



LandXplorer Studio Professional

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LandXplorer Studio Professional

by 3D Geo GmbH

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LandXplorer Studio Professional

Introduction

Part 1

1 Introduction

Welcome

Thank you for choosing LandXplorer Studio Professional!

With LandXplorer Studio Professional, you purchased an interactive, real-time authoring system for 3D geo data visualisations that allows you to effectively create, analyse, manage and distribute large-scale geo information. It integrates any kind of 2D and 3D geo data, including large-scale raster and vector data, as well as 3D city models, into dynamic visual documents, so called 3D geo documents. A collection of optional modules supports large-scale terrain textures, large-scale 3D city models, high-resolution printing, terrain analysis, animation and digital rights.

With LandXplorer Studio Professional you can visualise land models interactively, equip them with area textures from raster and vector data, insert additional 2D and 3D objects, logos watermarks or legends. You can combine complex information in a single significant document and perform live recordings (avi-encoded) while navigating through your model.

We hope and expect that you'll enjoy working with LandXplorer Studio Professional.

your 3D Geo GmbH

1.1 System Requirements

Your computer must meet the following hard and software minimum requirements to be able to properly install and run LandXplorer Studio Professional:

- Platform/Operating System: PC, Windows® 2000/XP/ Vista
- 256 MB RAM
- 1.6 GHz CPU (Pentium 4, AMD Athlon or comparable Celeron/Duron CPU)
- OpenGL 1.4 (note: please install the most recent driver!)
- GPU with at least 32 MB RAM(NVidia GeForce2MX or ATI Radeon 8xxx)

Recommended set up:

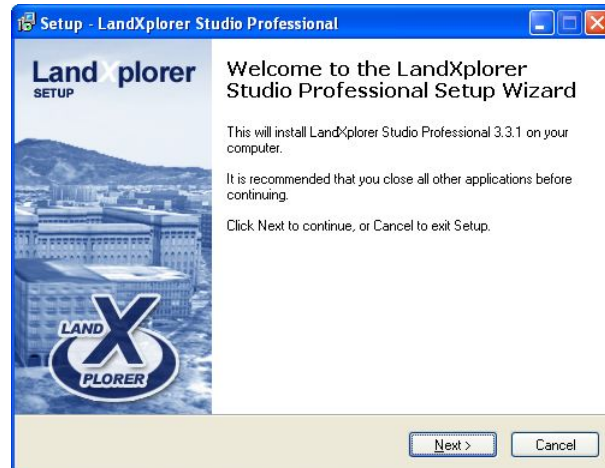
- Windows® 2000/XP/Vista
- >=512 MB RAM
- 2,x GHz CPU (Pentium 4, AMD Athlon or comparable Celeron/Duron CPU)
- OpenGL 1.4 (note: please install the most recent driver!)
- GPU with at least 128 MB RAM(NVidia GeForce FX or ATI Radeon 9xxx or later)

1.2 Installation

! Note: In Windows NT/2000/XP/Vista systems you have to log in as administrator or at least use a login with sufficient administrative rights. Otherwise, the installation-process might abort. !

After inserting the "LandXplorer Studio Professional Setup CD into your CD/DVD drive or opening the "LandXplorer Studio Professional-Setup-x.x.x.exe"-file from your hard disk, the Setup-Assistant will open and guide you through the installation of LandXplorer Studio Professional.

Set-up Assistant

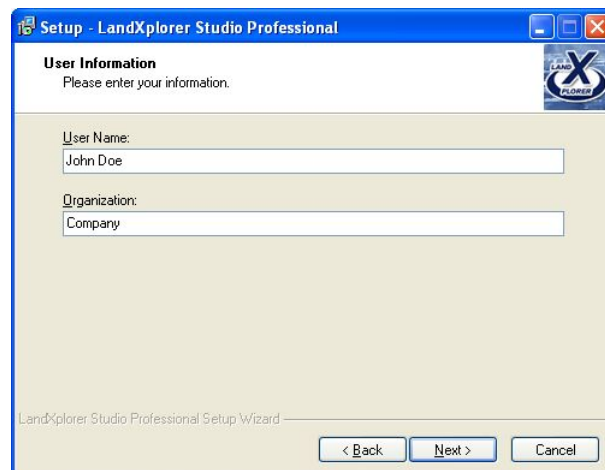


To start the installation process click **Next**.

The End User License Agreement (EULA) will be displayed in the next step. Read through the EULA carefully. The installation can only be completed if you agree to this agreement.

The following dialog will prompt you for general user data. Please enter your full name.

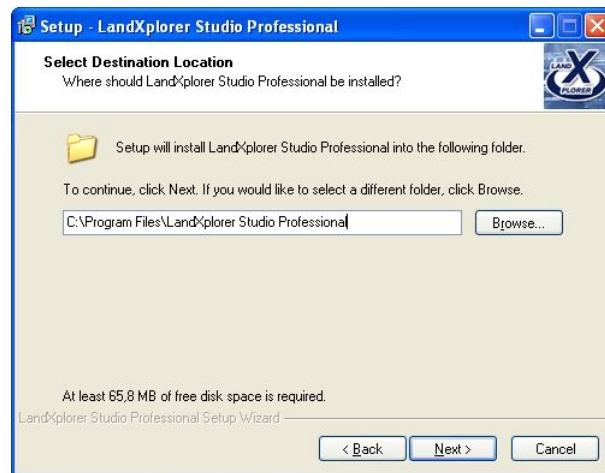
User data input window



In the next step you can determine the folder for appearance in the Windows Start-Menu. Click **Browse** to choose a different folder. Click **Next** and you will be asked to select the

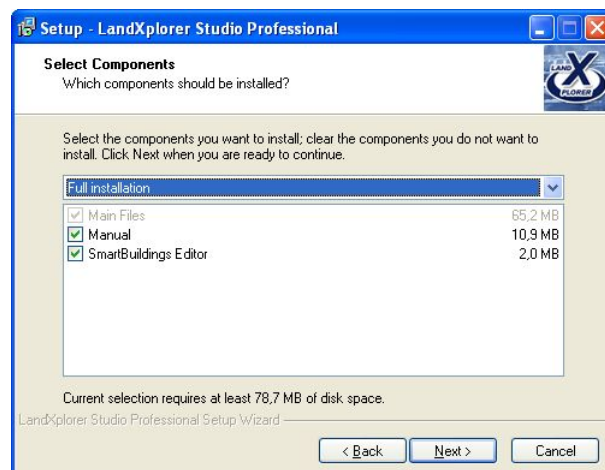
features you want to install.

Select Destination Folder Window



Click **Next** and you will be asked to select the features you want to install.

Select Components Window



Next you can determine if you want to create a shortcut on your desktop and/or a quick launch icon in the start menu.

Select Start Menu Folder



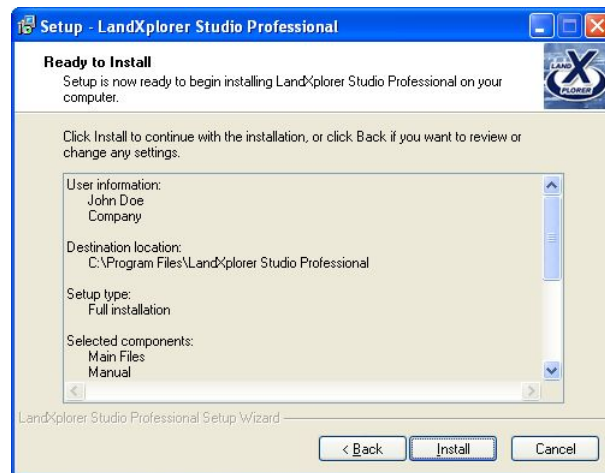
Review the settings selected and click Install if all settings are correct.

Review Settings Window



To start the installation click **Install**.

Ready to Install Window



LandXplorer Studio Professional is being installed. This may take several minutes. After the successful completion of the installation you will find shortcuts to LandXplorer Studio Professional in the start menu and on your desktop.

1.3 Activation

LandXplorer Studio Professional is copy-protected by means of an Authorization-Key is necessary to activate the programme. You may only use this programme in combination with this authorization key. You may not copy or distribute copies of this software, or electronically transfer the software from one computer to another or over a network. You may not alter, merge, modify, adapt or translate the Software, or de compile, reverse engineer, disassemble, or otherwise reduce the Software to a perceivable form. You may not sell, rent, lease, or sublicense the software. You may not modify the software or create derivative works based upon the software.

Some licenses may have an expiry date. If LandXplorer Studio Professional shows an error message indicating that your software key is not valid anymore, please contact support at Support@3dgeo.de.

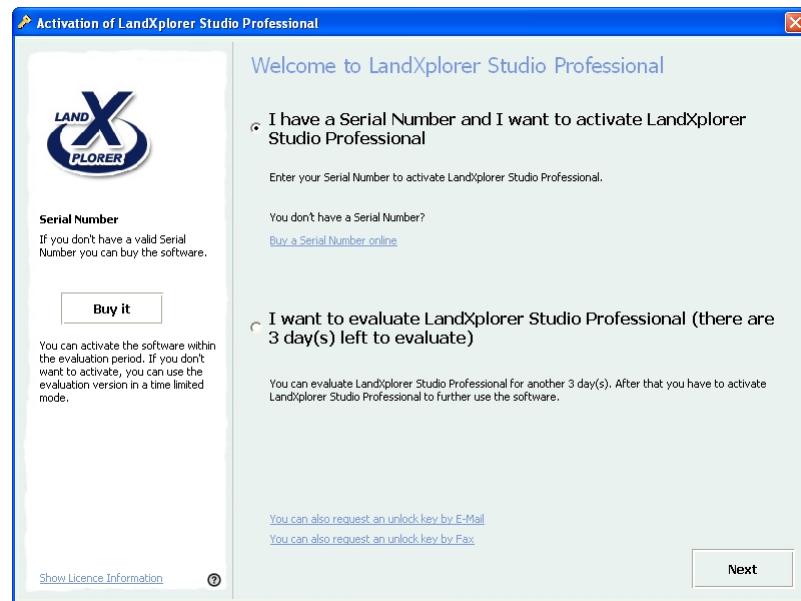
You can evaluate the programme for a period of three days. After this period you have to activate the application by going thorough the activation process. If you do not have an activation key yet, you can purchase a licence by clicking the Buy it button on the left of the activation dialog window.

If you are not connected to the internet, you can also request an unlock key by Fax or E-Mail. Click on the respective Link at the bottom of the activation window for the contact using E-mail or Fax.

How to Activate LandXplorer Studio Professional

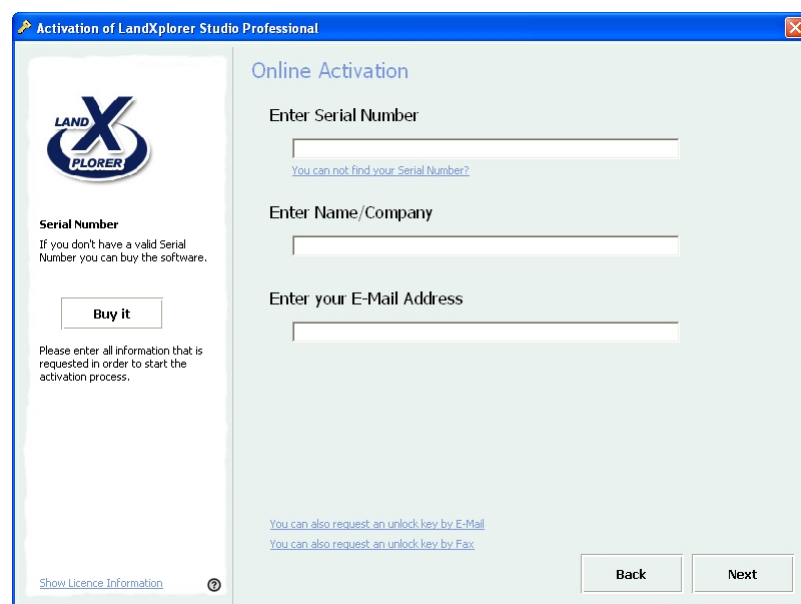
When starting the programme, the following activation dialog will appear.

