire scene
Delete selected	deletes lightmaps of selected objects
Delete all	deletes lightmaps of all objects in the scene
Export	opens the settings dialog for shadow tree calculation for the entire scene
Export selected	opens the settings dialog for shadow tree calculation for selected objects
Save obstacles	saves *.obs file for selected objects. *.obs files contain information for shadow casting or demarcate area for shadow tree for later use
Update	if the scene has "grow" type objects in it, use this button to recalculate their lighting

grow.dat	

Shadow tree calculation
Lightmap calculation

Lightmap calculation

Lightmap is actually a texture that is applied to a model. This texture is calculated from direction, intensity and course of light rays in the scene.
The lightmap data are stored in *.ldt files.

Here, you can see an example of a lightmap (the helicopter shadow) applied to the terrain.
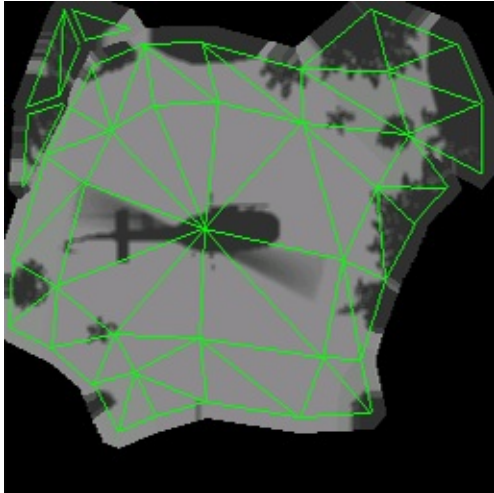
An example of a scene with lightmaps.

An example of a scene without lightmaps.

The path to the *.ldt files is as follows:

\[game directory]\levels\[map dir]\data\[sub-level dir]\ldt

Lightmaps can be also used to decrease the number of lights litghting an object. This is because all static lights that influence the lighting of an object are not applied to it anymore when it has a lightmap assigned. Thus only dynamic lighting is calculated during the game (for that object).

Settings dialog for lightmap calculation

panel : lms / compute selected
panel : lms / compute all
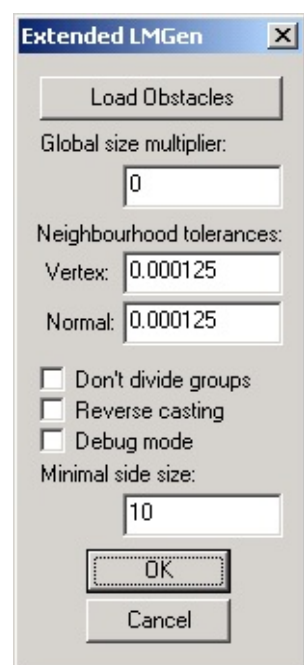
Load Obstacles	loads the *.obs data file containing info regarding shadow casting objects, if there is no such file, the calculation takes into account all objects in the scene
Global size multiplier	map level of detail multiplier the recommended value is between 0.5-1
Vertex	distance tolerance which determines whether two adjacent triangles' border points share the same location if the lightmap calculation on an edge between two triangles seems incorrect, it is recommended to increase this value, say to 0.05
Normal	tolerance (of difference) between two normals of adjacent triangles used to determine whether the two triangles are in the same plane if the lightmap calculation on two adjacent triangles seems incorrect, it is

	reccommended to increase this value, say to 0.1
Don't divide groups	this switch determines whether adjacent triangles that are in the same plane should be taken into calculation as a single polygon or separately
Reverse casting	this switch determines whether triangles should be treated as one-sided or two-sided in the calculation
Minimal side size	minimal size of the rectangle side on the light map in pixels if the lightmaps seem blurred on large triangles, it is recommended to increase this value

Shadow tree calculation

Shadow tree is an auxiliary grid positioned in the 3D space around the scene or its selected part. Each cell contains information regarding light intensity including cast shadows. This information is then used for dynamic object lighting calculation. Dynamic objects include characters, weapons, "grow" type objects etc.

