Landscape Editor Documentation

1 Introduction

The *Landscape Editor* lets you create and manipulate the landscape and its potential combat sites as seen in *Söldner - Secret Wars* on your own. This tool has been used during the development of *Söldner - Secret Wars* itself and its game content. So, most of what was possible to us at Wings Simulations is possible for you now if you use this tool. Most? Well, for some landscape related things you have to use a text editor but this will only affect you if you want to make major changes to the look of the original landscape of *Söldner - Secret Wars*.

In order to give you a quick overview about the editor and to demonstrate how easy it is to create a map in general we start with a small tutorial. The editor's components, commands and tools will be covered in detail later, beginning in chapter 2.

1.1 Starting the Landscape Editor

The *Landscape Editor* is located in the sub-directory Game\Bin of the installation directory of *Söldner - Secret Wars*. Double-click the file editor.bat in order to start the editor. The *Landscape Editor* will show two windows: the main window containing a 2D view of the map and a 3D preview window which is used by the engine of *Söldner - Secret Wars* to render a 3D view.

1.2 Opening a Map

Chose *Open Map...* from the *File* menu. Chose *siberia* and click *OK*. The map has now been loaded. In the editor window's client view you can now see a 2D view of the map.

1.3 Navigating to a nice site

In the *View* menu click *Goto Coordinates...* . In the upcoming dialog fill in the coordinates 323.16 and 30.13 as shown in the picture below:
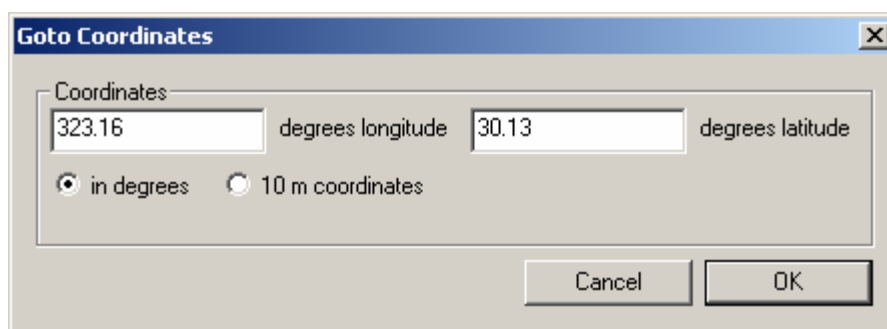
Click *OK*. The 2D view of the map will update immediately. The upper left corner of the 2D view corresponds now to the coordinates which we typed in before. The 3D preview camera has also been moved to these coordinates. Select a zoom of 10 m per pixel using the zoom toolbar:
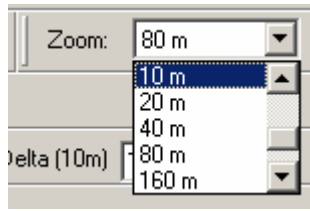
The 2D view of the map is updated again, showing more details of the landscape. Whenever you change the zoom, the camera becomes centred. You should see now a green/blue and red pattern. The red pattern represents water data which creates a water level above the terrain's ground. The blue/green pattern represents water data below the terrain's ground.

To have an in-game impression, we start the engine by clicking the Button *Engine on* found in one of the editor's toolbars. The 3D preview window should show you an image similar to this one:

As you can see, the camera is under the water level of this region. We can fix this by moving the camera. Click on to the 3D preview window so that it receives the focus. Use the num-pad keys and the mouse to navigate.

Key	Function
8	Move camera into looking direction
5	Move backwards
4	Turn left
6	Turn right
1	Strafe left
3	Strafe right
+	Move up
[Enter]	Move down
/	Turn down
*	Turn up

If you move the mouse the camera will also turn accordingly. You can combine the keys and the mouse movement to navigate. Press the key to move up for now until the camera is above the water. Then, look a bit around using the mouse.

Go back to the main window of the editor and chose the *Set Camera Tool* ( ). The mouse cursor will change to a small camera now. Click somewhere to the lakes border to move the camera there. Everytime you set the camera's position using this tool, the camera will be set to a position right above the ground. Its orientation is maintained.

Finally, chose the *Map Grab Tool* ( ) and centre the camera in the 2D view. The camera's position is not affected by this operation.

1.4 Creating a Detail-Map

Well, around the camera we are now going to create a *detail-map*. Detail-maps — in contrast to the map itself which consists of generated data (based upon satellite data, though) — can be manipulated and changed and can thereby contain special sites. We will use such a detail-map now to create our lakeside lodge.

Select the *Create Detail-Map Tool* ( ). Left-click into the 2D view where you want the upper left corner of your detail-map to be. Hold down the mouse button and move the mouse to the lower right corner of your new detail-map. Release the mouse button.

If everything went fine, the following dialog should be displayed:
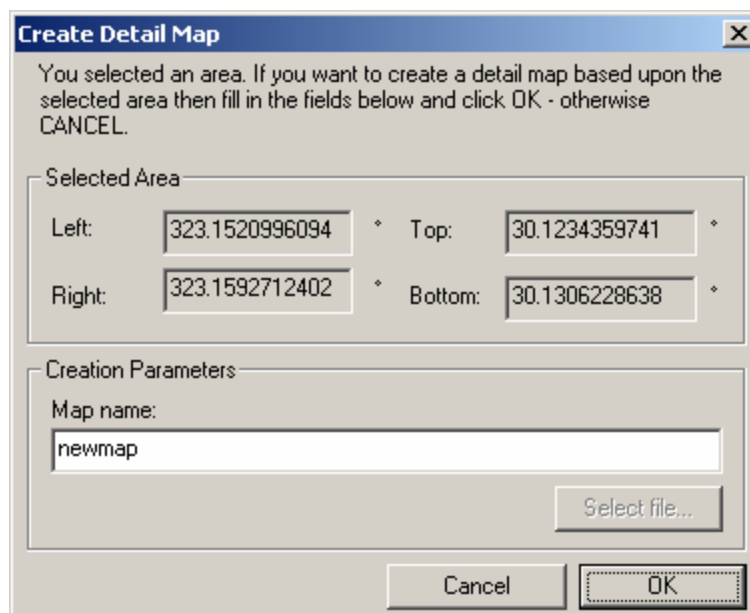
Change the detail-map name from *newmap* to *Lakeside Lodge* and click *OK*. The detail-map will be created now and will be selected for editing.

1.5 Editing the Detail-Map

Change the zoom to 10/16 meters per pixel. In the *Terrain Object Type Picker Toolbar* — which looks like this:
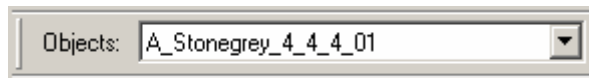
– chose the object type called *B_Woodwhite_2_2_3_01*. Select the *Set Terrain Object Tool* () and left-click near to the lake's shore and keep the mouse button pressed. Move the mouse a bit around to find the right place for your lodge. You can observe the lodge's position using the 3D preview window. Release the mouse button when you think the position is fine. Select the *Move Terrain Object Tool* () to move the lodge again or rotate it around the y-axis (which points up). In the 2D view, terrain objects are drawn as pink circles except buildings and bridges whose bounding rectangles are drawn instead. To move a terrain object left-click its graphical 2D view representation, to rotate it right-click its representation. Just add some more terrain objects by selecting another terrain object type from the *Terrain Object Type Picker Toolbar* and using the *Set Terrain Object Tool*. If you are not satisfied with a terrain object you set select the *Delete Terrain Object Tool* (). Remove the terrain object by selecting an area which contains the terrain object you want to delete.

If you have put enough stuff around your lodge we finalise our property by building a fence. Select the terrain object type *W_CivFence04* from the *Terrain Object Type Picker Toolbar* and select the *Fence Tool* (, Z stands for Zaun here which means fence in German. I actually was too lazy this day to create a more reasonable icon). Left-click to the point where the fence should start. Left-click again to complete a fence line. If you do not want to draw any fence lines anymore do a right-click. *Note: due to certain constraints of the engine the fence's total extension should not be greater than 80 meters in diameter.* If you want to move the fence, rotate or delete it use the terrain object tools as normal.