Activation Dialog



If you already purchased LandXplorer Studio Professional, you can activate it, using the activation key (serial number) that was delivered with your copy. Click Next to get to the following dialog.

Online Activation Dialog



Once you have entered the required information into the corresponding text fields, click Next to activate your copy of LandXplorer Studio Professional automatically.

Please exit and restart the program to adopt the changes made.

To help you manage your license the License Manager can be started from within the program, by selecting **Extras/License Information**.



LandXplorer Studio Professional

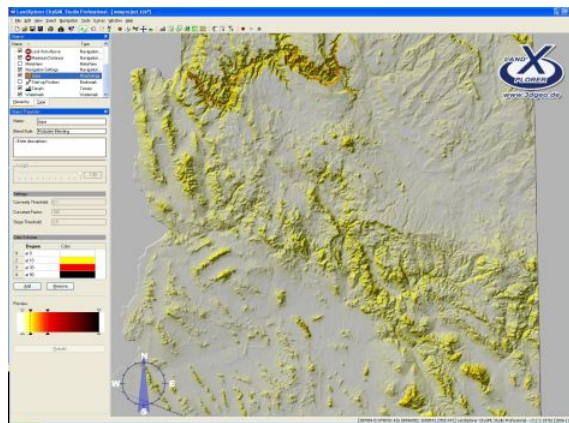
Programme Structure

Part 2

2 Programme Structure


The screen of LandXplorer Studio Professional consists of four main sections. The Main Menu is in the upper screen area and is described in detail in the chapter menu structure. The toolbars underneath the main menu are icons representing shortcuts of actions used regularly when working with the program. The Object Window, which has two different views, the Hierarchy View and Type View, is located on the upper left hand side of the screen. Underneath the Object Window the Object Properties are displayed. The centred Main Section contains the picture of the project you are working on, with all the features and objects that are loaded.

Programme Overview



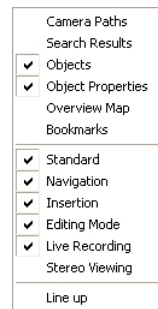
Depending on the selected objects or activated features, additional dock windows may be displayed.

2.1 Toolbars

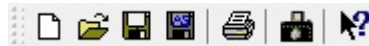
The toolbars are arranged beneath the Main Menu. They display icons which are shortcuts performing certain actions that are used regularly. You can rearrange the toolbars by clicking on the respective grasp point () and dragging it to a new position.

You can also activate or deactivate the toolbars by checking or un-checking the respective box in the **View** menu under **Toolbars**. Press **Line up** in the toolbars menu to line up the toolbars after you have moved them. The Lock Toolbars menu item locks the toolbars at their position and deactivates the grasp points.

Toolbars Submenu



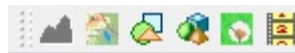
Standard Toolbar



Navigation Toolbar



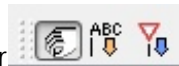
Insertion Toolbar



Presentation Toolbar



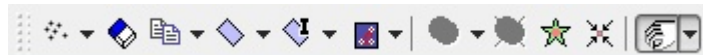
Editing Toolbar



Stereo Mode Toolbar



Vector Layer Toolbar



2.2 Object Window

The **Object Window** is intended to provide you with fast and structured access to the different items of the currently active project. If you select one item, its adaptable settings will be displayed in the Object Properties section beneath the Object Window. All checked items are displayed in the main section. Use the respective check marks to show or hide the different items.

The Object Window



Please note: Several items may not be activated, if they are not visible in the main section

(i.e. Camera Path).

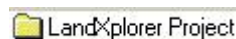
The **Object Window** is divided in two different views - a hierarchical and a type-based view. They can be selected using the two tabs at the bottom of the object window.

Object Window Tabs



Both views have a shared root node - the **Project Node**. The root node symbolizes the project itself. You can add some project specific information by selecting the project node and editing its properties in the object properties window.

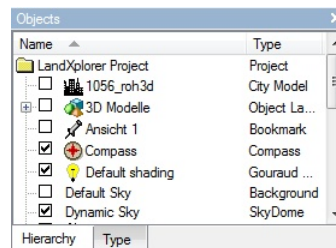
The Root/Project Node



2.2.1 Hierarchy View

The **Hierarchy View** is intended for fast object access by grouping objects, which logically belong together. Therefore this view allows a project to be organized by using folder nodes.

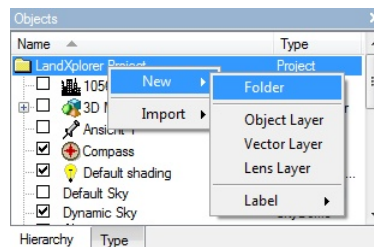
Hierarchy View



Creating new Folder Nodes

For creating a new folder node, right-click on the project node or an existing folder node. Then select **New Folder** in the context menu to create the folder node.

Project Content Menu

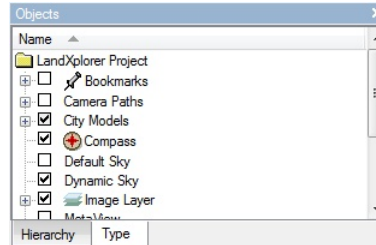


Objects can be arranged in folders by using "Drag & Drop". Drag the object you want to move and drop it onto the destination folder.

2.2.2 Type View

The **Type View** of the object window allows fast access to the objects, by grouping them together according to their type.

Type View

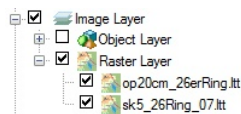


Some of the settings can be accessed only via the type view, since they rely on special nodes, which are only available in the type-based view. One of these is the image layer node.

The Image Layer Node

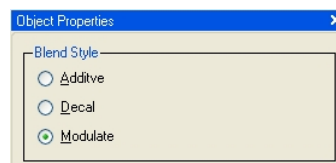
The image layer node groups all types of image layers - either imported like vector or raster data layers or generated layers from different computations (hypsometry, morphology, hachures).

Image Layer Node



By selecting the **Image Layer Node** you can choose between three different blend styles in the properties window.

Blend Styles



C – Colour: C is defined as components of red, green, blue (R,G,B); R,G,B in [0..1] ((0,0,0) - Black; (1,1,1) - White)
W – Weight: W in [0..1]

- The **additive mode** computes the resulting colour for two image based layers as follows:

$$CR = C1 * W1 + C2 * W2$$

For each layer a weight can be defined, whereas the sum of all weight values determines the resulting weight used for the calculation.

$$WR = Wi / \sum Wi$$

As a result of this computation the final colour will be brighter, the more layers are added.

If the resulting colour is white, nothing will be displayed (transparent).

- The **decal mode** uses the "painters algorithm". The layers are drawn in the same sequence as they were added to the project. So if the decal mode is needed for a project, the layers have to be added in the order that they shall be projected.
- The **modulate mode** calculates the resulting colour by component-wise multiplication of all colours. The following example illustrates the calculation for two layers.

$$CR = C1 * C2$$

The result of this computation will be a darker colour, if more layers are added. An exception is the occurrence of white areas, which have no influence on the final colour.

The Navigation Constraints Node

The navigation constraints node groups all activated navigation constraints. For more information, please refer to the sub chapter **Navigation Constraints** in the Navigation chapter.

Navigation Constraint Node



For calculating the result of a constraint check, one or more iterations can be used for the calculation. In general, a constraint checks whether a requested position can be reached or not. If the check fails, it returns a new point, which can be used in a new iteration step.

If the number of iterations is raised, the chance of finding a valid point will grow, but this can lower the overall performance significantly.

2.3 Object Properties

The **Object Properties** window is the most important interface for analyzing, exploring and editing the objects of your project.

The object properties window displays the properties of which ever object is selected in the Object Window. Different actions may be invoked in the object properties window depending on the object selected.

Object Properties Window

Object Properties

Name:

LandXplorer Project

Author:

Unknown

Name	Value
Programm.Name	LandXplorer Studio f
Programm.Version	v3.3.0.11279 [2007-
Programm.Copyright	(c) 2004 - 2007 3D C

Add row

Remove row

General

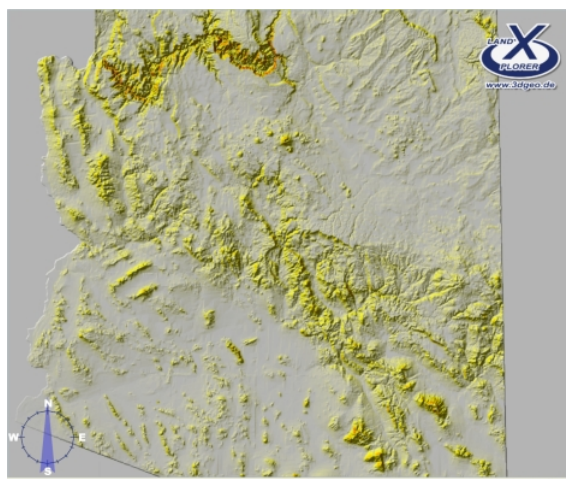
Statistics

2.4 Main Section

This is where you actually explore your project and see the results of changes made. Read through the Navigation chapter for more information on how to navigate the project.

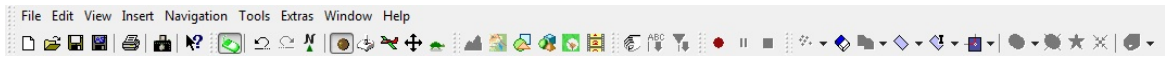
In the lower right hand side of the screen, you can see the coordinates of the position the cursor is currently pointing at. Additionally the program name and the version of the software is displayed.

The Main Section



2.5 Menu Structure

This chapter contains information on the LandXplorer Studio Professional menu structure. All items of the main menu and their submenu, representing actions that can be performed with the program, are explained.



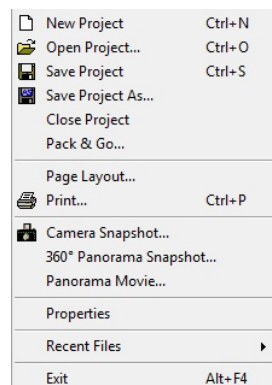
The toolbars display icons which are shortcuts to certain actions that are performed regularly. They are arranged beneath the main menu. You can rearrange them by clicking on the respective grasp point (☞) and dragging it to a new position.

2.5.1 File

The **File** menu provides features for managing your projects. Select **New Project** to create a new project. After that new layers can be added to this project. **Open Project** allows you to open an existing project, **Save Project** to save a project you have been working on, and **Save Project As** to save a project under a new name. Select **Close Project** to exit the project but not the program. **Page Layout** gives you different possibilities to set up your page for printing. To print your project select **Print**.

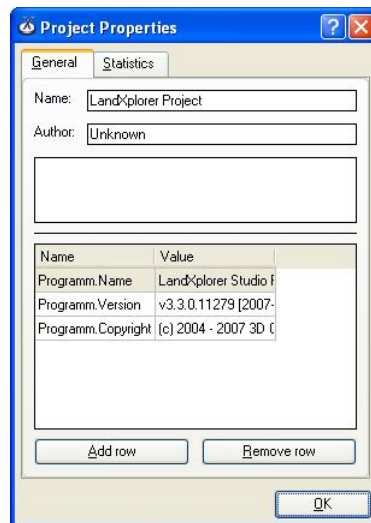
For details on **Camera Snapshot**, **360° Panorama Snapshot** and **Panorama Movie** see the chapter Capturing Tools.

The File Menu



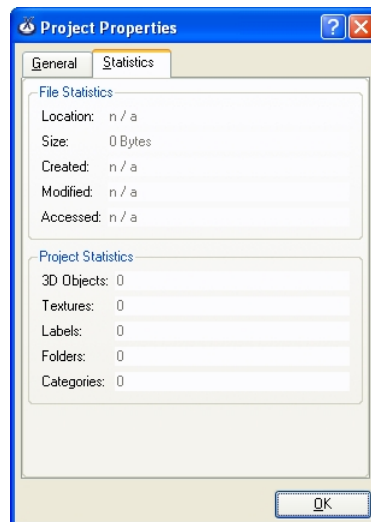
The **Project Properties** option opens a dialog which will let you review and alter the project properties. It is divided into two tabs - the General Section and the Statistics Section. The general section of the project properties window shows the name, version, and copyright of your program by default. However, additional meta information may be added by using the **Add Row** button.