The path to the *.shm file is as follows:

\[game directory]\levels\[map dir]\data\[sub-level dir]\ldt

Settings dialog for shadow tree calculation

panel : lms / export
panel : lms / export selected
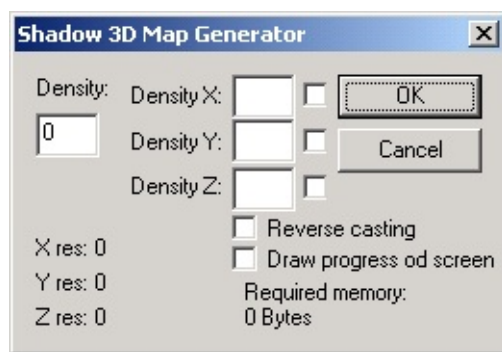
Density	grid density along all three axes in meters
Density X	grid density along x axis only in meters; this needs to be activated with the checkbox next to the number
Density Y	grid density along y axis only in meters; this needs to be activated with the checkbox next to the number
Density Z	grid density along z axis only in meters; this needs to be activated with the checkbox next to the number
Reverse casting	this toggle determines whether triangles are taken into calculation as one sided or two sided
Draw progress on screen	draws calculation of individual layers in real time

X res.	resolution along x axis
Y res.	resolution along y axis
Z res.	resolution along z axis
Required memory	estimated memory usage for the calculation

Finalizing Scene

menu : file / finalize mp mission
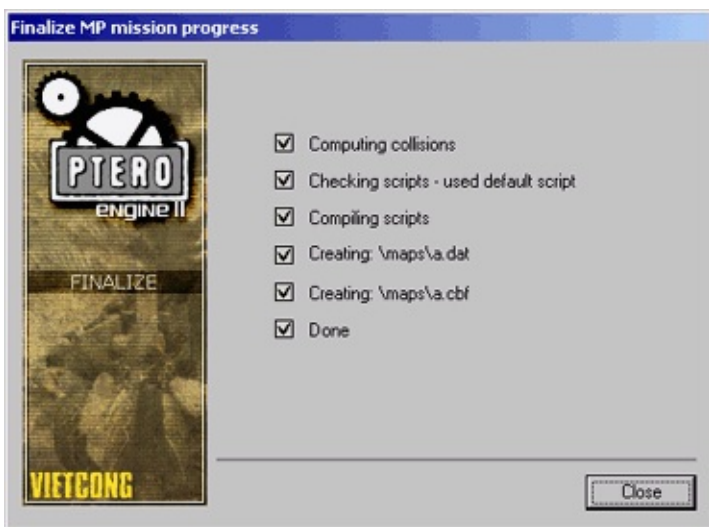
This function performs all the tasks necessary to finalize a scene. Before it can be run, you must enter at least one type of MP game.
If the engine doesn't find the level.c and sound.c files in:
\levels\[map dir]\data\[sub-level dir]\scripts,
the basic sripts are used.

The data of a scene created in this way consist of two files:

[scene_name].cbf
[scene_name].dat

Vietcong searches for these files in the *\maps* directory.

Both files must be stored here.

You can test these multilplayer game data with more players, who have installed the same version of the editor.
The game can by executed via:

menu : game / game menu

If you will be starting the server, your scene should be shown in the list.

How to define an MP game
How to create thumb

How to create the map thumbnail

cesta : \[dame dir]\levels\[map dir]\data\[sub-level dir]\thumb.bmp

This thumbnail is displayed when you browse maps in Game menu.

The bitmap for thumbnail must be stored in *.bmp format and its resolution must be 290x189 pixels.