1.6 Save your work

Chose *Save Map* from the *File* menu to save your work. This will not save the detail-maps data (which is saved automatically during editing) but saves other map related settings and data – which includes the reference to your newly created map.

1.7 End of Introduction

Actually, you have learned everything to build your own complex detail-maps. Admittedly, this is not enough to play the maps neither in single-player mode nor in multi-player mode. To make the detail-maps work with the different game modes one need to do some more work. More about this in the Chapters 5, 6 and 7.

2 Maps

In *Söldner - Secret Wars*, maps are the worlds a player can play in. Actually, this term addresses a whole bunch of files which control different aspects of the landscape. Among these files there are detail-map files. These files are rectangular shaped areas which replace the generated landscape by their own content.

2.1 Navigating in Maps

There are several ways to navigate through a map: using the *Goto Coordinates Dialog*, using the navigation tools or using the camera controls within the 3D preview.

2.1.1 The Goto Coordinates Dialog
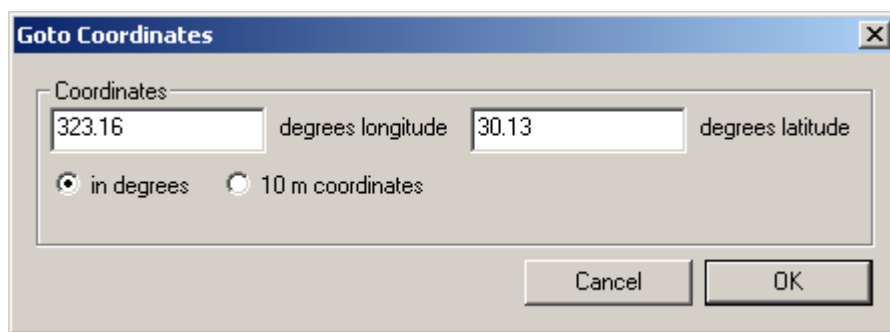
The dialog offers 2 fields to enter the coordinates of the point to which the camera should be moved and the 2D view should show. The longitude coordinate corresponds to movements from West to East, the latitude coordinate corresponds to movements from North to South. You may enter these coordinates in *game degrees* or in *10 meter coordinates*. The game degrees are defined as shown in the figure below:
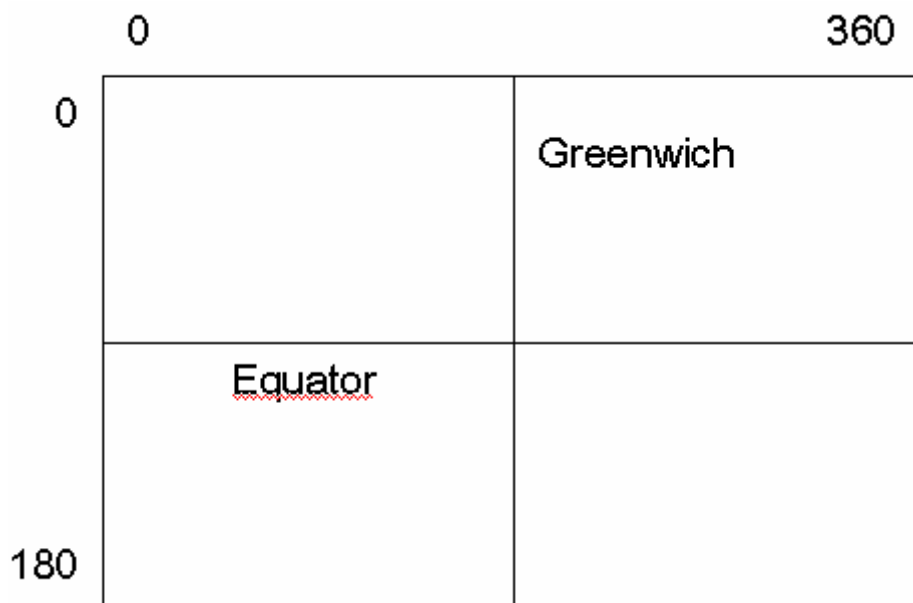
The 10 meter coordinates start from the upper left corner of the rectangular map area (world area). Their maximum possible values depend on the map's size.

The different coordinates can be obtained using the *Property Window* by clicking *Show Property Window* in the *View* menu. The coordinates shown in this window are updated while the mouse cursor is moved.

2.1.2 Navigation Tools

2.1.2.1 Set Camera Tool ( )

If you select this tool you can set the camera's position by left-clicking into the 2D view of the map. You may also keep the mouse button pressed to move the camera continuously. The camera's position on the y-axis is set near to the ground. The camera's orientation is maintained. If the engine is turned on you can follow the camera's position changes in the 3D preview window. Note that if you set a camera position which is far away from the former position the engine needs some time to compute the terrain data.

2.1.2.2 Map Grab Tool ( )

Use the *Map Grab Tool* to move the map through the 2D map view in the editors main window. The camera position is not changed by this tool.

You can access this tool in all other selected tools if you press the `Ctrl` key while you left-click and drag with the selected tool. The cursor will change to the grabbing hand in this case.

2.1.3 Camera Controls in 3D Preview Window

You may use the following keys to move the camera in the 3D preview window. The window must have the focus in order to control the camera.
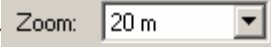
Key	Function
8	Move camera into looking direction
5	Move backwards
4	Turn left
6	Turn right
1	Strafe left
3	Strafe right
+	Move up
[Enter]	Move down
/	Turn down
*	Turn up

You may also use the mouse to change the camera's orientation.

2.1.4 The *Maps...* menu

You can also change the 2D view by using the *View | Maps...* menus. Actually used to select the detail-map to be edited you can use the menus to move the 2D View to the detail-maps by selecting them for editing. Note that the position of the 3D camera is not changed and therefore the next zoom command will change the 2D view's shown area to the area around the camera. Use the *Set Camera Tool* after you have selected a detail-map for editing to set the camera into the detail-map's area.

2.2 Zooming

There are three ways to change the level of zoom for the 2D view of a map. The easiest way to change the zoom is to use the *Zoom Toolbar* (Zoom: 20 m). Just select a new zoom level. The 2D view will be re-rendered with the 3D camera residing in the 2D view's centre.

Another way to change the 2D view zoom level is to use the menu *View | Zoom...* . The several zoom level are listed there for selection.

The fastest way to change the level of zoom is to use the command keys defined for the menu items found in the menu *View | Zoom...* . Press the Ctrl key and a number out of 1 to 9 corresponding to the desired zoom level.

3   Detail-Maps

3.1 Creation

Navigate to the area of which you want to create a detail-map. There are two ways to create a detail-map. You can create a detail-map using the Create Detail-Map Tool (   ) or the *Settlement Generator Tool* (   ).

3.1.1 Using the *Create Detail Map Tool* (   )

To create a detail-map left-click into the 2D view where you want the upper left corner of the detail-map to be. Hold down the mouse button and move the mouse cursor in order to select the area where the detail-map should be created.

Note, that there are the following restrictions:

- detail-maps may not overlap or intersect with other detail-maps

- the edges of the detail-map's rectangular area will be aligned to an imaginary grid whose grid cell edge length is 2.56 km. The upper-left corner of the detail-map's rectangular area is moved to the next upper-left grid node, the lower-right corner to the next lower-right grid node.

If the detail-map could be created, the following dialog is displayed:

Create Detail Map ✕

You selected an area. If you want to create a detail map based upon the selected area then fill in the fields below and click OK - otherwise CANCEL.

Selected Area

Left: 323.1520996094 ° Top: 30.1234359741 °

Right: 323.1592712402 ° Bottom: 30.1306228638 °

Creation Parameters

Map name:

newmap

Select file...