Project Properties: General Section



The **Statistics** section shows general information on the project file (location where it is saved, date it was created) as well as information on the project (how many objects, etc.).

Project Properties: Statistics Section





Recent Files shows you those projects that have been opened recently.

And **Exit** will close the program.

2.5.2 Edit

The **Edit** menu contains entries for manipulating a project or a selected object. It offers a cascading menu entry for the selected object. Here you can choose the editing action you want to use for the object or project.

The Edit Menu

Delete	Del
 Edit Mode	Ctrl+E
 Find Object...	Ctrl+F
Convert GenericCityObject to...	
Transform Selected Objects	Ctrl+T
Delete Selected Objects	Ctrl+X
Mappings...	

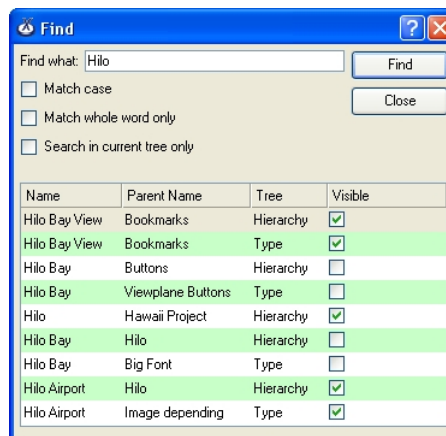
The **Delete** entry allows the the removal of the node/layer which is selected in the object window.

Please note: There is no undo function, so if you decide to remove a node from the project, please make sure that you have selected the correct one.

The editing mode can be activated using the **Edit Mode** entry. See the chapter Main Features for further details on how to use the edit mode.

Use the **Find Object** function to search for objects in the object window. You can narrow your search by making it case sensitive, searching for objects whose name is the whole search string, or searching in the currently marked tree only. The search results will be displayed in a table like this:

Search Result Window

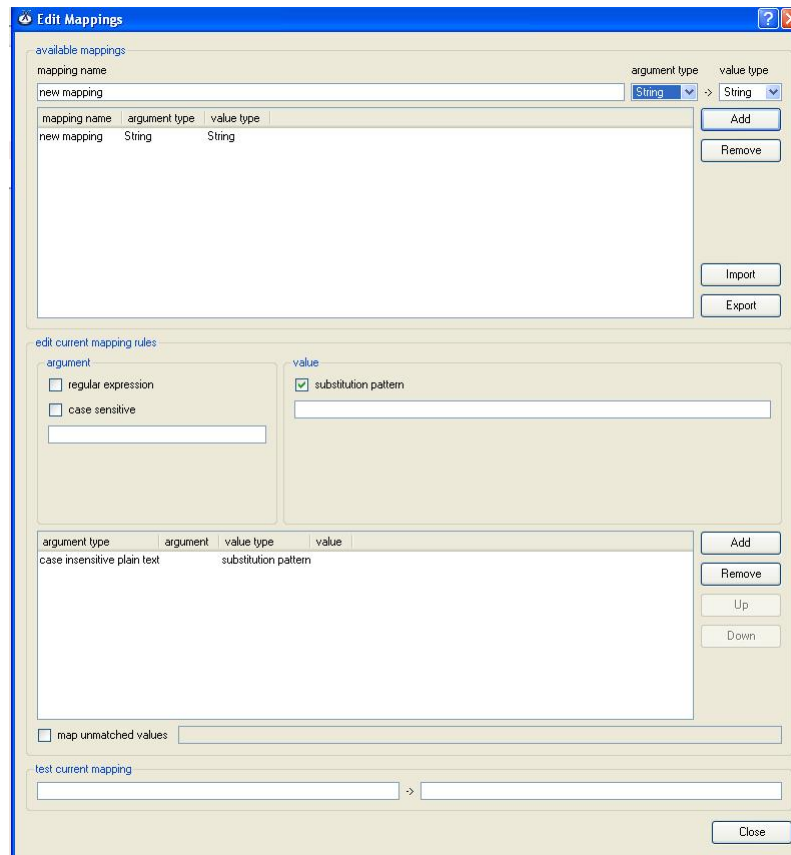


Name	Parent Name	Tree	Visible
Hilo Bay View	Bookmarks	Hierarchy	<input checked="" type="checkbox"/>
Hilo Bay View	Bookmarks	Type	<input checked="" type="checkbox"/>
Hilo Bay	Buttons	Hierarchy	<input type="checkbox"/>
Hilo Bay	Viewplane Buttons	Type	<input type="checkbox"/>
Hilo	Hawaii Project	Hierarchy	<input checked="" type="checkbox"/>
Hilo Bay	Hilo	Hierarchy	<input type="checkbox"/>
Hilo Bay	Big Font	Type	<input type="checkbox"/>
Hilo Airport	Hilo	Hierarchy	<input checked="" type="checkbox"/>
Hilo Airport	Image depending	Type	<input checked="" type="checkbox"/>

The options **Convert Generic City Objects to**, **Transform Selected Objects** and **Delete Selected Objects** are all specific to CityGML city models and are explained in the chapter Inserting City Models and its sub chapters.

Mappings

Edit Mappings Window



2.5.3 View

The **View** menu gives you the possibility to change the appearance of windows and toolbars on your screen.

The View Menu



You can activate two different screen modes, separately, or in combination. **Full Screen** will bring your model in full-screen-mode. You can deactivate the full screen mode by right clicking on the main section and un-checking **Full Screen** in the appearing menu. **Gray Scale Mode** will show the entire main section in different shades of grey.

Lock Toolbars disables the rearrangement of the toolbars and removes grasp points.

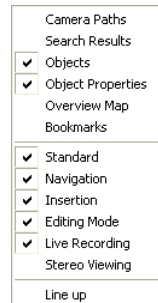
Toolbars

In the toolbars submenu you can show (or hide) single control windows or toolbars by setting (or removing) the respective check mark (see image below). The control windows

(upper section) are arranged automatically, but may also be arranged manually, by drawing them to any place of the application window.

Select **Line up** to line up the toolbars in a row, as close to each other as possible.

The Toolbars Submenu

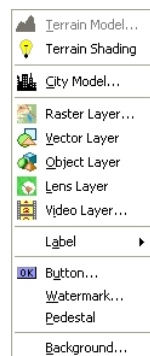


2.5.4 Insert

The **Insert** menu is the most vital one for creating models. You can insert all kinds of layers or objects. They will first be listed in the object window. Then they can be "filled" with information for creating your model.

After you have created a new project you usually start with inserting a terrain model or city model. Later on you can add layers like raster, vector, object, lens or video layers. Please refer to the respective chapter in the Main Features section for further information on how to insert different layers.

The Insert Menu



Alternatively, you may insert the layers by simply clicking the respective button in the Insertion Toolbar .

The **Label** submenu lets you choose between different types of labels that will be inserted in the model at a certain position. Refer to the chapter Inserting Labels for further information.

The Label Submenu



You can also insert buttons. Please refer to the sub chapter Inserting Buttons for further information.

The **Watermark** menu item allows you to choose a picture to replace the default watermark. Just navigate to the picture you want to use and click open. Refer to the sub chapter Watermark for further information.

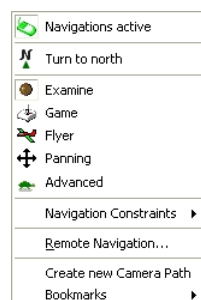
Inserting a **Pedestal** will create a boundary around your model. When inserting a pedestal via the insert menu it will appear in the object window. You can change the height and width of the inserted pedestal in the object properties window.

The menu item **Background** allows you to insert different backgrounds for your model. Please refer to the sub chapter Inserting a Virtual Sky for further information.

2.5.5 Navigation

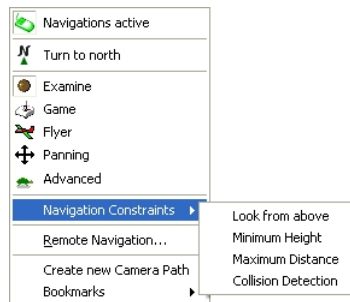
The **Navigation** menu provides a variety of navigation metaphors as well as other navigation settings. Navigation metaphors are different ways of navigating your project. You can also right click on your model and choose a new navigation metaphor from the context menu. The different metaphors and additional navigation options are explained in the Navigation chapter.

The Navigation menu



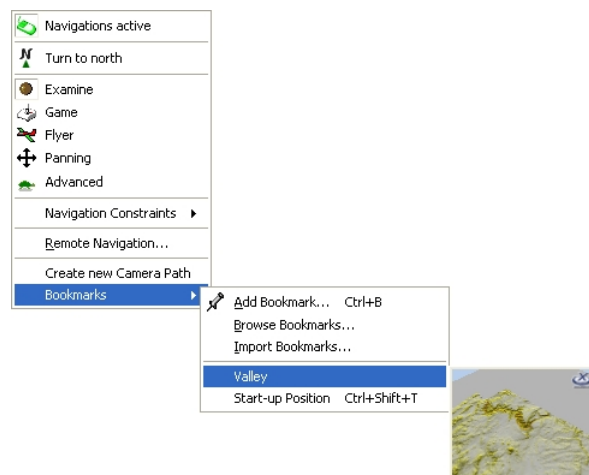
Navigation Constraints give you the possibility to set restrictions to the navigation. For example you can restrict the view from going below the terrain surface by clicking **Look from above**.

The Navigation Constraints submenu



Bookmarks give you the possibility to mark certain views and to save these to make it easier to return to these later. Please refer to the respective chapter for further information.

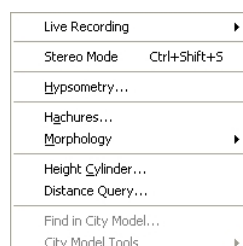
The Bookmarks submenu



2.5.6 Tools

The **Tools** menu provides a variety of tools such as **Live Recording**, **Stereo Mode**, different terrain analysis tools, and two tools related to city models, the **Find in City Model** and the **City Model Tools**.

The Tools Menu

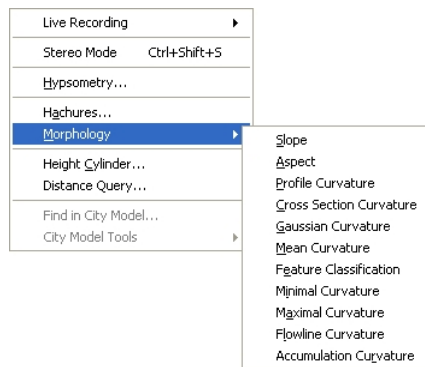


The **Live Recording** feature is explained in the chapter Capturing Tools.

The **Stereo Mode** is explained in the chapter Stereo Mode .

The tools for terrain analysis such as Hysometry, Morphology, Hachures, Height Cylinder and Distance Query are explained in the chapter Terrain Analysis. In the **Morphology** submenu you can choose between different visualizations of morphological characteristics.

The Morphology Submenu



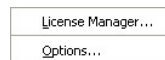
The **Find in City Model** feature is explained in the Search in City Model section.

City Model Tools are available only when city models are loaded.

2.5.7 Extras

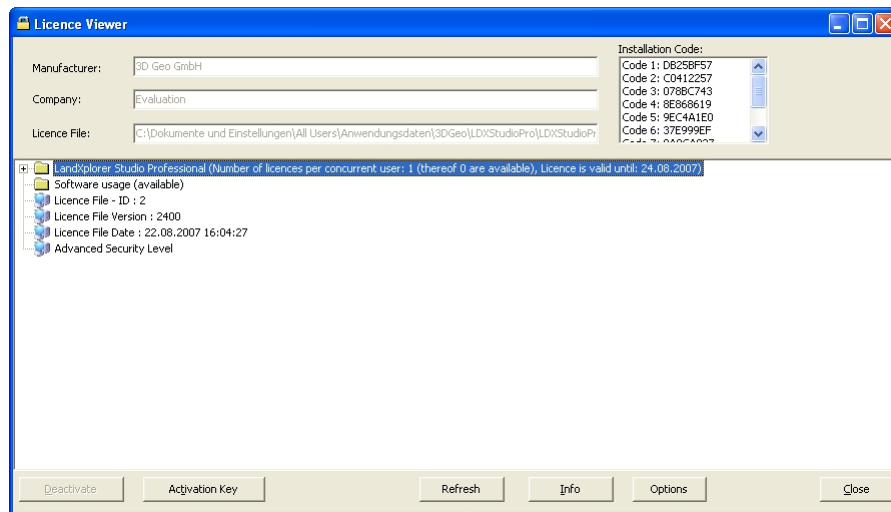
The **Extras** menu has two sections; the **License Manager** and **Options**.