Example of thumb.bmp:

How to define an MP game

menu : editor / multiplayer game editor

MP game editor

Use this editor to set the name of the game and its types. You MUST enter this information in order to be able to create a final MP game pack.
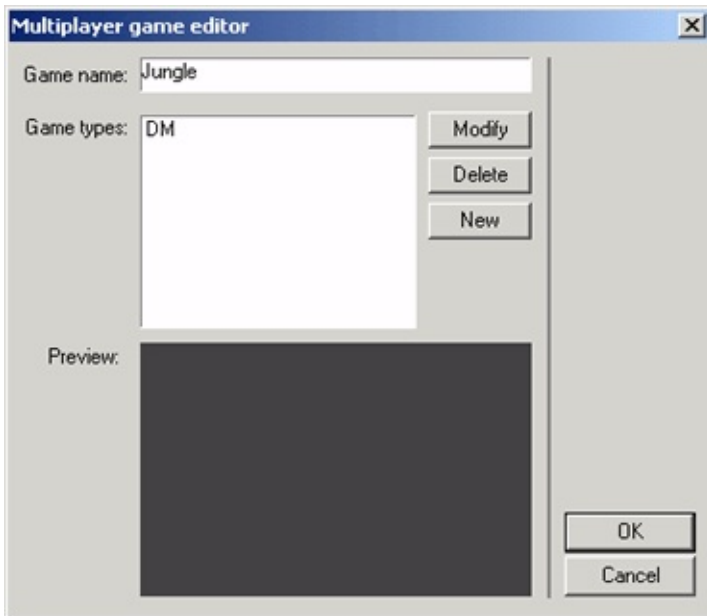
Game name	the name that is shown in the list of MP games
Game types	types of games that can be played in this scene
Modify	opens the dialog for editing of the selected game type
Delete	deletes the selected game type from the list
New	opens the dialog for creating a new game type
Preview	automatically generated preview

MP game type editor

This editor serves for creation or modification of MP game types.

Game type name	game type name
Game type description	general description of the game type
Game type US description	game type description for the U.S. side
Game type VC description	game type description for the VC side
Maximum num. players	maximum number of players
Script type	select script according to the game type
Script file	Location of the script file
Time	…
Points	…
Frags	…

Multiplayer mode list

menu : entities / create
panel : database / special objects

Special objects are used for fine-tuning the scene. These objects are added in the Editor and possess special properties.

Editor supports the following types of special objects:

△ **Dummy**	helper object used for scene optimization, scripts etc.
△ **Event**	object (trigger) for graphic and sound effects
△ **Fauna**	adds fauna to the scene
⚲ **Level item**	used for placing of various items that can be picked up by a player, such as weapons
◇ **Light**	omni-directional light and spotlight
△ **MP Helper**	helper object for MP game, used for adding flags, ammo crates etc.
⚓ **North star**	
⚱ **Player**	helper object used for placement of scripted characters in SP and MP coop games
⚱ **Recovery point**	recovery points for MP game players
△ **Script helper**	helper object used by a script
⚙ **Sound switch**	sound system helper object which determines places where sound settings are changed (e.g. for EAX)
◻ **Spectator camera**	spectator camera for MP game
△ **Way point**	helper object for AI pathfinding in SP and MP cooperative game

Note:
SP - single player game

MP - multiplayer

Objects database

Special Object - Dummy

menu : entities / create / dummy
panel : database / special objects / dummy (⚠)

Dummy is an auxiliary object used for scene optimization, scripts and other purposes.

When an object is linked to a dummy near it, the object tree search is faster, thus the game itself performs better. A dummy has a variable called "clip distance" which determines the distance from which the dummy and its children are not drawn anymore.

The editor also supports Hierarchy Dummy object type. This is a dummy object, created in the center of the current (multiple) selection bounding box. The currently selected objects are then automatically linked to it. The tab in the editor panel is then switched to Properties so that the clip distance can be set.

Hierarchy Dummy can be also created using INSERT hotkey.