Cancel   OK
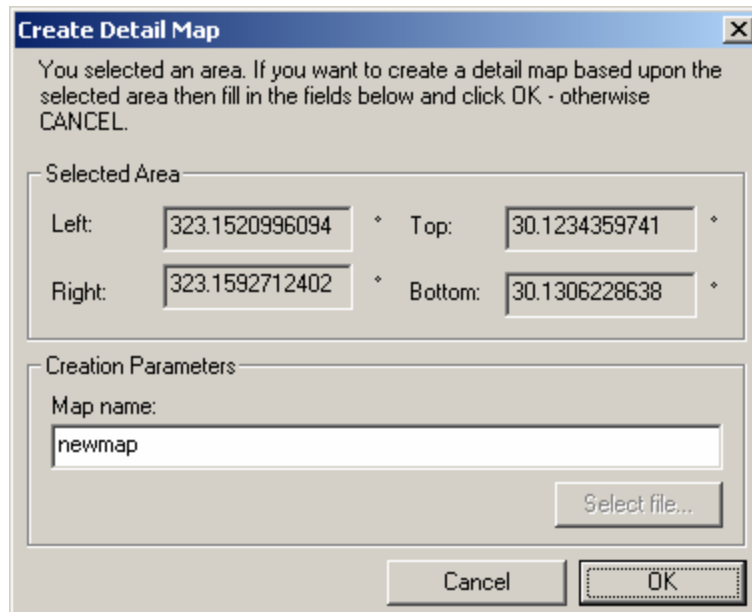
The dialog shows you the coordinates of the selected area and contains a field into which you can enter a name for the new detail-map. This name must be unique for the map. If the name is already in use or there is already a corresponding detail-map file, the user is asked to confirm that the already existing detail-map will be overwritten. **Please note:** already existing detail-maps which belong to other maps can be overwritten. This will likely destroye the other map which refers to the overwritten detail-map.

After the detail-map has successfully been created it will be selected for editing.

3.1.2 Using the *Settlement Generator Tool* ( )

If you create detail-maps with the *Create Detail Map Tool* ( ) those detail-maps initially contain the landscape that is found originally in the area they cover. If you want to create detail-maps with a settlement in it you can use the *Settlement Generator Tool* ( ) which will generate a settlement according to user defined rules and modules. This saves a lot of work and time and you can concentrate on the settlement details.

In order to be able to use the Settlement Generator you have to provide the following:

- Settlement Settings

- Settlement Modules

- Settlement Module Settings

Settlement Settings describe the shape and the look of a settlement. A *settlement module* is a *terrain module* which is used to fill the lots that are created during the settlement generation process. The *Settlement Module Settings* define when the Settlement Generator should use a settlement module or not. More on this in detail in Chapter 0.

To generate a settlement, left-click to the point where the settlement's seed should be placed (from the position of the seed the settlement will grow and extend). You will be asked for the

settlement's name, for the detail-map's file name (which will contain the settlement) and for the settlement settings which are to be used to generate the settlement.

After the successful generation of the settlement the detail-map containing the created settlement will be selected for editing.

3.2 Management

3.2.1 Detail-Map Statistics

If you select the menu item *View | Detail-map statistics...* then a dialog will be displayed which shows you detailed information about the detail-maps of the map. At the dialogs top is a drop down list containing the names of all detail-maps of the map. Select the detail-map of which you want to see the statistics using the drop down list.

The statistics will contain the following data:

- the coordinates of the detail-map's rectangular area in different scaling units

- the number of tiles the detail-map consists of (a tile is 160x160 m² in size)

- the total number of terrain objects

- minimum, maximum and average terrain object count per tile

- the terrain object types used and how often they have been used.

The statistics can be quite handy to improve the performance of a detail-map since you can see which kind of objects are used and how often these are used.

3.2.2 The Detail-Map Manager

Well, the name is a bit misleading since the Detail-Map Manager can only remove detail-maps from the map (other planned functions have not been implemented yet). You can access the Detail-Map Manager selecting the menu item *File | Manage Detail Maps...* . In the displayed dialog you can chose the detail-maps to be deleted by simply left-clicking their names in the list. If you click *Remove...* the selected detail-maps will be removed from the map after confirmation.

The button *Add...* has currently no function.

3.3 Special Detail-Maps

3.3.1 Detail-Maps containing Terrain Modules

Detail-maps whose name begin with `module_` are treated in a special way. These detail-maps will not be loaded if you play Söldner. They are loaded by the editor only and contain *terrain modules*. Terrain modules are rectangular shaped areas which may contain terrain objects, items and texture tile matrices. They are used like templates: either you or the settlement generator can copy the terrain modules into other detail-maps. This enables you to create some terrain modules like farms, military bases etc. and re-use them as often as you want. If you have a large library of

such terrain modules then the creation of a new detail-map is done in a few minutes with a few clicks.

3.3.1.1 Creating a Terrain Module

If not yet done create a detail-map for terrain modules and select it for editing. Select the *Box Area Tool* ( ). Left-click into the detail-map at the position at which the centre of the terrain module shall be. In 2D View, a green rectangle is rendered for the module. In 3D view, a pulsing box is rendered for the module. Though you can move this box on the y-axis (that is up and down) and change its height only the dimension and coordinates in the xz-plane are used to distinguish where the terrain module is and what is contained by it.

If you have left-clicked a dialog will be displayed which lets you edit the terrain module's properties:
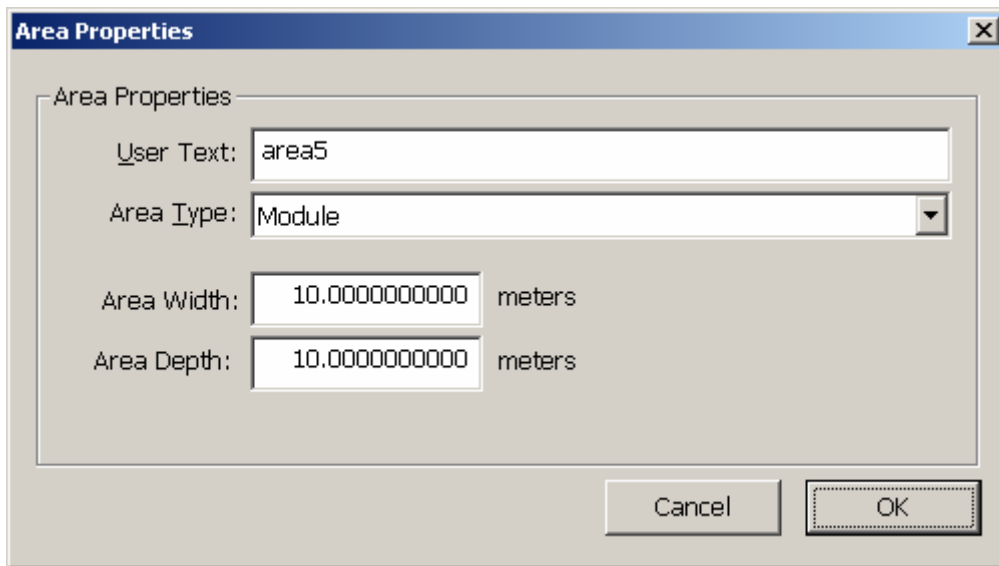
In the *User Text* field enter a unique name for the module. This name is used by tools and the engine to identify the module. Set the *Area Type* combo to `Module`. Using the fields *Area Width* and *Area Depth* you can set the terrain module's dimensions. Click *OK* if you entered all necessary information.

You can now place terrain objects, items and terrain modules into the terrain module.

3.3.1.2 Resizing and Moving of the Module Rectangle

You might have to resize or move the area rectangle of the terrain module. To move the terrain modules rectangle use the *Box Area Tool* ( ) left-click into the rectangle, hold down the button and start dragging the rectangle. Release the button if you want to stop moving the rectangle.

To resize the terrain module's rectangle press and hold down the `SHIFT` key, left-click into the module's rectangle and hold down the mouse button. If you now move the mouse cursor the rectangle will be resized according to the mouse cursor movement. Release the mouse button when you are satisfied with the new size of the module.

There is a second way to set the terrain module's size. Select the *Area Properties Tool* () and left-click into the area of the terrain module whose size you want to change. The *Area Properties Dialog* will be displayed which you know from the terrain module creation process. Enter the new dimensions of the terrain module into the fields *Area Width* and *Area Height* and click *OK*.

3.3.1.3 Changing a Terrain Module's Name

To change a terrain module's name, select the *Area Properties Tool* (), left-click the terrain module whose name you want to change and edit the *User Text* field's content in the upcoming *Area Properties Dialog* and click *OK*.