The Extras Menu



The **License Manager** is intended to help you manage your LandXplorer Studio Professional license. Use the license manager to activate your product and to keep track of your licensing periods and other key information. For more information on product activation procedures, please review the Activation chapter.

The License Manager

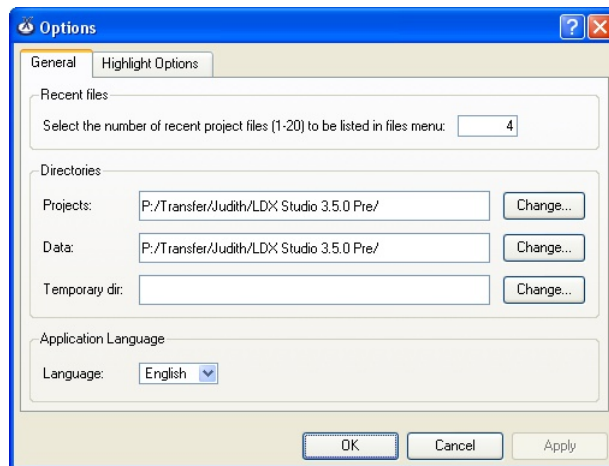


Options

Use the **General** tab of the options allows you to set the standard paths for storing projects and data. You can also select a temporary directory for storage of temporary data that is created during runtime. If the Temporary dir: field is left blank, the standard windows temp directory will be used.

Additionally you can change the language here. Currently you have the possibility to change between German and English.

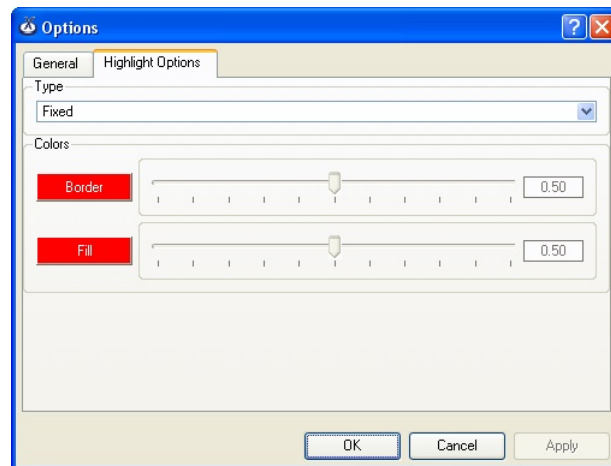
Options Window



The Highlight Options tab defines the settings for the selection of vector data. You can choose three different types. Inverse chooses the inverse color for the selected element for the selection color. When you choose the type Fixed, it will always choose the set color for the selection. if you choose modulate blends the selection color with the color of the selected element.

In the color setting you can choose a color for the border as well as for the fill of the selection area.

Options Highlight Window



2.5.8 Window

The **Window** menu lets you choose which windows shall be displayed.

The Window Menu

<input checked="" type="checkbox"/>	Objects	Ctrl+1
<input checked="" type="checkbox"/>	Object Properties	Ctrl+2
<input type="checkbox"/>	Overview Map	Ctrl+3
<input type="checkbox"/>	Bookmarks	Ctrl+4
<input type="checkbox"/>	Camera Paths	Ctrl+5
<input type="checkbox"/>	Search Results	Ctrl+6

2.5.9 Help

Click on **Online-Help** to open the online help of LandXplorer Studio Professional in your standard browser. Click on **What's this** and then on an item to determine its purpose or function. The Graphics Hardware Info gives you an overview about which features your graphic hardware supports!

The Help Menu

	Online-Help	F1
	What's This?	Ctrl+F1
Graphics Hardware Info...		
LandXplorer Studio Professional Online...		
About LandXplorer Studio Professional...		

Choose **LandXplorer Studio Professional Online** to be forwarded to the LandXplorer Studio Professional homepage or **About LandXplorer Studio Professional** to get information about your version of LandXplorer Studio Professional Software

2.6 Shortcuts

Here you can find a list of the keyboard shortcuts used by the program.

Ctrl + N	Create New Project
Ctrl + O	Open Project
Ctrl + S	Save Project
Ctrl + P	Open "Print" Dialog Box
Ctrl + E	Toggle "Edit Mode"
Del	Delete selected Object in Tree
Ctrl + F	Open "Find" Dialog Box
Ctrl + T	Toggle "Transform Mode" for selected building(s) (For CityGML based models only)
Alt + Left Mouse Button + Mouse Movement	Move building(s) horizontally (Transform Mode only)
Alt + Shift + Left Mouse Button + Mouse Movement	Move building(s) vertically (Transform Mode only)
Alt + Middle Mouse Button + Mouse Movement	Rotate building(s) (Transform Mode only)
Alt + Shift + Middle Mouse Button + Mouse Movement	Scale building(s) (Transform Mode only)
Alt + Left Mouse Button + Mouse Movement	Select multiple buildings (selection box)
Shift + Left Mouse Button	Add/Remove selected building to selection
Ctrl + X	Delete selected buildings
Ctrl + Z	Undo Navigation Step
Ctrl + Shift + Z	Redo Navigation Step
F1	Open Online Help (Opens Browser Windows)
Ctrl + F1	Activate "What's this?" feature
Ctrl + B	Create new Bookmark
Ctrl + Shift + T	Go to Start-Up Position (shortcut can be altered)

Ctrl + Shift + S	Activate "Stereo Viewing"
Ctrl + Alt + R	Open "Live Recording" Dialog Box
Ctrl + Alt + P	Pause "Live Recording"
Ctrl + Alt + S	Stop "Live Recording"
Ctrl + 1	Show/Hide "Object Tree"
Ctrl + 2	Show/Hide "Object Properties"
Ctrl + 3	Show/Hide "Overview Map"
Ctrl + 4	Show/Hide "Bookmark Browser"
Ctrl + 5	Show/Hide "Camera Path Editor"
Ctrl + 6	Show/Hide "Search Results"
Alt + F4	Exit program



LandXplorer Studio Professional

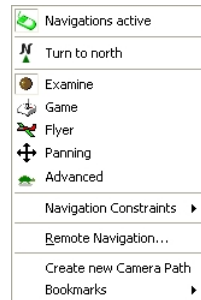
Navigation

Part 3

3 Navigation

This chapter describes the navigation possibilities or metaphors. It also describes the navigation constraints and settings. You can access the navigation possibilities and different metaphors via the Navigation Menu or the Navigation Toolbar.

The Navigation Menu



Click **Navigations active/inactive** in the menu to activate or deactivate the navigation metaphors. The metaphors may also be activated in the navigation toolbar by clicking



on

The Navigation Toolbar



3.1 Navigation Metaphors

LandXplorer Studio Professional allows to choose and switch between different navigation metaphors intended to help you to intuitively navigate through your model. Select the metaphor that suits you best or the one that seems to be the most appropriate for a certain situation or purpose.

Sphere Metaphor:

Left click into the model, keep the mouse key pressed and move the mouse. The model will follow the movement rotating around its own centre, so you can get any perspective. Use your mouse wheel or the middle mouse key to zoom in and out.

The Examine metaphor provides Sphere but also Move Focus Navigation and Zoom, i.e. by holding CTRL and clicking on a certain point in the model, you will move that focus point to the centre of your view.

Game Metaphor:

Using this Metaphor allows you to use the cursor keys in a way that might be familiar from computer games. Use the cursor keys to move forward, backward, left, and right, along the model surface. You can still use your mouse to rotate the terrain like using a joystick and zoom as described in the sphere metaphor. For moving up and down use the keys Page Up and Page Down respectively.

Airplane Metaphor:

Left click into the model and keep the mouse key pressed to start flying. Move around your mouse to fly over the model and get airplane vision and behaviour. When using

Page Up and Page Down you can alter the perspective/slant. The altitude can be adjusted by using the mouse wheel.

Panning Metaphor:

Left click into the model, keep the mouse key pressed and move the mouse. The model will be translated parallel to its surface. Holding CTRL, you can also use the Sphere Navigation. The mouse wheel will let you zoom in and out.

Advanced Metaphor:

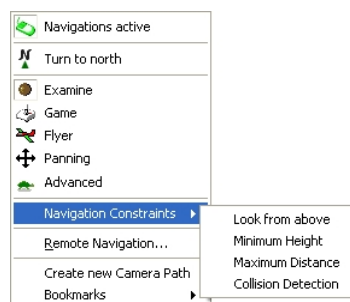
This metaphor is a combination of the Sphere, Focus, Zoom, and Game Metaphors. Use the keys as follows:

- left mouse key: rotate the model
- CTRL + left mouse key: change focus point
- mouse wheel: zoom in and out
- middle mouse key: change direction of view for Game metaphor
- cursor and page keys like game metaphor

3.2 Navigation Constraints

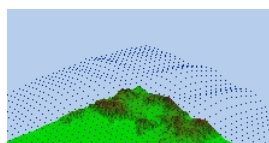
Use the **Navigation Constraints** submenu to set constraints for the observer's navigation. Constraints will be added to the hierarchy window and can be turned off by unchecking the respective check mark.

The Navigation Constraint Submenu

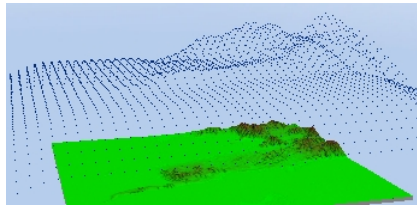


The **Look from above** constraint guarantees that the camera won't be able to look or get under the terrain. The **Minimum Height** constraint allows to set values for a minimum height as well as a maximum height within which the observer can move. Use the **Settings** tab of this constraint to specify these values. Check **Show Visualization** to display an area of coloured points to indicate the height border.

Visualized Height Border



A higher maximum height value provides extra space above mountainous parts of the model.



The **Maximum Distance** navigation constraint specifies the maximum distance for each of the three directions (East-West, Bottom-Up, North-South).

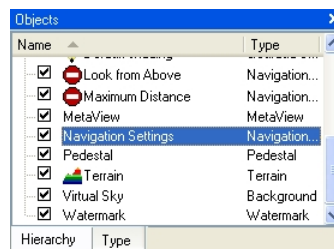
Collision Detection specifies an X, Y, and Z size value of the camera. For collision response, choose to either **Stop on collision** or to **Slide along the surface**. Currently this constraints works with the terrain only, not with buildings.

3.3 Navigation Settings

You can personalize your LandXplorer Studio Professional 's navigation behaviour.

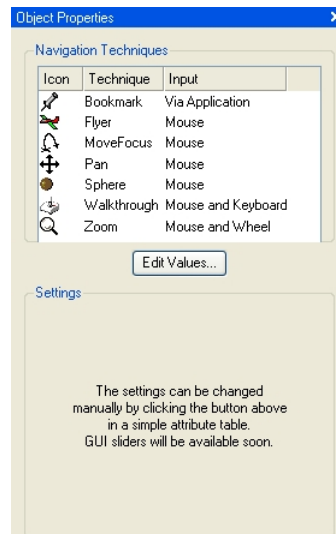
Choose **Navigation Settings** in the **Hierarchy View** of the **Object Window**.

Navigation Settings in the Object Window



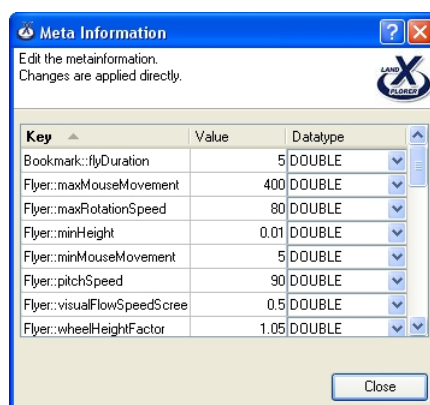
Push the **Edit Values** button in the property dialog.