Example:

```
⚠  Hierarchy Dummy [ClipDist: 50.00]
○  njh_lapalma (g\nature\jungle\njh_lapalma.bes)
○  njh_tropy (g\nature\jungle\njh_tropy.bes)
○  njh_zedjunngle (g\nature\jungle\njh_zedjunngle.bes)
○  njk_bamboo01 (g\nature\jungle\njk_bamboo01.bes)
○  njk_bamboo02 (g\nature\jungle\njk_bamboo02.bes)
○  njk_bamboo03 (g\nature\jungle\njk_bamboo03.bes)
○  njk_bamboo04 (g\nature\jungle\njk_bamboo04.bes)
○  njk_bamboo05 (g\nature\jungle\njk_bamboo05.bes)
○  njk_banana01 (g\nature\jungle\njk_banana01.bes)
○  njk_banana03 (g\nature\jungle\njk_banana03.bes)
```

In this example, all of the objects linked to the Hierarchy dummy cease to be drawn as soon as the distance between the camera and the dummy center exceeds 50m.

Basic properties in the Properties tab

Entity name

```
iuz_ladder_1_5m
```

Entity name	object name shown in the editor

Clip Distance	distance in meters to which an object is drawn (it isn't drawn any further)
Current	sets the current distance between the camera and the object center

Special Object Types
Objects database

menu : entities / create / event
panel : database / special objects / event (⚠)

   Event serves for launching audio and visual effects. A single event can only launch one type of effect - either audio or visual.

Basic properties in the Properties tab

Entity name
iuz_ladder_1_5m

Entity name	name of object shown in the editor

Node properties
Clip Dist. (m): 0.00   Current

|	
Clip Distance	distance in meters to which object is drawn (it isn't drawn any further)
Current	sets the current distance of the camera from the object center

Event
Sound: 0   Select
Effect: 0   Select
Flare: 0

Fill in the effect ID next to its type.
Currently, Flare objects are not supported.

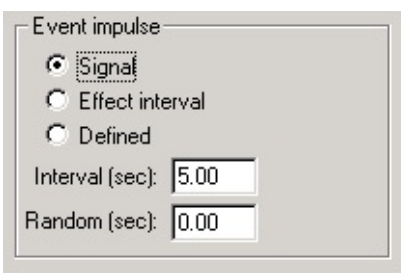|	
Sound: Select	opens the dialog in which sounds can be selected
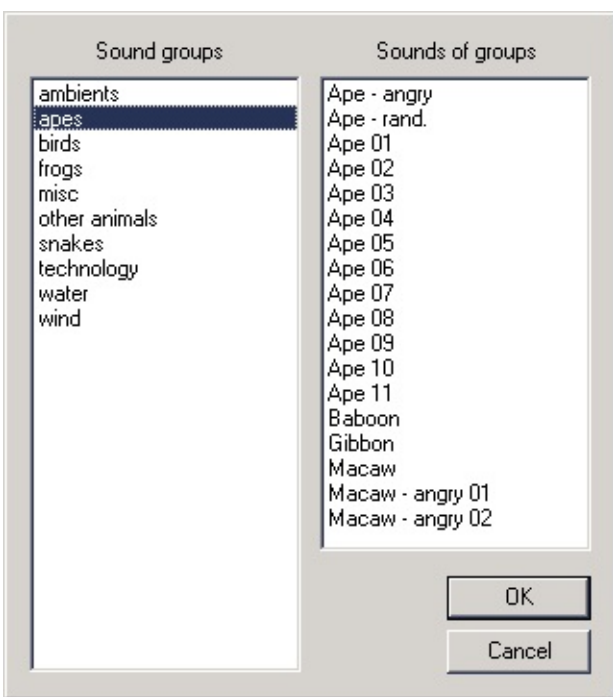
Seznam Sound groups obsahuje skupiny zvuků a Sounds jednotlivé zvuky ve vybrané skupině.