3.3.1.4 Deleting a Terrain Module

There are two alternatives to delete a terrain module. You can use the *Delete Area Tool* () and delete the area of the terrain module by left-clicking it. The terrain objects, items and texture tile matrices remain, though.

If you also want to delete the things the terrain module contains then use the *Terrain Module Dialog* described in the following sections.

3.3.1.5 The Terrain Module Dialog

You can access the *Terrain Module Dialog* through the menu item *Tools | Terrain Modules...*. The image below shows the dialog:
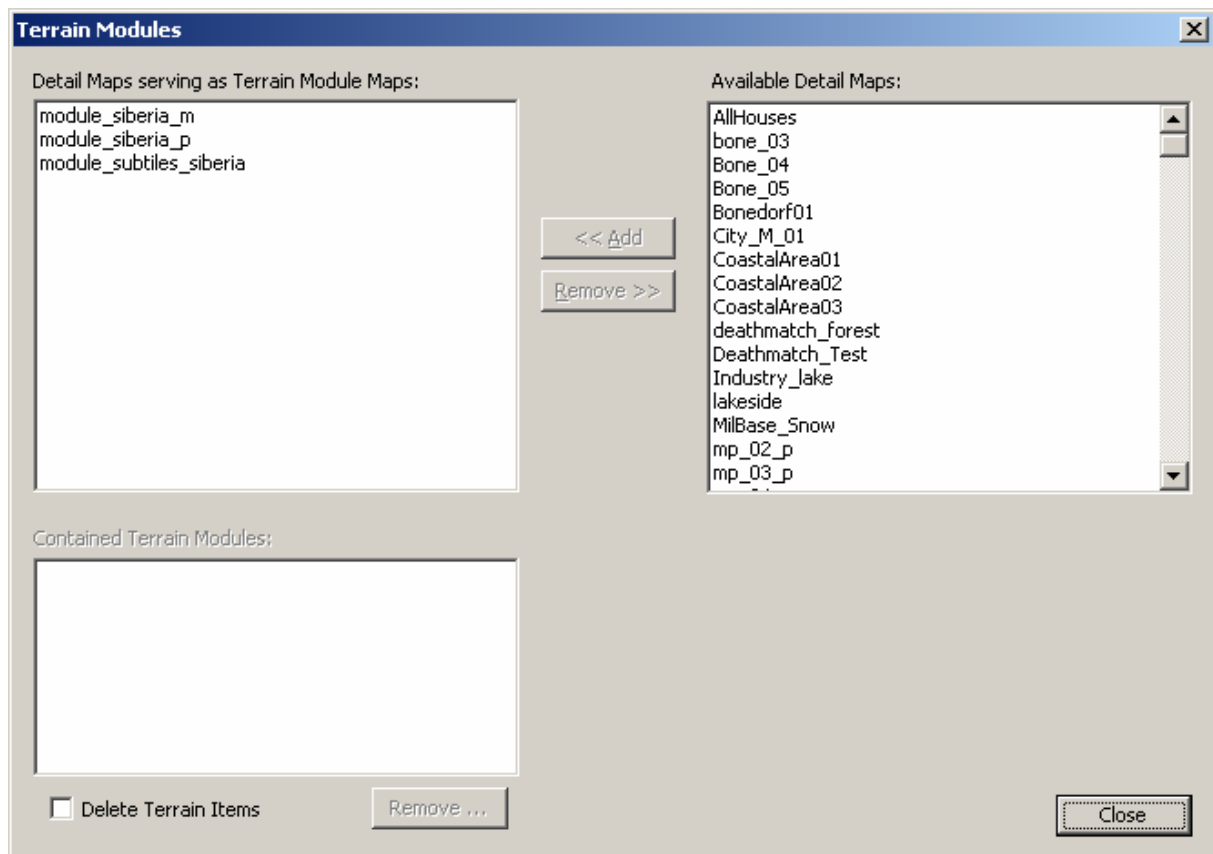
The two list boxes in the dialog's top contain detail-map names. The left list box contains the names of the detail-maps, which have currently been declared to contain terrain modules. The right list box contains detail-maps available for declaration. By selecting the names and using the two buttons between the two lists you can move the detail-maps from one list to the other.

3.3.1.6 Removing Terrain Modules using the Terrain Module Dialog

The list box below the list box of terrain module maps is filled with the names of the terrain modules contained by the terrain module map currently being selected. You can select one or more names and press the *Remove...* button below the list box to remove the terrain modules from the map. As with the *Delete Area Tool* ( ) the contained objects remain in the map. To delete also the terrain modules content just check the *Delete Terrain Items* checkbox. The terrain objects, items and TTMs will then be removed from the map too when you remove the terrain module.

Note: terrain objects, items and TTMs set using the removed module will not be deleted and remain of course.

3.3.1.7 Pasting Terrain Modules

You can paste the content of a terrain module into any detail-map – this includes the detail-map that contains the terrain module. To do so, select the *Paste Terrain Module Tool* ( ). Select the terrain module you want to paste from the *Terrain Module Picker Toolbar*. If not done yet select the detail-map for editing into which you want to paste the terrain module. If you now left-click into the detail-map then a rectangle with the actual size of the terrain module is drawn. You can drag this rectangle by left-clicking it and holding down the button. If you shift-left-click it and holding down the button you can rotate it. If the position and orientation suits your needs then right-click. The terrain module is then pasted into the detail-map.

3.3.1.8 Emulate Copy and Paste Using Terrain Modules

Since the Landscape Editor does not support a clipboard you can use terrain modules for this purpose. Create an area of the type *module* with the *Box Area Tool* ( ) and name the area "Clipboard" or something like that. Now you can copy terrain objects, items and TTM using this area: move it to the stuff you want to copy, resize it so that it contains all the items you want. Then navigate to the position within a detail-map where you want to paste the objects. Select the *Paste Terrain Module Tool* ( ) and select your clipboard terrain module from the *Terrain Module Picker Toolbar*. You can now paste the content of the clipboard terrain module by left-clicking into the 2D view (see chapter 3.3.1.7 for further details on pasting terrain modules).

3.3.2 Detail-Maps containing Sub-Tile Modules

The vegetation has once been generated as the elevation values still are. The problem with generated vegetation was that the map designers haven't had as much control as they needed, the results have been too unpredictable, the amount of used processor time too expensive.

To solve the problem we used the system of terrain modules to distribute vegetation over the landscape. The map designer defines a set of terrain modules which are 160x160 meters in size. This size corresponds to the smallest squared area that can be used for the engine's terrain renderer (areas of this size are called sub-tiles). In order to give control over the look of the vegetation, the map designed combines the sub-tile modules to sub-tile module patterns which consist of 4x4 sub-tile modules. When the landscape is generated the Terrain Generator chooses quasi-randomly which sub-tile module pattern for a certain area is to be used. The content of the

sub-tile modules which are referenced by the sub-tile module pattern are then copied into the landscape.

3.3.2.1 Creating Sub-Tile Modules

Sub-tile modules can only be created in detail-maps with names starting with `module_subtiles_`. The sub-tile modules are created in the same way terrain modules are created (see chapter 3.3.1.1). In order to make the sub-tile module accessible by the Sub-Tile Module Manager their names must follow a certain convention. Look at the (pseudo) Backus-Naur-Form and the examples below:

```
<sub-tile module name> ::= "subtile_"
      <sub-tile module set index>
      '_' <sub-tile module type>
      '_' <sub-tile module variation>
<sub-tile module set index> ::= number in a sequence of
      integer numbers starting with 0.
<sub-tile module variation> ::= number in a sequence of
      integer numbers starting with 0 grouped by <sub-tile
      module set index> and <sub-tile module type>.
<sub-tile module type> ::= {'0', '1', '2', '3', '4'}
```

Examples:

Here are the sub-tile module names of the first set of sub-tile modules. Note that the sub-tile module of type 3 has 2 variations.

```
subtile_0_0_0
subtile_0_1_0
subtile_0_2_0
subtile_0_3_0
subtile_0_3_1
subtile_0_4_0
```

This example defines a second sub-tile module set. The sub-tile module of type three has 3 variations.

```
subtile_1_0_0
subtile_1_1_0
subtile_1_1_1
subtile_1_1_2
subtile_1_2_0
subtile_1_3_0
subtile_1_4_0
```

The sub-tile types define the shape of the sub-tile module. There are the following shapes:

Sub-tile type number	Shape
0	, vegetation only in the lower-left corner
1	, vegetation only in the left part of the module
2	, no vegetation in the upper-right part only
3	, vegetation everywhere
4	, vegetation in the centre of the module

While terrain modules may contain (almost) as many texture tile matrices (TTMs) as you want the sub-tile modules may only contain one TTM. If a sub-tile module contains more than one TTM then only the first TTM will be copied into the landscape.