Navigation Settings, Property dialog



Adjust the values in the table to personalize the speed of execution of your navigation commands.

Navigation Settings, Value table



3.4 Overview Map

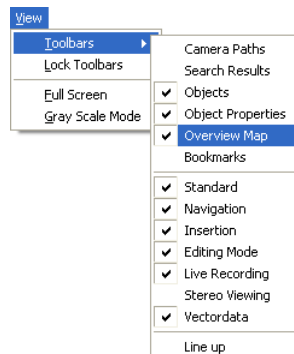
The **Overview Map** window shows a small version of the terrain from top view and allows quick navigation from one side of the model to another. It indicates the viewer's position as well as his angle of view.

Choose **Overview Map** in the **Window** menu or in **View/Toolbars/Overview Map**.

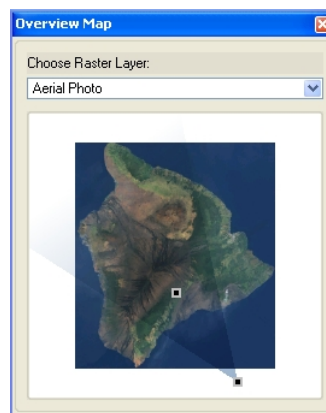
The Window Menu

<input checked="" type="checkbox"/>	Objects	Ctrl+1
<input checked="" type="checkbox"/>	Object Properties	Ctrl+2
<input type="checkbox"/>	Overview Map	Ctrl+3
<input type="checkbox"/>	Bookmarks	Ctrl+4
<input type="checkbox"/>	Camera Paths	Ctrl+5
<input type="checkbox"/>	Search Results	Ctrl+6

The View Menu



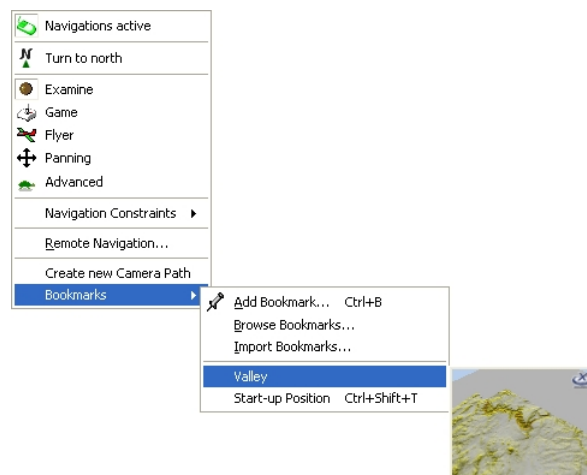
Overview Map



3.5 Bookmarks

A bookmark gives you the possibility to save a specific view of your project to be able to return to it whenever you need to.





The Navigation Menu



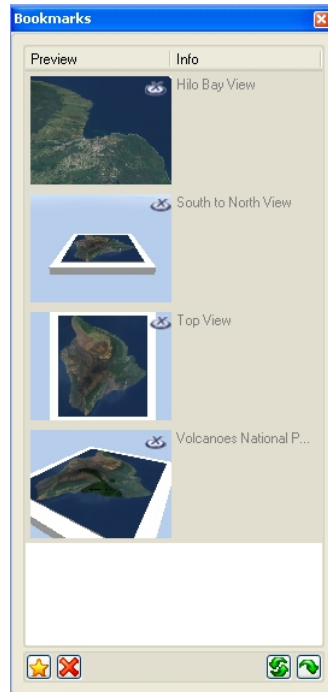
You can add bookmarks to your project, when you encounter interesting perspectives you might want to go back to later for presentation or closer observation. You can do this by going to **Navigation/Bookmarks/Add Bookmark**. You can then give the new bookmark a name, description, shortcut or make it your new startup position in the object properties window.

Bookmark in hierarchy tree and bookmark properties:



The bookmarks window will open on the right when you go to **Navigation/Bookmarks/Browse Bookmarks**. It shows you a preview list of all the bookmarks contained in the project. Press the star  to create a new bookmark at the current position, the red cross  to remove the selected bookmark, the double arrow  to refresh the bookmark previews, and the single arrow  to go to the currently selected position. You also need the bookmarks window to create a Camera Path.

The Bookmarks Window

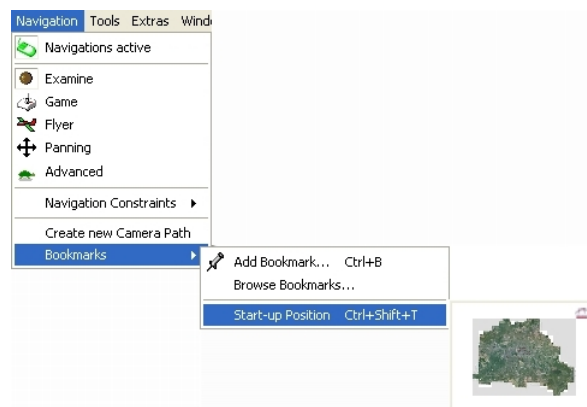


The Start-up Position Bookmark is part of every new project.

3.6 Start-Up Position

You can select a certain view to be your start up position whenever you open your project. For a presentation it might also be useful to start from a previously chosen position. You can set one of the bookmarks to be your start up position by checking the respective box in the Bookmark Properties. To go back to this position select **Bookmarks/Start-up Position** (Ctrl + Shift + T).

Navigation Menu

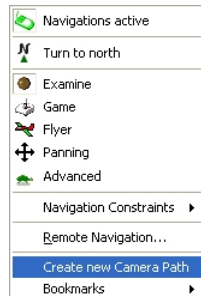


3.7 Camera Path

A camera path is a collection of views that will be used to animate a tour.

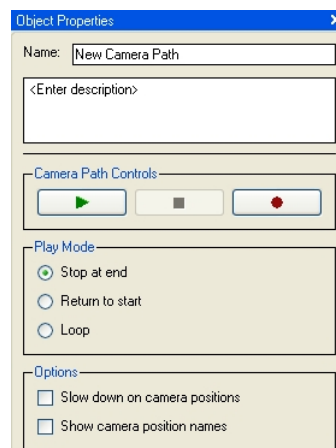
In the **Navigation** menu choose **Create new Camera Path**.

The Navigation Menu



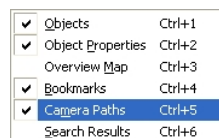
If you have the object properties activated, you will see the **Camera Path Properties** window appear. In the play mode section, choose whether the animation should stop at the end, return to the start, or even play repeatedly (loop).

Camera Path Properties

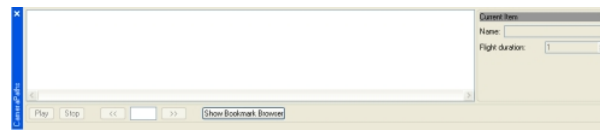


From the Window menu activate the bookmark window (Ctrl + 4) and the camera path window (Ctrl + 5). The latter will per default appear at the bottom of the application window

Window menu

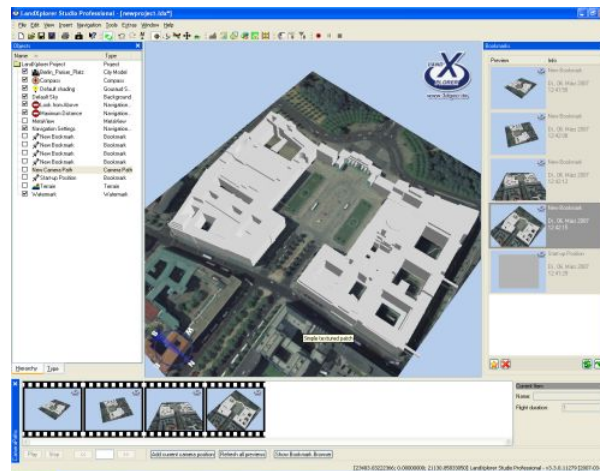


Empty Camera Path Window



Now drag the bookmarks you want to use on the camera path to the camera path window and slide them into the desired order. Additionally, you can insert the current camera position to the camera path by pressing the Add current camera position button.

Example of a Project with Camera Path



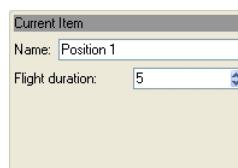
As soon as you mark a camera position in the camera path, you will be able to play and stop the animation. You may also go through the camera positions manually, using the double arrows << and >>.

Camera Path Window



For each camera position in the camera path window, you can specify the time the camera will need to move to it. To update a camera position, navigate to the desired location and select Update position from the camera position's context menu.

Camera Path Item properties





LandXplorer Studio Professional

Main Features

Part 4

4 Main Features

This chapter deals with the functions typically implemented in LandXplorer Studio Professional.

Here you will learn how to insert city models, all kinds of layers (terrain, raster, vector, object and lens) as well as map objects like buttons. You will also learn how to insert and adapt a virtual sky.

The chapter on Inserting Labels describes how to insert text or image labels into the model. The parts on the watermark and compass describe these to features and the integrated stereo viewing mode is explained in chapter Stereo Mode. The chapter on Terrain Analysis describes and explains the different analysis features available. Capturing Tools is mainly about the integrated multimedia capturing possibilities for presentation purposes.


4.1 City Models

Working with City Models is a base functionality of LandXplorer Studio Professional. This chapter describes how to insert City Models into your project and explains the functions related to City Models.

A City Model is a collection of individual building objects. Depending on the input format, there are different building objects types. The following table gives an overview of the available building types

Building type	Description	Input format(s)
CityGML Building	Buildings contained in a CityGML model. Every supported CityObject is represented as a CityGML building.	CityGML
Block Building	Simple LOD1 buildings that are extruded from ground plan polygons. Block buildings can also contain a roof geometry.	2D vector formats
Explicit Building	LOD2 or LOD3 buildings that define an explicit building model consisting of floor, wall and roof geometries.	3D vector formats
Generic Building	LOD2 or LOD3 buildings that have an arbitrary building geometry.	3D model formats, 3D vector formats
Smart Building	Floor-based building model that can be refined and textured by the Smart Building Editor.	LandXplorer SmartBuilding format

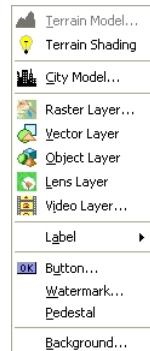
Inserting City Models

Before a city model can be inserted, you first have to open a new project by selecting **New Project** in the **File** menu or by clicking on the **New Project** symbol  on the standard

toolbar. Optionally, you can insert a Terrain Model, as described in the chapter Inserting Terrain Models. If you insert a City Model without terrain, a standard flat terrain is created.

To insert a City Model, choose **City Model** in the **Insert** menu, and select the input file(s).

Insert Menu



If your selected files contain vector data, the 'City Model Import Wizard' will show up. Please refer the chapter Inserting City Models from vector data for detailed information about the import options.

4.1.1 CityGML and Water Shading

What is CityGML

CityGML is a format for the representation of 3D urban objects. It defines the classes and relations for most topographic objects in city and regional models with respect to their geometrical, topological, semantic, and appearance properties. Included are generalization hierarchies between thematic classes, aggregations, relations between objects, and spatial properties. This thematic information goes beyond a graphic exchange formats and allows to employ virtual 3D city models for sophisticated analysis tasks in different application domains like simulations, urban data mining, facility management, and thematic inquiries.

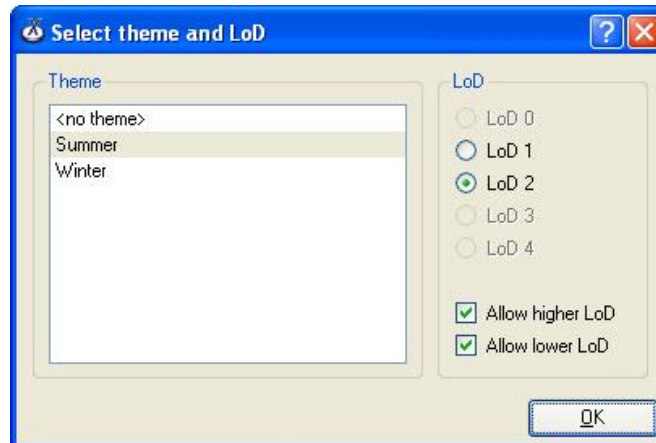
CityGML is realized as an open data model and XML-based format for the storage and exchange of virtual 3D city models. It is implemented as an application schema for the Geography Markup Language 3 (GML3), the extendible international standard for spatial data exchange issued by the Open Geospatial Consortium (OGC) and the ISO TC211. CityGML is intended to become the standard for 3D city models.