Sound: Effect	opens the dialog in which visual effects can be selected
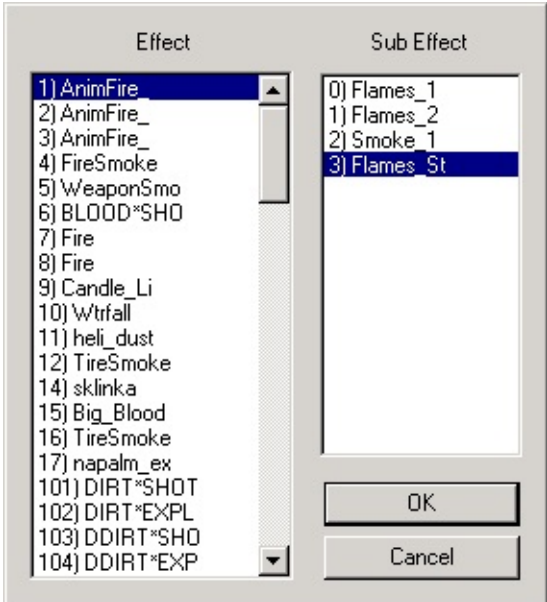
The important thing here is the selection of an effect. The list of sub-effects serves only informative purposes.

The timing of the effect can be set in the following ways:

Signal	the effect is launched only by script
Effect interval	basic effect settings
Defined	user-defined settings

Special Object Types
Objects database

Speciální objekt - Fauna

menu : entities / create / fauna
panel : database / special objects / fauna (⚠)

Fauna object makes it possible to insert insects and animals into the scene. One Fauna object can contain several kinds of insect/fauna species.
All species (except insects) react to player/AI movement/proximity.
Birds constitute a special sub-type. They are initialized only when an alarm occurs nearby.

Supported fauna species

Insects	Butterfly, Dragonfly, Wasp, Fly
Poultry	Duck, Hen
Small animals	Frog, Rat
Large animals	Buffalo
Birds	Parrot, Dove

Basic properties in the Properties tab

Entity name
iuz_ladder_1_5m

Entity name	object name shown in the editor

Node properties
Clip Dist. (m): 0.00   Current

Clip Distance	distance in meters to which the object is drawn

Current	sets the current distance between the camera and the object center

Add	opens the fauna type selection dialog
Remove	removes the selected type of fauna
Create radius	distance in metres from the center of the Fauna object, in which the animals/insects are created. They do not move out of this radius either.
Count	the number of instances to create
Upper hemi. only	insects remain only within the upper hemisphere of the sphere around the Fauna object
Do not collide	insects do not use collision tree to calculate their movement
Max flying height	maximum height for insects to fly
AI makes	AI causes animals to become alert

alert	
Step over radius	maximum distance from the Fauna object center, to which the animals can stray in "panic" mode
Predator radius	radius within which a player/AI can cause animals to panic
Shot radius	radius within which shots of player/AI can cause animals to panic
Respawn time	time to elapse before Birds can be startled again

Special Object Types
Objects database

Special Object - Level Item

menu : entities / create / level item
panel : database / special objects / level item (▲)

Level Item Object allows for placement of objects players can interact with. They are the objects that a player can pick up or use.

Normally, only the object icon is drawn. To display the actual object model, go to:

menu: view / draw / level item beses

Basic properties in the Properties tab

| Entity name	object name shown in the editor

Clip Distance	distance in meters within which the object is drawn
Current	sets the current distance between camera and the object center

Weapons	weapons which a player can pick up or drop during the game

Ammo	ammunition which a player can pick up or drop during the game
Intel	special objects which a player can pick up and examine

Special Object Types
Objects database

Special object - Light

menu : entities / create / light
panel : database / special objects / light (◈)

Editor uses two types of lights - Omni and Spot. Both types are static, which means all of their settings and transformations remain constant during the game.

A single object can be lit only by the maximum of 8 light sources. This number also includes dynamic lights and sector light settings.

Omni light radiates its rays from a point source to all directions.

Spot light casts a cone of light.