A sub-tile set must at least contain a sub-tile of each sub-tile type.

3.3.2.2 Using Sub-Tile Modules

To make the engine use the sub-tiles created by you you must edit or create some plain ASCII text files. There are currently no dialogs in the editor which save you from editing the files by yourself.

First of all, you must define a sub-tile module pattern. The sub-tile module patterns are matrices with a size of 4x4 sub-tile modules. You define them by creating a file with the extension `.stmp` using an ordinary text editor like `notepad.exe` (Microsoft Word won't do it). The file's format is described by the following BNF:

```
<stmp file> ::= "def_begin" <CR><LF>
      {<pattern element definition>}
      "def_end" <CR><LF>
      <width of pattern definition>
      <height of pattern definition>
      <pattern>

<pattern element definition> ::=
      <pattern character> <whitespace>
      <rotation> <whitespace>
      <sub-tile set index> <whitespace>
      <sub-tile type> <whitespace>
      <sub-tile variation index> [<whitespace>] <CR><LF>

<pattern character> ::= any character with a code > 0x20

<rotation> ::= '0', no rotation | '1', 90° clock-wise |
      '2', 180° clock-wise | '3', 270° clock-wise |
      '4', special meaning: use no sub-tile

<sub-tile set index> ::= an index of an existing sub-tile set
```

```
<sub-tile type> ::= a valid sub-tile type number, see table
      above
<sub-tile variation index> ::= an index of an existing
      variation of the sub-tile defined by
      <sub-tile set index> and <sub-tile type> of the same
      pattern element definition.
<width of pattern definition> ::= "width" <whitespace>
      <width><CR><LF>
<height of pattern definition> ::= "height" <whitespace>
      <height><CR><LF>
<width>, <height> ::= '4'
<pattern> ::= (3 * <pattern line><CR><LF>) <pattern line>
<pattern line> ::= 4 * <pattern character>
<CR> ::= 0x0d, carriage return
<LF> ::= 0x0a, line feed
<whitespace> ::= 0x20 | 0x08
```

For all of you which have a headache now look at the sample `.stmp` file below:

```
def_begin
# 0 0 3 0
* 0 0 4 0
_ 4 0 0 0
def_end
width 4
height 4
_##_
#**#
#**#
_##_
```

This sample `.stmp` file creates the following pattern:
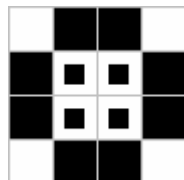
You can use your library of created sub-tile module sets and mix them as you want to create sub-tile module patterns. The more sub-tile module patterns you create the more variation you achieve in the distribution of vegetation.

In order to use a sub-tile module pattern you must declare it. This is done in the `.stmps` file of the map which is a plain ASCII text file. It contains the base names of the `.stmp` files which shall be declared. Each sub-tile module pattern uses 1 line in the file for its declaration. For a map called `MyMap` the corresponding sub-tile module pattern declaration file would be `MyMap.stmps`. Assuming the sub-tile module pattern files `forest1.stmp`, `forest2.stmp` and `tundra.stmp` the content of `MyMap.stmps` would be:

```
forest1
forest2
tundra
```

The sub-tile module patterns are chosen pseudo randomly (depending on the map position they are placed to) by the Terrain Generator, all sub-tile modules have the same chance to be chosen.

4 Editing

Most of the tools modify the data of detail-maps but there are some tools affecting global map data.

4.1 Terrain Objects

Terrain objects are immovable objects which are attached to the terrain resp. a certain position in the x-z-plane which cannot be changed in-game. Examples for terrain objects are: house, tree, fence, lantern as well as barrels (though there might be barrels which are no terrain objects but so called items).

4.1.1 Placing Terrain Objects: The Set Terrain Object Tool ()

With this tool you can place terrain objects into detail-maps. The *Terrain Object Type Picker Toolbar* specifies of which terrain object type the terrain object to be set is. If you left-click into a detail-map an according terrain object will be created and placed to the ground. If you hold the left mouse button down you can move the terrain object around in order to find the right place for it. You can observe the terrain object in the 3D view as well as in the 2D view. In 2D view, the terrain object is rendered as a circle. If the terrain object is a building (this includes bridges), the bounding rectangle of the building is rendered instead.

4.1.2 Delete Terrain Objects Tool ()

Use this tool to delete terrain objects from a detail-map. Left-click into the detail-map and hold down the mouse button. Move the mouse (while still holding down the mouse button) to select a rectangular area. If you release the mouse button then all terrain object within the selection rectangle will be deleted.

4.1.3 Move Terrain Object Tool ()

To move terrain objects around or rotate them around the y-axis use this tool.

Action	Description
left-click single terrain object, hold	Move the selected terrain object(s).
left-click, hold button, move	Selects all terrain objects which reside in the selected rectangular area
shift-left-click, hold button, move	Adds the terrain objects which reside within the selected rectangular area to the selected group of terrain objects.
right-click, hold button, move	Rotates the clicked terrain object around the y-axis.

4.1.4 Terrain Object Properties Tool (⌂)

If you left-click a terrain object the Terrain Object Properties Dialog is shown:
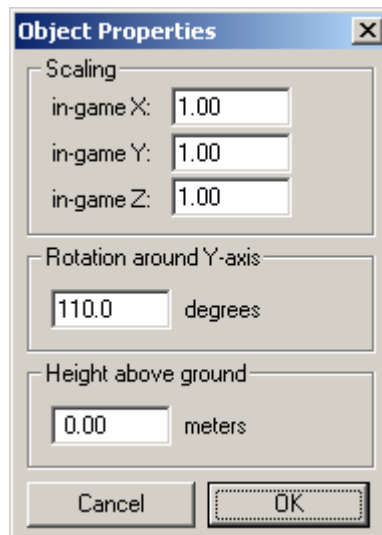
You can modify the shown properties of the terrain object and click *OK* if you want to apply the changes to the terrain object.

4.1.5 Terrain Objects To Ground Tool (⌂)

If you have changed the terrain elevation value using an external tool the terrain objects might be under the ground or hover in the air. To fix this, select a rectangular area by left-clicking and holding the mouse button with this tool. All terrain objects within the selected area will be placed to the ground (resp. their pivots).

4.2 Items

Items are objects the user interacts directly or indirectly with (terminal, spawn point). Some items are essential, some others aren't. More on this topic in chapter 6 and 7. Items are rendered as blue rectangles in 2D view.

4.2.1 Set Item Tool ( )

This tool places an item of the selected type to the ground. The item type is selected using the *Item Type Picker Toolbar*:

Item Object Name:	A10_Mk84Bomb	▼
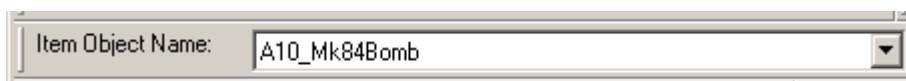
This toolbar lists most of the registered item types. Admittedly, it is not reasonable for all of the listed item types to place an instance of into a detail-map (like the bomb item shown in the image above).