The CityGML Theme Dialog

After importing a CityGML Model, the CityGML theme and LOD dialog is displayed. If the CityGML Model includes appearance themes you can select the theme you want to be used. Additionally, you can select the LOD to be displayed if the model contains more than one level. With the options 'Allow higher LOD' and 'Allow lower LOD' buildings from

higher or lower levels are also displayed, if they don't specify the selected LOD.

The CityGML theme and LOD dialog



Water Shading

Water Shading is a way of realistically visualizing water bodies in your city model. With this technique surrounding buildings will be taken into consideration and a reflection of these buildings will be shown on the water surface. When a CityGML city model is loaded the WaterSurface elements defined in the model will be automatically depicted with this technique.

There are a few hardware prerequisites that have to be in place for water bodies to be depicted with water shading:

OpenGL-Extension:

GL_ARB_shader_objects

GL_ARB_vertex_shader

GL_ARB_fragment_shader

GL_EXT_framebuffer_object

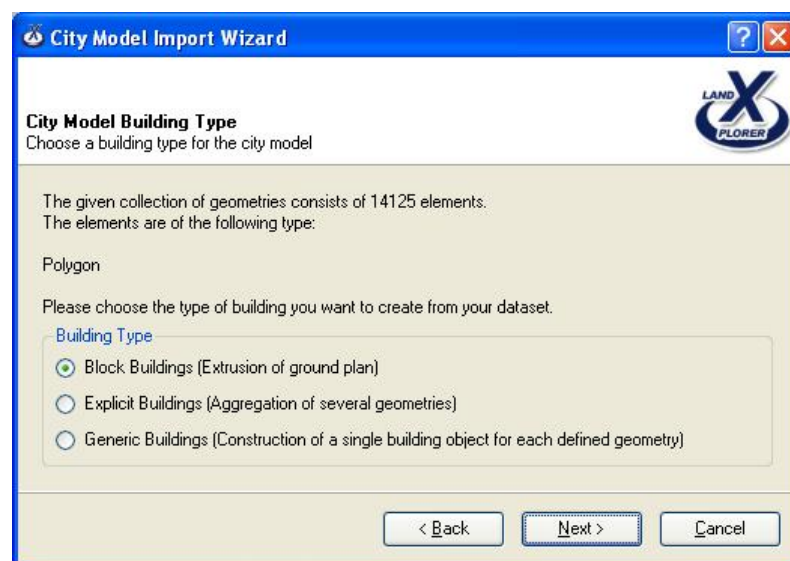
Example of a model with water shading



4.1.2 Inserting City Models from vector data

The import of City Models from vector data requires some configuration. Therefore the 'City Model Import Wizard' appears after loading the geometries. On the first wizard page simply click **Next** to get to the City Model Building Type page.

The City Model Building Type page



Select the building type you want to create and use the **Next** button to continue the wizard. The following sections explain the different building types and describe the import options.

Block Buildings

Block Buildings are created by extruding the importing geometries, which define the ground plan polygons. Therefore this options should be used for 2D vector data. For extruding the buildings, each geometry must be assigned a building height. This can be done on the Building Extrusion page.

The Building Extrusion page

City Model Import Wizard

Building Extrusion
Settings for the extrusion of geometries to create simple block buildings.

Building Extrusion Settings

General Settings

Default Height:

☐ Geometry height values define building height

☐ Values are height above sea level

☒ Read building height from attributes

Attribute Settings

☐ Ignore geometry without valid attribute value

☐ Use measured height

Height Attribute Field: Height Scaling Factor:

☒ Use number of storeys

Storeys Attribute Field:

Storey Height Field:

	Value	Mapped Height
1	Neubau	2.5
2	Altbau	3
3	<input type="text"/>	
4		
5		

< Back Next > Cancel

You can enter a **Default Height**. This height is used for all buildings for which no valid height can be derived from your settings. If you don't make any further settings, this height is used for all buildings.

If you select **Geometry height values define building height**, the Z value of the geometries is used as building height and the buildings are placed on the terrain surface.

The option **Values are height above sea level** indicates that the height values are relative to the sea level. In this case a terrain model is required for correct building extrusion.

Another way to derive the building height is to read it from the geometry attributes. Therefore select **Read building height from attribute value**. If you check **Ignore geometry without valid attribute value**, geometries without valid attribute values are skipped. Otherwise, these geometries are extruded with the default height.

There are 2 options for reading the height from attributes:

- **Use measured height**

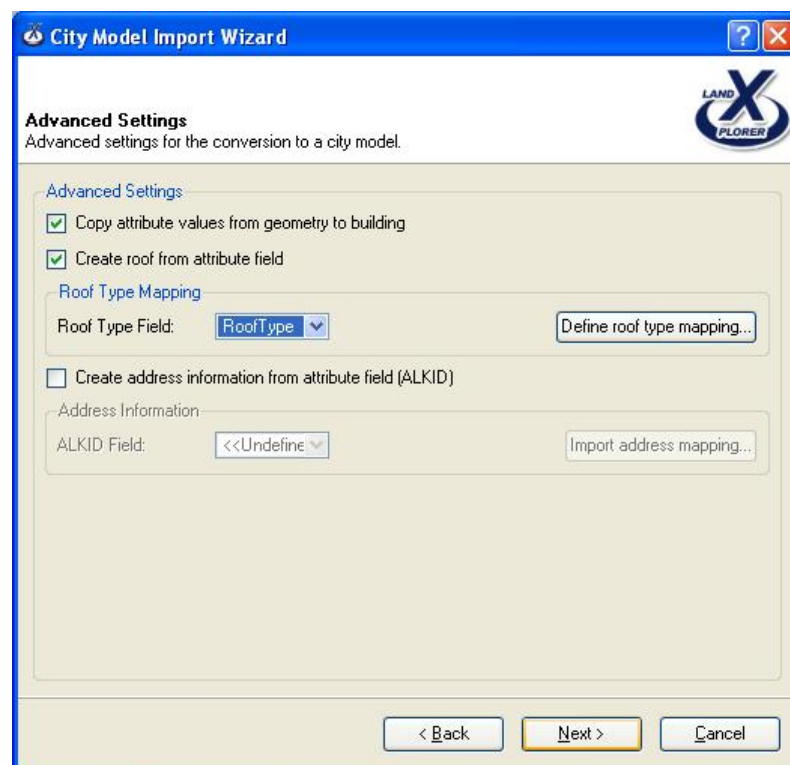
If the attributes contain the building height, it can be used directly. Therefore select the appropriate field from the list. Additionally, you can specify a **Height Scaling Factor**. All attribute values are multiplied with this factor.

- **Use number of storeys**

To derive the height from the number of storeys, 2 attributes fields are required. The **Storeys Attribute Field** must contain the number of storeys. Additionally, you have to provide a storey height. Therefore select a **Storey Height Field** that contains a building classification, for example, and enter a mapping from these values to storey heights. So you can define, e.g., that office buildings have a storey height of 3 meters and apartment buildings a storey height of 2.5 meters.

After setting the extrusion options, click **Next** to get to the Advanced Settings page. The configuration of this page is optionally, so you can keep the default values, if you want.

The Advanced Settings page



By selecting **Copy attribute values from geometry to building** all available attribute values of a geometry are assigned to the resulting building. This option is activated by default.

With **Create roof from attribute field** a roof geometry is created for the buildings. Therefore an attribute field is required, that contains the roof type for each building. Select the attribute field and define a mapping from the attribute values to the available roof types.

If your geometries contain data from the German ALK system, you can **Create address information from attribute field (ALKID)**.

Therefore select an attribute field that contains the ALKID (Gebäudekennzeichen). This ID

is evaluated and the results are added to the buildings as attribute fields:

Position	Description	Attribute field
1-24	"Gebäudekennzeichen"	ALK_ID
1-7	community ID	ALK_Gemeinde_ID
8-12	street ID	ALK_Strasse_ID
13-16	house number	ALK_Hausnummer
17-20	house number annex	ALK_Hausnummer_Zusatz
21-24	building number	ALK_Gebaeudenummer

Additionally, you can add detailed address information to your buildings. This is done by mapping the community ID or the street ID. The mapping must be defined in a CSV file that contains the attribute ID and the additional data, e.g.:

```
STRNR  STREETNAME
00001  Aachener Str.
00002  Aalemannufer
00003  Aarau Str.
00004  Aarberger Str.
00005  Abbestr.
00006  Abendrotweg
```

The separator between the columns must be one of ; | tabulator. Click **Import address mapping** to define the mapping. In the ALK Data Mapping dialog you choose your mapping file(s) and select the column that contains the attribute ID. In the example above this would be STRNR. The mapping matches attribute ALK_Strasse_ID to the column STRNR and adds an attribute STREETNAME with the appropriate value to the buildings.

Finally, click **Next** to get to the Summary page and use **Finish** to start the import.

Explicit Buildings

Explicit Buildings are composed of several geometries and define a building model that is made up of floor, wall and roof faces. So the vector data should contain 3D geometries, that are aggregated to buildings. For creating Explicit Buildings the Building Aggregation

Settings page is displayed.

The Building Aggregation Settings page

City Model Import Wizard

Building Aggregation Settings
Set attribute fields and face type mapping for building aggregation.

Building Aggregation Settings
Please choose the attribute field, which defines the object identifier. The value of this field will be used, to create the building from the collection of faces having the same value. Furthermore a attribute field is needed to determine the type of the face. This is important for a valid structure of the resulting building. Otherwise the given faces will be added with an undefined type.
Additionally you should provide a valid mapping for the different face types. The mapping can be modified in the table below.

Building Aggregation
Building Identifier (ID): **OBJEKT_ID**
Face Type: **FaceType**
☒ Invert face orientation

Face Mapping

	Face Type	Value
1	Floor	0
2	Wall	1
3	Roof	2

< Back Next > Cancel

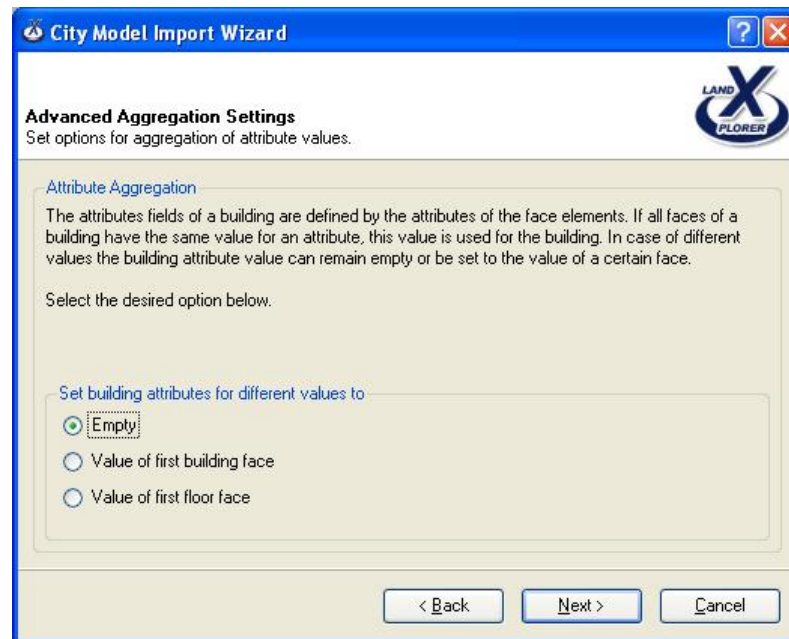
In order to aggregate the geometries, a **Building Identifier** is required. Therefore select an attribute field from the list. All geometries, that have the the same building identifier value, are combined to a single building object.

Additionally, an attribute field indicating the **Face Type** of the geometries is required. The attribute values must define whether the geometry is a floor, wall or roof face. If your attributes do not contain the default values 0, 1, 2, you can edit the **Face Mapping** which maps the attribute values to face types.