Basic properties in the Properties tab

Entity name	object name shown in the editor

Clip	

Distance	distance in meters within which the object is drawn
Current	sets the current distance between camera and the object center
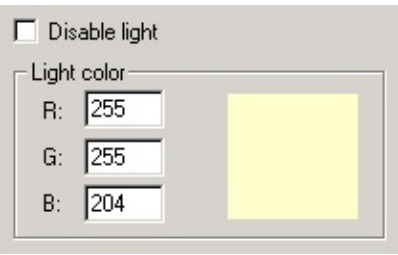
Disable light	switches the light on/off
Light color	click here to open the color selection dialog, *pressing Shift and right-clicking on a color acts as an eyedropper*
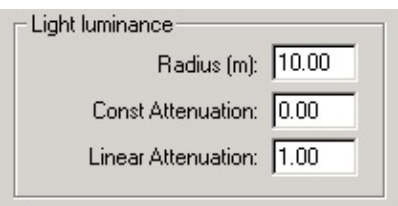
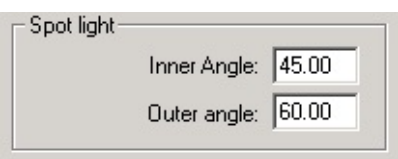| Radius	ray length
Const. attenuation	constant multiplier
Linear attenuation	multiplier, value of which approximates zero with increasing distance

Both multipliers add up.

Inner angle	inner angle of the spotlight, within which the light is cast with constant intensity
Outer	outer angle of the spotlight - the light brightness gradually diminishes toward the

angle	cone edges
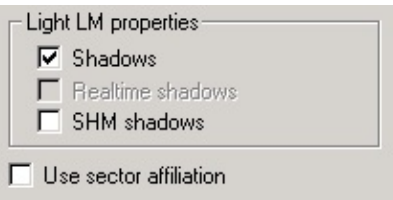
Shadows	switches shadow calculation according to lights
Realtime shadows	not supported yet
SHM shadows	switch for shadow tree calculation for players and dynamic objects
Use sector affiliation	turns association of lights with sectors on/off, If the light is not associated with any sector or if this switch is off, the light affects all sectors
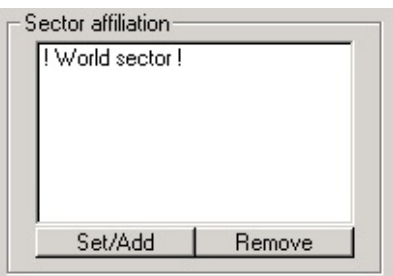
Set/Add	opens the dialog for sector association
Remove	cancels associations with selected sectors

Special Object - MP helper

menu : entities / create / mp helper
panel : database / special objects / mp helper (⚠)

MP helper is an object used for placement of MP gameplay elements.

Basic properties in the Properties tab

Entity name	object name shown in the editor

Clip Distance	distance in meters within which the object is drawn
Current	sets the current distance between camera and the object center

Mode	multiplayer game mode
Item	gameplay elements of individual modes

Gameplay elements list

ATG Bombing - it is necessary to use all of the elements

bombplace	the place where the bomb must be planted
c4	this object must be placed in the location, where the bomb will be planted

ATG Pilot

Landing zone	the location where the pilot must make it alive

CTF

Ammo box	ammo can be replenished here
Flag US	the place to be captured by VC soldiers
Flag VC	the place to be captured by U.S. soldiers

DM

Bedna 1	the place where weapons are inserted when editing an MP game
Bedna 2	the place where weapons are inserted when editing an MP game

RW

Ammo box	ammo can be replenished here
Flag villageA, …, Flag villageF	places to be captured

TT

Flag 1, …, Flag 5	a place where players can respawn after they had captured it
Flag final	the place a team must capture

Special Object - North Star

menu : entities / create / north star
panel : database / special objects / north star (🏴)

An auxiliary (helper) object which serves for setting cardinal points of the scene. This object has no editable properties.

Special Object Types
Objects database

menu : entities / create / player
panel : database / special objects / player (♀)

Player Object is used for player placement into a scene of MP or SP game modes.