If the item has so called *item properties* the *Item Properties Dialog* will be shown:
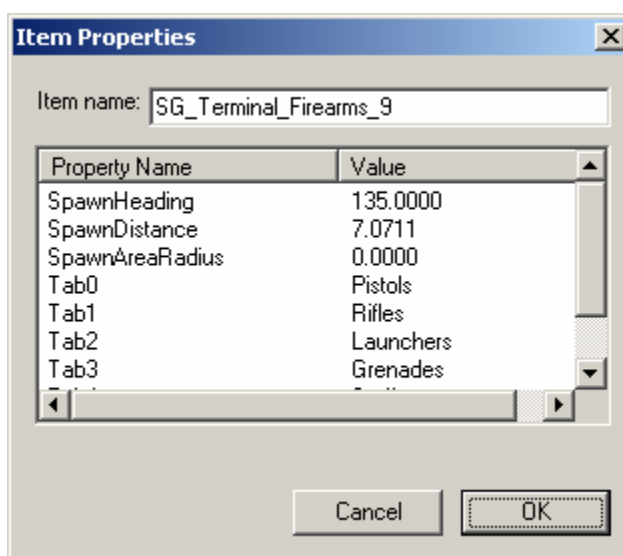
If you click a row in the list box then a field, a combo box or other controls are displayed which lets you manipulate the selected item's property of the item. More about these properties in the in chapters 6 and 7.

4.2.2 Delete Item Tool ( )

Use this tool to delete items from a detail-map. Select the rectangular area by left-clicking, holding down the mouse button and moving the mouse. All items within the selected rectangular area will be deleted.

4.2.3 Move Item Tool ( )

Possible actions of the *Move Item Tool* ( ) are listed in the table below:

Action	Description
left-click single item, hold	Move the selected item(s).
shift-left-click single item	Add clicked item to group of selected items.
left-click, hold button, move	Selects all items which reside in the selected rectangular area
shift-left-click, hold button, move	Adds the items which reside within the selected rectangular area to the group of select items.
right-click, hold button, move	Rotates the item around the y-axis.
shift-right-click, hold button, move	Moves item along y-axis (up and down)

4.2.4 Item Properties Tool (⬡)

If you left-click an item with this tool the *Item Properties Dialog* for the clicked item is shown. More about this dialog in the *Set Item Tool* (⬡) in chapter 4.2.1 and in the chapters 6 and 7.

4.3 Elevation Value Manipulation Tools

Elevation values can only be manipulated within the area of a detail-map.

4.3.1 Elevation Brush Tool (✎)

With this tool you can "paint" elevations. The size, blending border, opacity and the painted elevation value (relative or absolute) can be set using the *Elevation Brush Toolbar*:
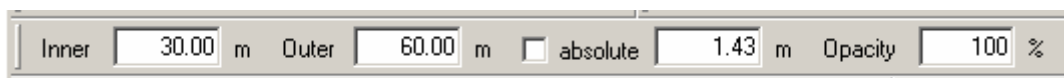
The elevation to paint is faded out to 0% from the inner radius of the circle shaped brush to the outer radius. Check the *absolute* checkbox if you want to draw absolute elevation values (that is, a certain defined elevation value). In the field whose scale unit is meters you either define the relative or absolute elevation value to be painted. The opacity defines the strength of the brush.

Left-click or left-click, hold down the mouse button and move the mouse in the 2D view to manipulate the elevation values.

4.3.2 Flattening Tool (🗻)

You can select a rectangular area by left-clicking, holding down the mouse button and moving the mouse. If you release the mouse button the following dialog is shown:
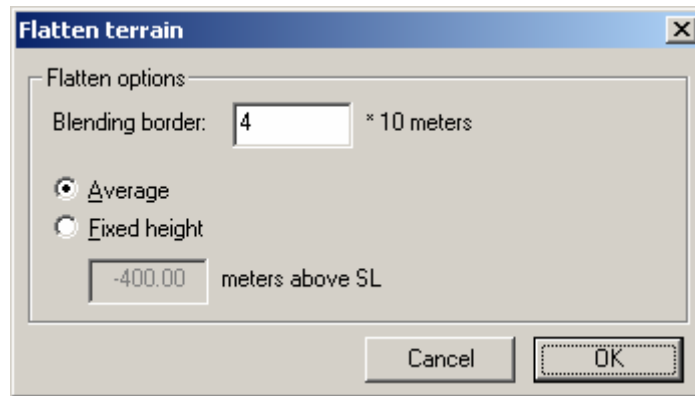
Using this dialog, you can define the size of the blending border and the way the terrain within the selected rectangular area shall be flatten. If you decide to flatten the selected area using a fixed elevation value you must provide an elevation value relative to the sea level. Click *OK* to flatten the terrain, *Cancel* if you decided not to flatten the terrain.

4.4 Fence Drawing with the Zaun Tool ()

This tool can be used to "draw" fences and walls. Fences are actually terrain objects but because of there shape which depends on each fence instance the creation of terrain objects of the class fence is handled differently. As mentioned in the introduction tutorial, the day I created the icon for the tool I was not in the mood to design a more reasonable one. In order to protect you from confusion (and to give you the opportunity to learn some German) I call this tool *Zaun Tool* () — Zaun (say "tsoun") is German and means fence. This preserves the connection between the tool icon and the tool (well, I could create a new icon now but I am still not in the mood to create a reasonable one).

To create a fence, select a terrain object type from the *Terrain Object Type Picker Toolbar*, which represents a fence or a wall. If you have not selected a fence class type the editor chooses a default terrain object type representing a fence.

Left-click now to start fence drawing. Everytime you left-click now a new *fence line* will be created. To stop drawing the fence do a right-click. The fence is created then in 3D view and can be manipulated with the terrain object tools like other terrain objects, too.

Note: due to certain constraints of the engine the fence's total extension should not be greater than 80 meters in diameter. Currently, there are no safety checks to prevent you from creating such a fence. If you need a long resp. big fence create many short lines.

4.5 Texture Tile Matrix Tools

Texture tile matrices (TTMs) are matrices of 10x10 square meter sized textures. The textures can be flipped and rotated in 90° steps. The whole TTM can be rotated freely. TTMs are used to overwrite the texture generated using the Terrain Generator. Runways, parking places, clearings and small paths can be created using TTMs. TTMs are represented by a turquoise rectangle with a small circle in its upper-left corner in the 2D view.

4.5.1 Set TTM Tool ( )

Left-click to add a TTM to a detail-map. The type of TTM which will be added is specified by the *Texture Tile Matrix Toolbar*:

Select the TTM template of the TTM to be placed using the drop down list which contains all known TTMs of the map.

If you hold down the mouse button you can move the TTM around. Release the mouse button to finally set the TTM.

4.5.2 Delete TTM Tool ( )

Left-click the TTM you want to delete — et voilà.

4.5.3 Move TTM Tool ( )

Use this tool to move or rotate a TTM. If you left-click a TTM, hold the mouse button down and move the mouse you can move the TTM. If you shift-left-click the TTM, hold the mouse button down and move the mouse the TTM is rotated.

4.5.4 Create TTM Template Tool ( )

If you need a new type of TTM then you need to create a new TTM template using this tool. If you left-click into a detail-map, hold down the mouse button and move the mouse you can size a rectangle which denotes the dimension of the TTM. If you release the mouse button you will be asked if you want to create a new TTM template of the given size. If you answer *Yes* then you will be asked for the new TTM template's name. Enter a unique name and click okay.

To learn how to edit and change the TTMs tiles see *TTM Brush Tool* ( ) in the next chapter.

4.5.5 TTM Brush Tool ( )

This tool lets you modify the components of a TTM: the texture tiles. You can set different textures, flip them or rotate them. All TTMs of the same template will be affected by the changes you make. If you place the mouse cursor over a TTM you can see that the texture tile beneath the mouse cursor is surrounded by a yellow box in the 2D and 3D view.

If you left-click the texture tile beneath the mouse curser is set to the texture selected in the *Texture Tile Matrix Toolbar*. You can change the selected texture by clicking *Select Texture...* . In the *Texture Tile Picker Dialog* the currently selected texture is marked with a red border. Click a texture and then *OK* to select the clicked texture.

If you shift-left-click a texture tile then it is rotated. If you right-click a texture tile then it is horizontally flipped, if you shift-right-click it then it is vertically flipped.

Note: Currently, only the instance of the TTM template you use to edit the template is updated in the 3D view.