For a correct visualization of the buildings, it is required that all faces are given in counter-clockwise order. If this is not the case for your data, select **Invert face orientation**.

The **Next** button brings you to the Advanced Aggregation Settings page. Here you can define how the attribute values are aggregated. The attributes values of the single geometries are assigned to the resulting face elements of the buildings. Additionally, the building object gets the attribute fields that are available in the input data. If all face elements of a building have the same value for an attribute field, this value is also used for the building. For attributes with different values in the face elements the building attribute vale can remain **empty**, or can be filled with the **value of the first building face** or the **value of the first floor face**. Select the option you want to use.

The Advanced Aggregation Settings page



Finally, click **Next** to get to the Summary page and use **Finish** to start the import.

Generic Buildings

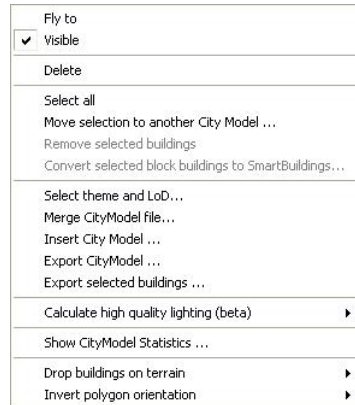
This building type can contain arbitrary geometries without any information about the building structure. It should be used if you have 3D geometries without the necessary attributes for aggregating them to Explicit Buildings. By selecting this import option, a building object is created from every single geometry and the attribute values are assigned to this building.

Because there are no settings for this building type, you get directly to the Summary page. Use the **Finish** button to start the import.

4.1.3 Browsing and Editing CityGML Models

You have different possibilities of working with your city model. By right clicking the city model in the **Object** window a context menu appears.

City Model Context Menu



Merge CityModel file adds buildings from another city model file. **Export CityModel** and **Export selected buildings** allows you to write your City Model or the selected parts to a new CityGML file.

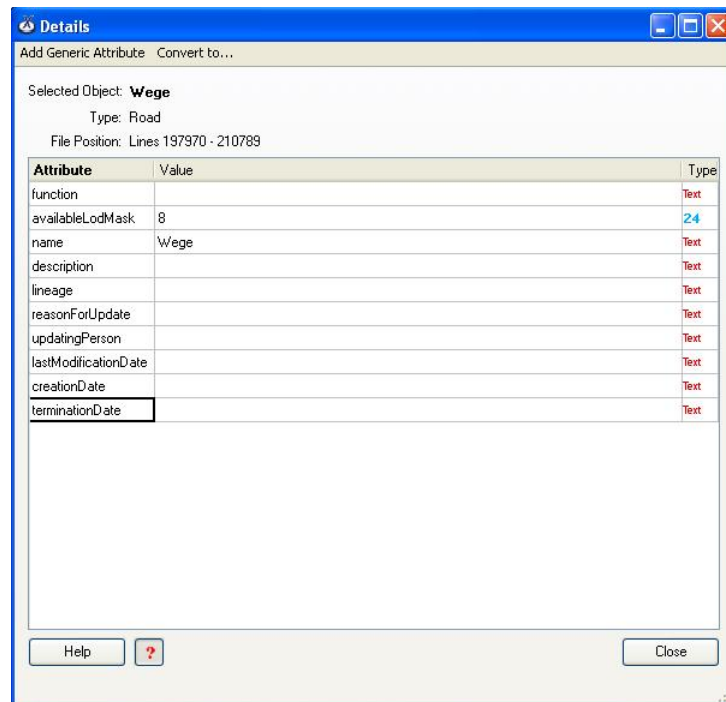
You can browse the CityGML structure by using the CityGML browser, which can be opened via the properties window by clicking on Show CityGML Browser.

The CityGML Browser



By clicking on a CityGML object in the browser with the right mouse button the object's context menu opens. Here you can remove the object or view its details. To view and edit the properties go to **Show/Edit details**. Here you can look at the attributes and their values. You can also add an attribute by clicking **Add Generic Attribute** or you can convert the object to a building or city furniture by clicking **Convert to**. This is also possible by going to **Convert Generic City Object** in the **Edit** menu. To delete an object click on remove or go to the **Edit** menu and click **Delete Selected Objects**.

CityGML Browser Details



4.1.4 Selecting and Working with Buildings

Building selection

To select a single building, **double-click** it. A selected building is highlighted by the selection color. For unselecting the building, **double-click** it again. It is also possible to have multiple buildings selected at the same time. To do this hold the **Shift key** and **double-click** all buildings you want to select.

If you want to select all buildings that are located within a certain area, press the **Alt key** and keep it pressed. Now you can select an area by clicking on the terrain and moving the mouse with the left mouse button pressed. The selected area is highlighted by a red box. When the mouse button is released, all buildings inside this box are selected.

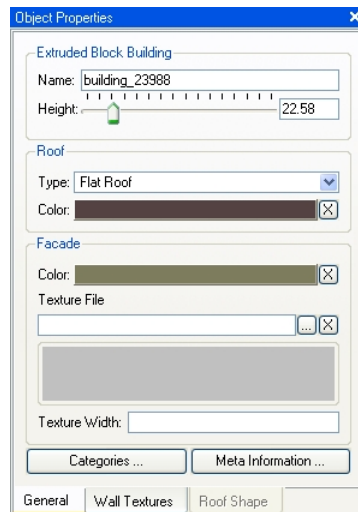
Selected buildings (left) and area selection (right)



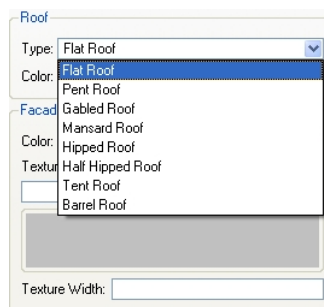
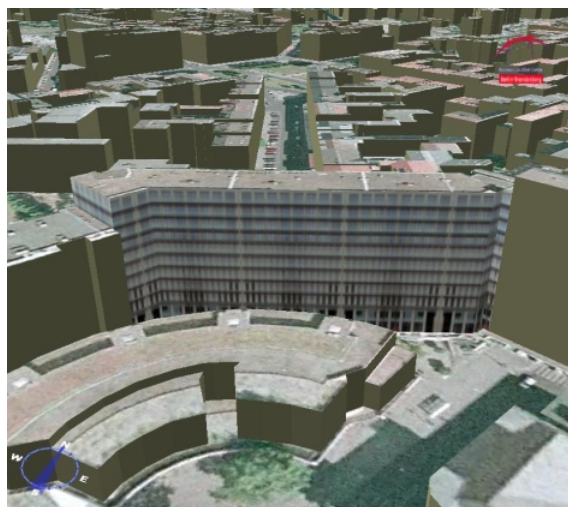
Building Operations

There are different possibilities to change the view of individual buildings:

In the properties of the selected building you can define a texture and what meta data shall be used for it.

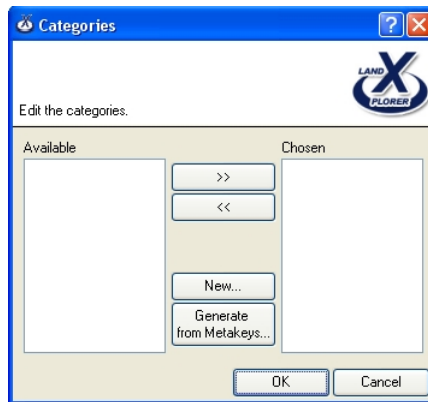
City Model Property dialog, Scaling tab

In the roof section, you can select a roof type and specify a colour. For the facade, choose a lighter colour if you want to use a texture file on it. Do not forget to specify the width after which the texture projection shall be repeated.

Roof types**Building facade**

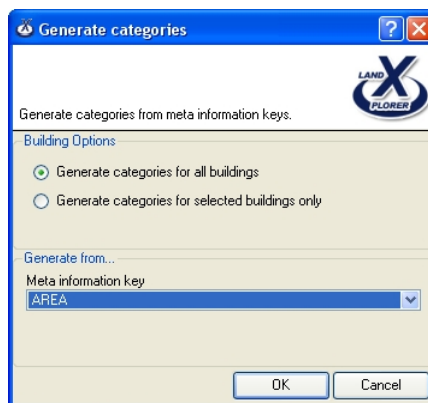
You can categorize your buildings by the meta data provided. Select a meta information key.

Category dialog



You can also categorise your buildings by the meta data provided. Click **Generate** from meta keys

Generate Categories dialog



Click the **Attributes** button to have a look at the meta info loaded with the vector data file.

Attributes dialog

Type	Name	Value	Remove
STRING	_name		Remove
STRING	Texture	texture_wall.png	Remove
STRING	Struktur	Wand	Remove
INTEGER	RoofType	0	Remove
DOUBLE	RidgeAbsol	131.53113	Remove
DOUBLE	Ridge		Remove
STRING	OBJEKT_ID	00089QL	Remove
INTEGER	Number	990	Remove
INTEGER	Modified	0	Remove
DOUBLE	LowestZ	112.28900	Remove
DOUBLE	HighestZ	131.53113	Remove
INTEGER	FaceType	1	Remove
INTEGER	FacelD	5	Remove
DOUBLE	EavesAbsol	131.53113	Remove
DOUBLE	Eaves		Remove

☐ Show only common attributes

New Attribute Reset OK Cancel Apply

In the wall textures section, double-click the empty cells to select a texture file, and enter the width the texture shall have on the wall.

Wall Textures section

☒ enable individual textures for each wall

Nr.	File	Width
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

General Wall Textures Roof Shape

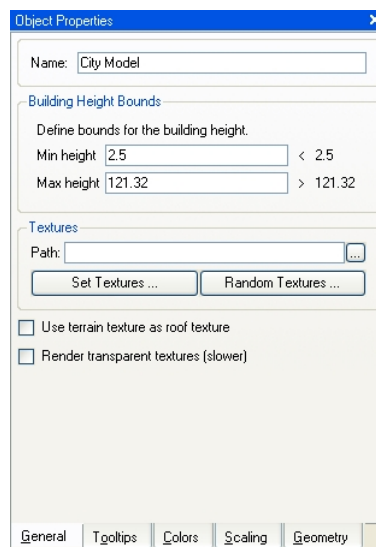
4.1.5 City Model Properties

Once a city model is loaded you can configure it in the properties dialog. To make the model look more attractive you can now set textures and colours.

Set Textures

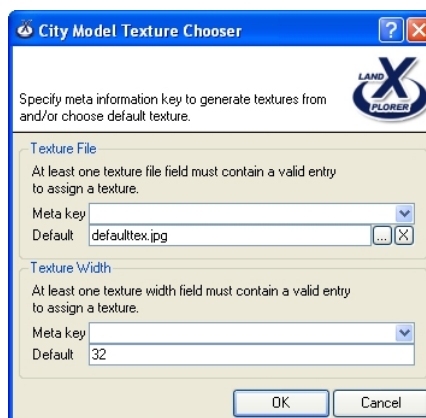
To set textures, you first need to specify a path. Only textures in this path will be accepted. If file names of the textures and corresponding texture widths are contained in the vector meta data, you can select the respective meta data fields. Else, just specify default values for textures and width. Click **Set Textures** in the Object properties Window to get to the city model texture chooser dialog.

City Model Property dialog, General tab



Choose Use terrain texture as roof texture to automatically project parts of the terrain texture onto the roofs. Click **Random Textures** to select a texture catalog file in .xml format. This xml file also needs to be in the predefined file path. The files listed in the catalog file will be applied randomly to the building facades.

City Model Texture Chooser



Using the Facade Catalog

A facade catalog is written in a XML document which contains all facade textures that shall be used.

this Document is set up the following way:

```
<?xml version="1.0" encoding="UTF-8"?>
<FacadeTextureCatalog>
<FacadeTextureCatalogEntry>
<Name> facade name </Name>
<File> filename </File>
<Attributes>
<Attribute>
<Key>FLOORS</Key>
<Value>number of floors </Value>
</Attribute>
<Attribute>
<Key>WIDTH</Key>
<Value> texturewidth </Value>
</Attribute>
</Attributes>
</FacadeTextureCatalogEntry>
<FacadeTextureCatalogEntry>
...
</FacadeTextureCatalogEntry>
...
</FacadeTextureCatalog>
```

The facade catalog contains for each facade texture a facade texture catalog entry element which has to corresponds to the above format.