Conventional location of player script files

Conventional location of player script files:

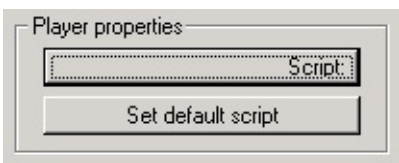*\[game directory]\levels\[map dir]\data\[sub-level dir]\scripts*

Player scripts for cooperative MP game are located at:

\[game directory]\levels\[map dir]\data\[sub-level dir]\scripts\coop

Basic properties in the Properties tab
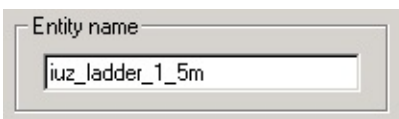
Entity name	object name shown in the editor

Script	opens dialog for player script search/selection
Set default script	sets the basic script for a player

Special Object - Recovery point
Special Object Types
Objects database

menu : entities / create / recovery point
panel : database / special objects / recovery point (⚐)
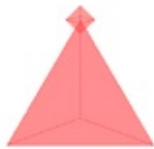
   Recovery point is used to set the respawn locations of players in MP maps. It is a place where a player is inserted, either in the beginning of the game, or after a certain amount of time has elapsed. The maximum number of Recovery Points of a single mode (type) is 64. US ATG Pilot and US Coop modes are exceptions - the Pilot can be inserted into the map only at one location, while US Coop can use maximum of 6 Recovery Points.

   The icon color depends on the game mode for which the recovery point is set.

Basic modes of Recovery Points

ATG

US ATG	location for insertion of US soldiers
US ATG Pilot	location for US Pilot insertion there can be only one RP of this type (mode) in a map
VC ATG	location for insertion of VC soldiers

CooP

US Coop	recovery points for US soldiers there can be only six RPs of this type in a map

CTF

US Flag	recovery points for US soldiers
VC Flag	recovery points for VC soldiers
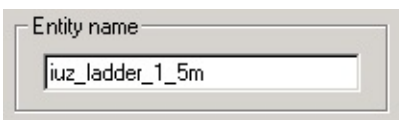
DM, LMS, TDM

DM	Insertion location for players

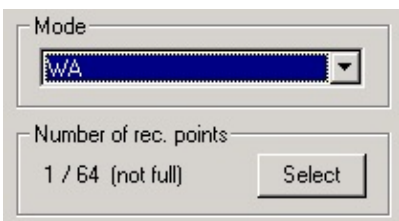|	**RW**
US RW	recovery points for US soldiers
VC RW	recovery points for VC soldiers
WA - WF	recovery points for soldiers of the team that captured the corresponding flag

Basic properties in the Properties tab

Entity name	object name shown in the editor

Mode	recovery point modes depending on the game type
Number of rec. points	the total number of all recovery points of the same type as the one currently selected
Select	selects all recovery points of the same type as the one currently selected

menu : entities / create / sound switch
panel : database / special objects / sound switch ( )

Sound switch serves for switching or resetting sound settings on collision with a camera. The parameters that can be changed include the type of walk noise, colliding dynamic objects and EAX settings. Sound switch is an oriented sphere; its positive hemisphere is marked with an arrow.