4.6 Street Tools

With these tools you can create, edit, connect, split and delete streets. The street tools are one of the few tools that can be used outside the borders of detail-maps. Furthermore, depending if you have selected a detail-map for editing or not, the created streets belong to the selected detail-map or the whole map. The difference is essential: streets belonging to detail-maps are only present in-game if the detail-map they belong to has been loaded. Streets belonging to the map as a whole ('global streets') are always present. You may use them to (visually) connect settlements residing in different detail-maps.

Streets are made up of street sections which have way-points at their endings. Connected street sections share their way-points. A maximum of four street sections can share the same way-point. Way-points shared by two street sections are rendered as curves. Way-point shared by at least three street sections are rendered as crossings.

4.6.1 Add Street Tool ( )

Left-click to start creating street sections. If you clicked near an existing way-point then this way-point will be used as first way-point of the new street. Left-click now each time you want to set a new way-point which creates a new street section. Right-click to stop creating street sections.

4.6.2 Move Way-Point Tool ( )

Use this tool to move a way-point.

4.6.3 Delete Way-Point Tool ( )

Left-click a way-point to delete it. Street section which shared the way-point will be deleted, too.

4.6.4 Add Way-Point Tool ( )

Left-click a street section to add a way-point.

4.6.5 Street Types

Streets are of a certain type. When creating streets the street type specified in the Menu *Tools | Street Type* is used. You may later change the street type of street sections, curves and crossings by right-clicking them. A dialog is shown which lets you select the street type. Click *OK* to accept the street type you have selected.

5 Preparing Detail-Maps for Single-Player Missions

In order to use a detail-map for single-player missions it must contain special terrain objects whose type name start with *Position_*. These objects denote positions of important places or items. Their orientation may be applied to the object they refer to (player, vehicle, item) if appropriate.

See chapter 4.1 to see how to place and edit terrain objects.

5.1 Minimum requirements

A detail-map must at least contain one of the following position terrain objects:

Terrain Object Type	Description
Position_SpawnPlayer	A position where a player can be spawned.
Position_GoalStreet	This position object is used for vehicles which are a goals of a mission.
Position_GoalBombrun	Place objects of this type inside buildings. The building may become a destruction goal of mission then.
Position_GoalIndoor	Place objects of this type inside buildings. The mission generator may place something which is found in buildings to the position of the position object then.
Position_GoalOutdoor	Place objects of this type outside of buildings. The mission generator may place something which is found outside only to the position of the position object then.
Position_MissionTerminal	May only be placed once. A mission terminal will be placed to the position of the position object.
Position_TerminalFlyer	Denotes the position of a terminal granting access to helicopters
Position_SpawnFlyer	Denotes the position where a helicopter can be spawned after it has been selected from a terminal.
Position_TerminalVehicles	Denotes the position of a terminal granting access to ground vehicles.
Position_SpawnVehicle	Denotes the position where ground vehicles can be spawned.
Position_TerminalWeapons	Denotes the position of a weapon terminal.

5.2 Optional Position Objects

The following position objects are optional:

Terrain Object Type	Description
`Position_TerminalJets`	Denotes the position of a terminal granting access to jets.
`Position_Runway`	Denotes the position where to place selected jets.

There may be other position objects in the list of terrain objects. Currently, there are not functional or implement a feature that might not be available in the future. Their usage is not recommended.

6 Preparing Detail Maps for Multiplayer Games

In order to use a detail-map for a multi-player game the detail-map must contain certain items depending on the game modes the detail-map shall support. Furthermore, you need to create or edit an XML file. More on this in chapter 7.

All multi-player related items are grouped by a property defining a *spawn group name*. This spawn group name is evaluated in case sensitive mode. That is,

    HQ Red

is not the same as

    hq red

and the according items will not share the same spawn group. Later — using the above mentioned XML file — you can assign the items of a spawn group to a team.

6.1 Spawn Player Items

Depending on the game mode each team needs at least 1 spawn item. This includes the "hostages team" in the game mode hostage rescue. You should add more than one spawn item for the player teams so that the players do not always spawn at the same position. For hostages, each spawn player item spawn exactly one hostage.

To place a spawn player item use the *Set Item Tool* () and select the `SpawnPlayer` item type from the *Item Type Picker Toolbar*. Then define the spawn group name using the spawn player item property named `Spawn Group`. Use the *Item Properties Tool* () to set this value.

Note: except for the `Spawn Group` property all other properties of the spawn player item are obsolete and are not evaluated anymore.

You may use spawn player items for different game modes. If you dislike this just create more spawn player items and group them using a new spawn group, e.g. "hq red conquest" and "hq red team deathmatch".

6.2 Spawn Terminal Items

Though optional, you should provide terminals where the players can buy their equipment. Its item type is either `Terminal` which represents a default terminal or some of the other types beginning with `Terminal_` which represent terminals with predefined tabs and content.

In contrast to all other spawn items the spawn terminal item cannot be assigned to a spawn group. This means that a placed terminal will be spawned in any game mode.

If the terminal gives the player the opportunity to buy vehicles of any kind you must set up the following item properties:

Spawn Vehicle Item Property	Description
`SpawnHeading`	Denotes where relatively to North rotating clockwise the vehicle's spawn position resides.
`SpawnDistance`	Denotes how far away the spawn position for the vehicle relative to the terminal's centre is.
`SpawnOrientation`	Denotes the orientation of the spawned vehicle relative to North rotating clockwise. The vehicle's front will point into the specified direction.
`SpawnAreaRadius`	Defines the radius of the spawn area. If a vehicle resides within this area no vehicle can be spawned for the according terminal.

Look at the image below to get a picture about the properties' meaning described in the table above:
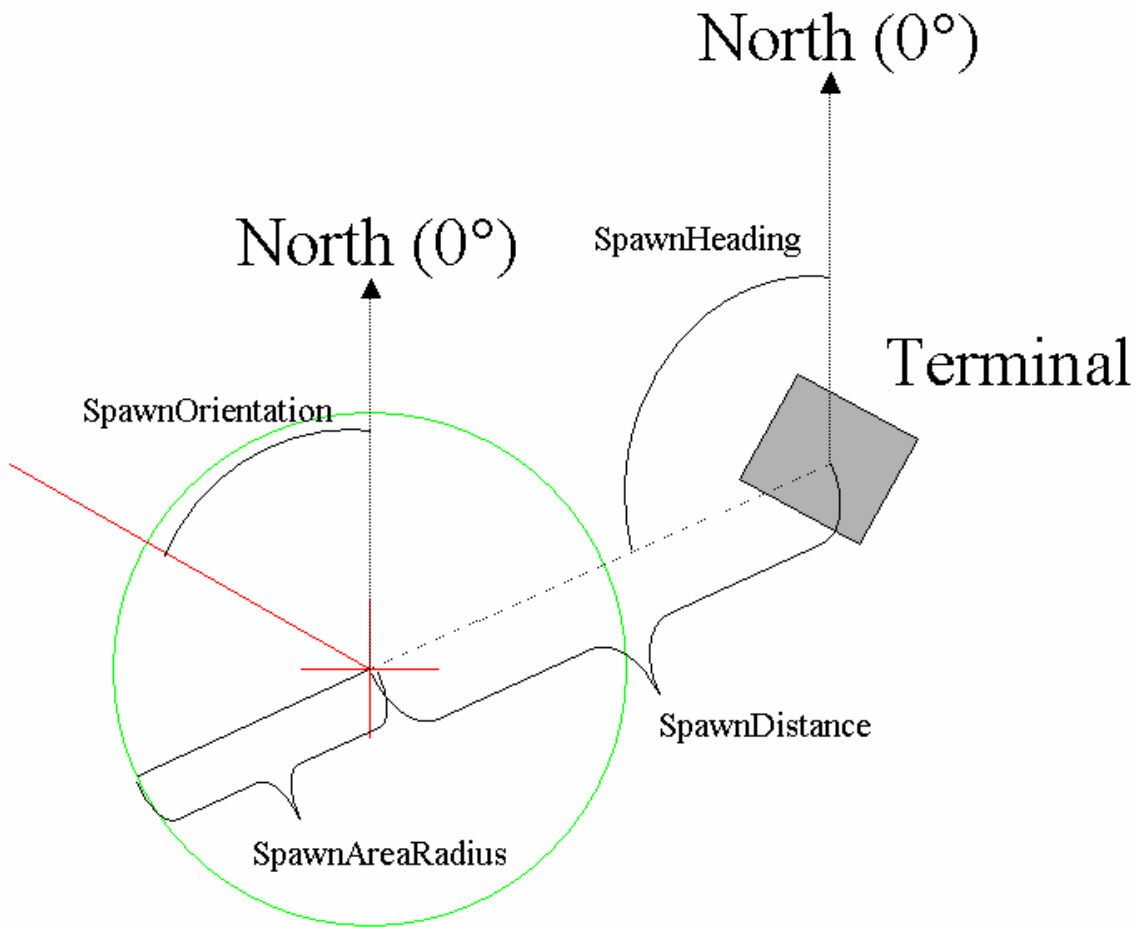
6.3 General Spawn Items

Set these kind of items selecting the SpawnItem item type in the *Item Type Picker Toolbar.* SpawnItem item are used to place game mode specific items like flags or a briefcase. More on this in detail in the Game Modes section.