Basic properties in the Properties tab

Entity name	object name shown in the editor

| Env1	opens the environmental presets selection dialog for the positive hemisphere
Env2	opens the environmental presets selection dialog for the negative hemisphere, or the central plane of the sphere
Eax rad.	radius of the sphere used for EAX params gradual change (interpolation)
Entire sphere interpolation	switches between the entire sphere or only its positive hemisphere (from central plane) for EAX params interpolation
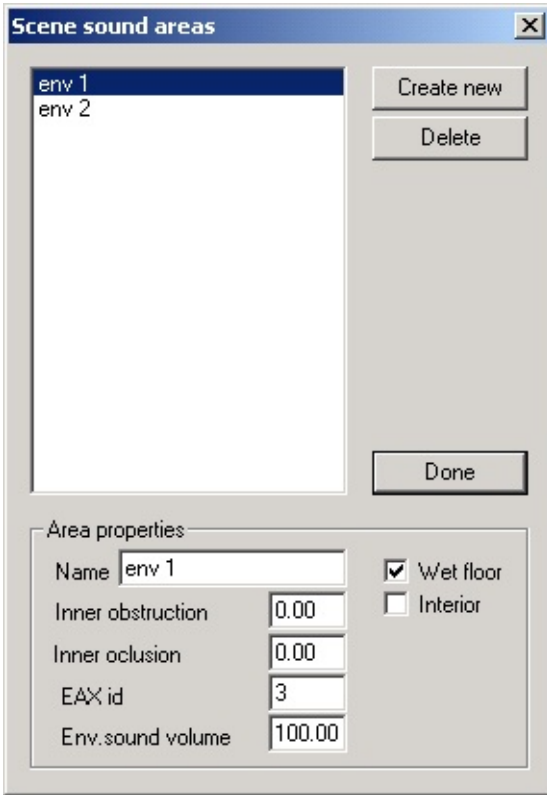
Create new	create new preset
Delete	delete the selected preset
Name	name of the preset
EAX id	predefined EAX number
Env. sound volume	sets the preset volume

EAX - sets the spatial characteristics of a sound

Special Object Types
Objects database
EAX presets

Special Object - Spectator Camera

menu : entities / create / spectator camera
panel : database / special objects / spectator camera (⬚)

This objects defines location from where a spectator can watch the game.

Basic properties in the Properties dialog

Entity name	
Entity name	object name shown in the editor

Mode	
Mode	multiplayer game mode

| Text ID: | text ID number
if TextID=0, the Entity name is taken for text |

Text ID list

ATG

5086	bombplace
5087	landing zone
5088	central

CTF

5073	vc side
5074	u.s. side

RW

5075	flag 1
5076	flag 2

TT

5089	camera 1
5090	camera 2

menu : entities / create / way point
panel : database / special objects / way point (⚠)
**panel : place / !waypoint**
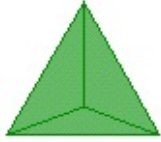
Way point is a helper object used by the Artificial Intelligence (AI). Way points are used in SP and MP coop games to mark passages for AI characters.

Way points can be either inserted from a database or using Placement tool ("Placeator" - hotkey O).

It is necessary to connect the way points. For this, use the Link at function (hotkey P). If you wish to make a one-way link, hold down Shift while linking.

Maximum number of way points in a scene is 2500.
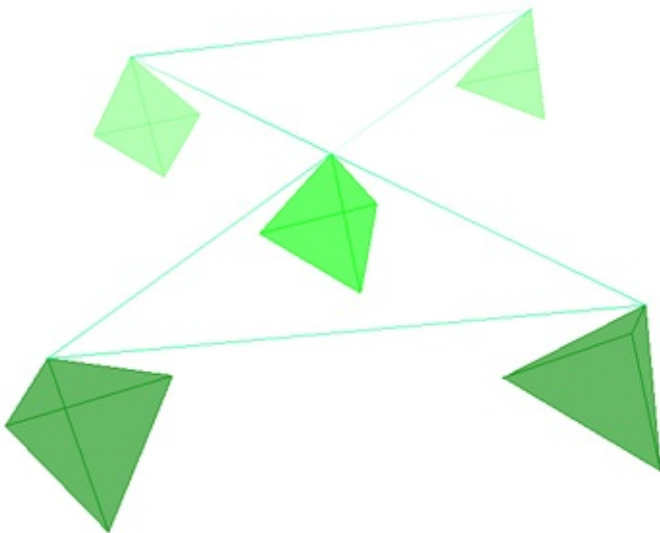
Here, the upper two way points have one-way connection in the clock-wise direction, while the lower two have two-way links with the one in the middle.
The two way points in the back are set to "No Shortcuts", while the one in the middle is set to be a "HideOut".

Basic properties in the Properties tab

Entity name

iuz_ladder_1_5m

Entity name	object name shown in the editor

No shortcuts	AI must pass through this way point
HideOut	AI can hide here

Special Object Types
Objects database
Placeator