In order to assign a spawn item to a spawn group enter the spawn group's name in the *Region* property of the spawn item. Using the *Item Name* property of the item you can define the sub-type of the spawn item. See the table below for valid sub-types:

Value of "Item Name" property	Description
BlueFlag	The flag of team blue used in CTF modes.
RedFlag	The flag of team red used in CTF modes.
Flagstaff	A flag used in conquest modes.
Briefcase	Used in extraction modes.

All other sub-types have become obsolete or are currently not supported. It is not recommended to use these sub-types.

All other properties of the spawn item are not evaluated.

6.4 Spawn Vehicle Items

This type of spawn item is found as SpawnVehicle in the *Item Type Picker Toolbar*.

Note: items of this type define their team affiliation using the *Team ID* property. The *Team ID* you specify corresponds to the team type values listed in the table in chapter 7.1.

Using the *Vehicle Name* property you can define what kind of vehicle is to be spawned.

All other properties are not evaluated.

6.5 Extraction Zone Items

These items are used to define areas a player must place hostages, vehicles etc. to accomplish a round in extraction and hostage rescue game modes. The item properties *Width*, *Height* and *Depth* define the size of the area box. The item property *Zone Name* contains the spawn group name.

6.6 Spawn Building Goal Item

This type of item is used to specify a building being a bombrun target. The building whose pivot is the nearest to the spawn building goal item will be a bombrun target. The *Building Name* property defines which name is displayed when a building has been destroyed.

Note: items of this type define their team affiliation using the *Team ID* property. The *Team ID* you specify corresponds to the team type values listed in the table in chapter 7.1.

6.7 Game Modes

Each game mode needs its own spawn items with certain properties — except for deathmatch and team deathmatch modes (actually, they only need the spawn player items).

6.7.1 Conquest

The following items are the minimum requirements for a detail-map to become suitable for conquest mode:

- at least 1 Flagstaff spawn item for team blue

- at least 1 Flagstaff spawn item for team red

- for each Flagstaff spawn item at least 1 spawn player item

The spawn player items must be grouped with their flagstaffs using the same spawn group name. Add as many neutral flagstaff spawn items as you want. We recommend to have an odd number of flagstaffs in total. This keeps the teams busy.

6.7.2 Capture the Flag

The following items are the minimum requirements for a detail-map to become suitable for capture the flag mode:

- 1 BlueFlag spawn item

- 1 RedFlag spawn item

- at least 1 spawn player item for each team

6.7.3 Deathmatch

There are no requirements for a detail-map to become suitable for deathmatch mode. But we recommend to set spawn player items. If there are no spawn player items the player will be spawned in the detail-map's centre.

6.7.4 Team Deathmatch

The following items are the minimum requirements for a detail-map to become suitable for team deathmatch mode:

- at least 1 spawn player item for team blue

- at least 1 spawn player item for team red

6.7.5 Capture the Vehicle

The following items are the minimum requirements for a detail-map to become suitable for capture the vehicle mode:

- exactly 1 spawn vehicle item for team blue

- exactly 1 spawn vehicle item for team red

6.7.6 Extraction

The following items are the minimum requirements for a detail-map to become suitable for extraction mode:

- at least 1 spawn item which will become extracted

- at least 1 extraction zone item

The item which is to be extracted shall reside near the terrorists.

6.7.7 Hostage Rescue

The following items are the minimum requirements for a detail-map to become suitable for hostage rescue mode:

- at least 1 extraction zone

- at least 1 spawn player item for SWAT

- at least 1 spawn player item for terrorists

- at least 1 spawn player item for team id 3 (hostages)

Note: one spawn player item with team id 3 spawns exactly one hostage.

6.7.8 Bomb Run

The following items are the minimum requirements for a detail-map to become suitable for bomb run mode:

- at least 1 spawn building item for team 1 (terrorists)

7 Integrating Detail-Maps for Multi-Player Games

The detail-maps prepared for multi-player need a map description file in the directory

```
Game\Content\Data\XML\MapDescriptions
```

The file's name is made up of the prefixed name of the map the detail-map belongs to (e.g. siberia), a following underscore, the filename of the detail-map excluding its extension and the extension ".xml" (e.g. `siberia_Lakeside.xml`).

7.1 Team IDs

In the map description file you assign the items belonging to a spawn group to a team using their corresponding id. There are following ids:

Team ID	Description
0	No team, e.g. an uncaptured flag.
1	Either team red or the team that has to move to the mission site, e.g. SWAT rescuing hostages.
2	Either team blue or the team that spawns at the mission site, e.g. terrorists who captured hostages.
3	Hostages.

7.2 Map Description File Structure

The structure of a map description file is a simple hierarchy of XML tags:

```
<gamemap ...>
    <gamemode ...>
        <spawngroup ...>
        ...
    </gamemode>
    ...

    <spectatorspawngroup ...>
</gamemap>
```

7.2.1 <gamemap>

The <gamemap> tag must have the following attributes defined:

Attribute name	Description
name	Human readable name of the detail-map (e.g. Riverside).
mapfile	The filename of the map file without extension (siberia).
maptitle	Currently, this value must be "MapTitleSiberia" (without quotation marks)
gamearea_x	The longitude corresponding 10 meter coordinate of the centre of the game area containing the maps that shall be loaded. You can obtain this value using the property window in the Landscape Editor.
gamearea_z	The latitude corresponding 10 meter coordinate of the centre of the game area containing the maps that shall be loaded.
gamearea_half_edge	Contains the half of the width and height of the game area in 10 meter coordinates.
picfilename	The name of a picture found in Game\Content\Art\Webimages This image is used in the web admin interface.

7.2.2 \<gamemode>

The \<gamemode> tag defines which spawn group belongs to which team. Define one \<gamemode> tag for each game mode that your detail-map supports. The following attributes must be defined:

Attribute name	Description
name	One of the following string corresponding to the game mode your detail-map supports (without quotation marks): • "Conquest" • "Team Deathmatch" • "Capture The Flag" • "Capture The Vehicle" • "Hostage Rescue" • "Bomb Run" • "Extraction" • "Deatmatch"

7.2.3 <spawngroup>

The <spawngroup> tag creates the connection between teams and spawn groups. The following attributes must be defined:

Attribute name	Description
name	Name of the spawn group. You assigned this name to the several spawn items you placed in the detail-map in order to make the detail-map multi-player ready.
team	A team id according to section 7.1. If the game mode is deathmatch then the id must be 0.

7.2.4 <spectatorspawngroup>

This tag defines the spawn group which contains spawn player items for spectators. The following attribute must be defined:

Attribute name	Description
name	Name of the spawn group that contains the spectator spawn player items.

8 Generating Settlements

This topic will be covered in detail in one of the next versions of this document.

9 Change Log

- May 2004, Pierre Bongen

    o Init

- 2004-05-24, Pierre Bongen

    o Added this change log

    o Added documentation for terrain object tools, item tools, elevation manipulation tools, TTM tools and the zaun tool.

- 2004-05-25, Pierre Bongen

    o Street tools

    o Preparing detail-maps for single-player missions

- 2004-05-27, 2004-05-28, Pierre Bongen

    o Preparing detail-maps for multi-player games

    o Integrating detail-maps for multi-player games