Those details marked red have to be set for the individual textures:

Element	Meaning
facade name	name of the texture, discretionary
file name	name of file which holds the picture of the facade
number of floors	number of floors that can be seen on the picture
texture width	width of texture

When using the facade catalog, each building will have one texture assigned to it which corresponds to its number of floors. The number of floors is defined through the building height using 3m as a default height for each floor. If there is more than one facade fitting the building the facade is chosen randomly.

The XML file has to be stored in the same folder as the facade textures. To use the catalog for a certain city model it is necessary to set the texture path to the respective folder. Then the catalog can be used by selecting the button **Set Random Textures**.

Example for a facade catalog with 3 facade textures:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```

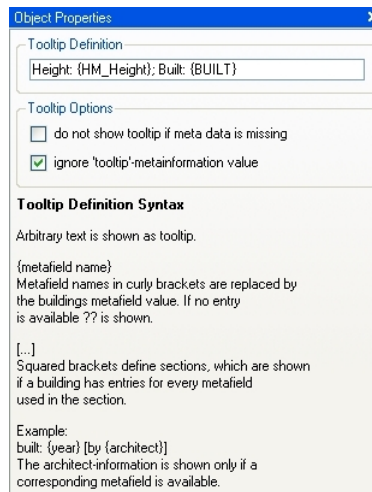
<FacadeTextureCatalog>
<FacadeTextureCatalogEntry>
<Name>Facade1</Name>
<File>ab03_103.jpg</File>
<Attributes>
<Attribute>
<Key>FLOORS</Key>
<Value>3</Value>
</Attribute>
<Attribute>
<Key>WIDTH</Key>
<Value>6.0</Value>
</Attribute>
</Attributes>
</FacadeTextureCatalogEntry>
<FacadeTextureCatalogEntry>
<Name>Facade2</Name>
<File>ab03_158.jpg</File>
<Attributes>
<Attribute>
<Key>FLOORS</Key>
<Value>3</Value>
</Attribute>
<Attribute>
<Key>WIDTH</Key>
<Value>10.0</Value>
</Attribute>
</Attributes>
</FacadeTextureCatalogEntry>
<FacadeTextureCatalogEntry>
<Name>Facade3</Name>
<File>ab02_070.jpg</File>
<Attributes>
<Attribute>
<Key>FLOORS</Key>
<Value>2</Value>
</Attribute>
<Attribute>
<Key>WIDTH</Key>
<Value>5.0</Value>
</Attribute>
</Attributes>
</FacadeTextureCatalogEntry>
</FacadeTextureCatalog>

```

Define Tool tips

If you click on the tool tips tab on of the properties window you can specify tool tips by entering the name of meta fields {in brackets}. It will be replaced by the respective meta data value whereas the words without brackets will remain as seen in the definition.

City Model Property dialog, Tool tips tab



Adjust Colour and Scaling

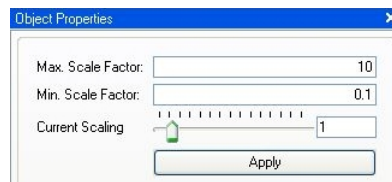
You can furthermore adjust the model's colour and scaling. In the colours tab, choose a basic model colour and a colour for selected buildings. Enable static lighting for faster rendering.

City Model Property dialog, Colours tab



In the scaling tab, define a lower and upper height scaling border, and a current scaling value.

City Model Property dialog, Scaling tab



The following images show some example views of city models.

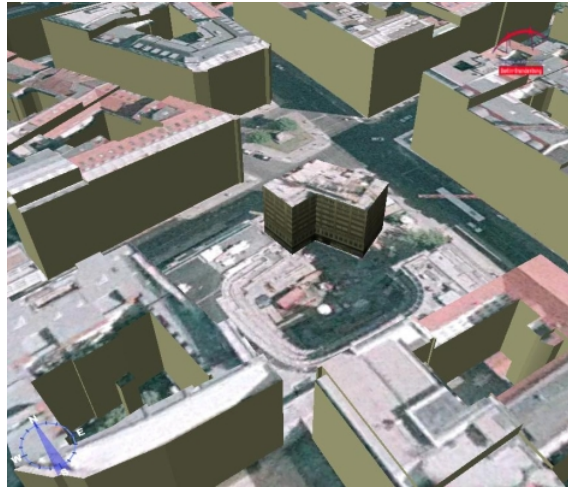
Scaled City Model without colours and textures



Example of a City Model with different colours for front and top, but no textures



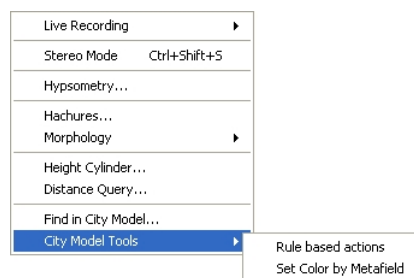
Example of a City Model with roof textures



4.1.6 City Model Tools

The **City Model Tools** can be accessed via the **Tools** menu.

City Model Tools submenu



The **Rule based actions** dialog allows you to set several actions for a city model, and define specific conditions to apply each action, including area selection and attribute matching.

You can also import rule definitions using a .csv (comma separated value) file. Only those buildings are taken in consideration, for which all rules apply.

City Model Tool Rule based dialog

City Model Tool

Define an action and conditions.
Apply them to buildings.

Action: Select Configure ...

Area ...

☐ Use selected area

Operation: Inside

South / North

West / East

☒ Use rule definitions

Buildings ...

... in category

... with properties

Key	Operation	Value
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

☐ Use rule import

Rules ...

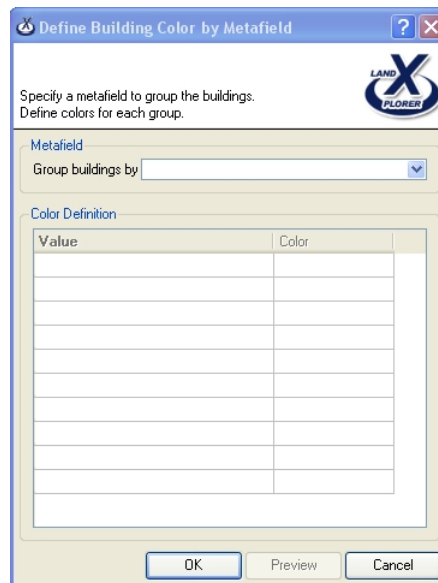
File: ...

Close Apply Undo

For each action you can define a list of conditions that need to be fulfilled. Each condition consists of a key (meta data name), an operation, and a value.

You can also set a variety of colours according to the values of meta data field. Choose **Set Colour by Meta field** in the **City Model Tools** submenu.

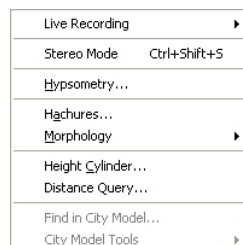
Building Colour Dialog



4.1.7 Search in City Models

You can conduct searches in a city model. This enables you to search for specific buildings, roads or other attributes of the elements in the city model.

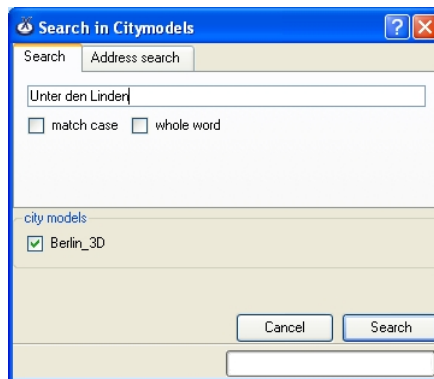
Tools Menu



To search in a city model, select **Find in City Model** from the tools menu. This will open the **Search in Citymodel** dialog.

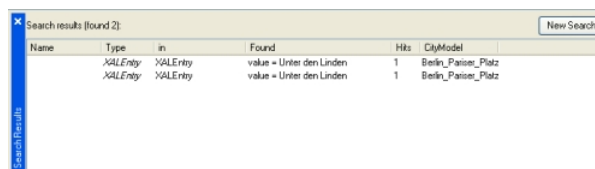
In the **Search in Citymodel** dialog, enter a word or a group of words that you want to search for. You can also select the city models that should be considered for the search. After pressing the **Search** button, the search starts. The search will find all elements of the city model that contain the search string in the name or the attributes.

Search in Citymodel Dialog



After the search has finished, the search results window opens. It contains all city model elements that matched the search. Here you can double-click the elements to select the according objects in the CityGML browser and in the 3D view.

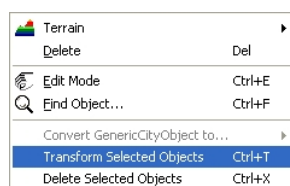
The Result Window



4.1.8 Transform Mode

The transform mode allows to interactively transform building geometries. Buildings can be moved, rotated and scaled.

Edit Menu



Select the buildings you want to transform and select **Transform Selected Objects** from the **Edit** menu. Alternatively, you can press Ctrl+T. This will start the Transform Mode and the selected buildings are colored blue.

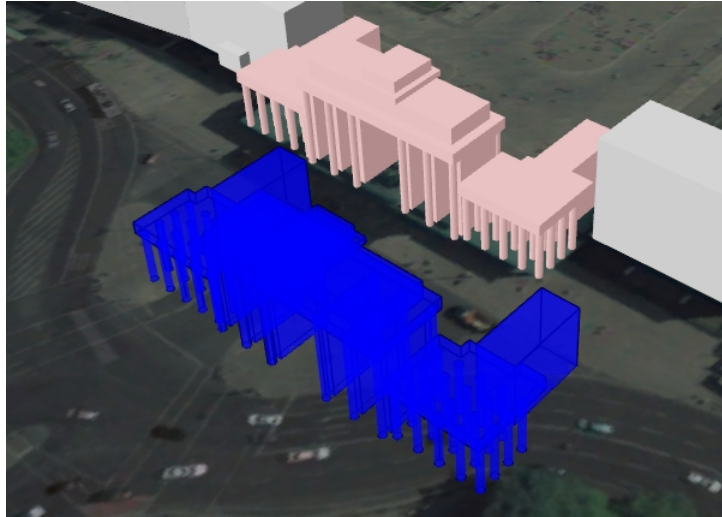
As long as the Transform Mode is active, you can transform the blue representation of the building(s) by picking it up with the mouse and moving the mouse. Therefore you have to use one of the following key combinations:

Alt + Left Mouse Button

Move horizontally

Alt + Shift + Left Mouse Button	Move vertically
Alt + Middle Mouse Button	Rotate
Alt + Shift + Middle Mouse Button	Scale

Building in Transform Mode



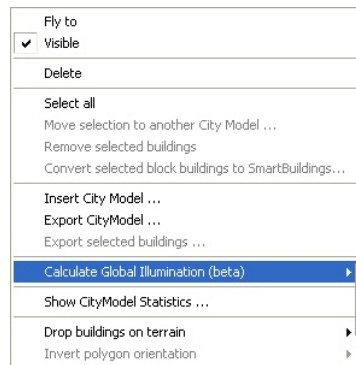
To leave the transform mode, select **Finish Transformation** from the **Edit** menu or press Ctrl +T. This will open a dialog asking to apply the transformations. Press **Apply** if you really want to perform the transformations on the city model or **Discard** if not.

4.1.9 Global Illumination

Classic techniques to illuminate 3D scenes are based on the local illumination models and take into consideration the angle of light from light sources on the single scenery objects. On reality, the illumination of a scene and its objects is also influenced by the surrounding objects, which reflect light or cast shadows. LandXplorer Studio Professional uses a technique to calculate global illuminating, which takes these complex relations into consideration when illuminating city models or terrains. In this way, models can be visibly represented in a more appealing and vivid way.

You can only calculate the global illumination for city models and terrain models. To calculate the global illumination, load a city model or a terrain model as explained in the respective chapters. In the object window you can then open the context menu by clicking on the city model or the terrain model node with the right mouse button. Then go to **Calculate Global Illumination**.

Context Menu of City Model



You now have the possibilities to light your city model with the moods: Cloudy Day Lighting, Sunset Lighting, and Sunny Day Lighting.

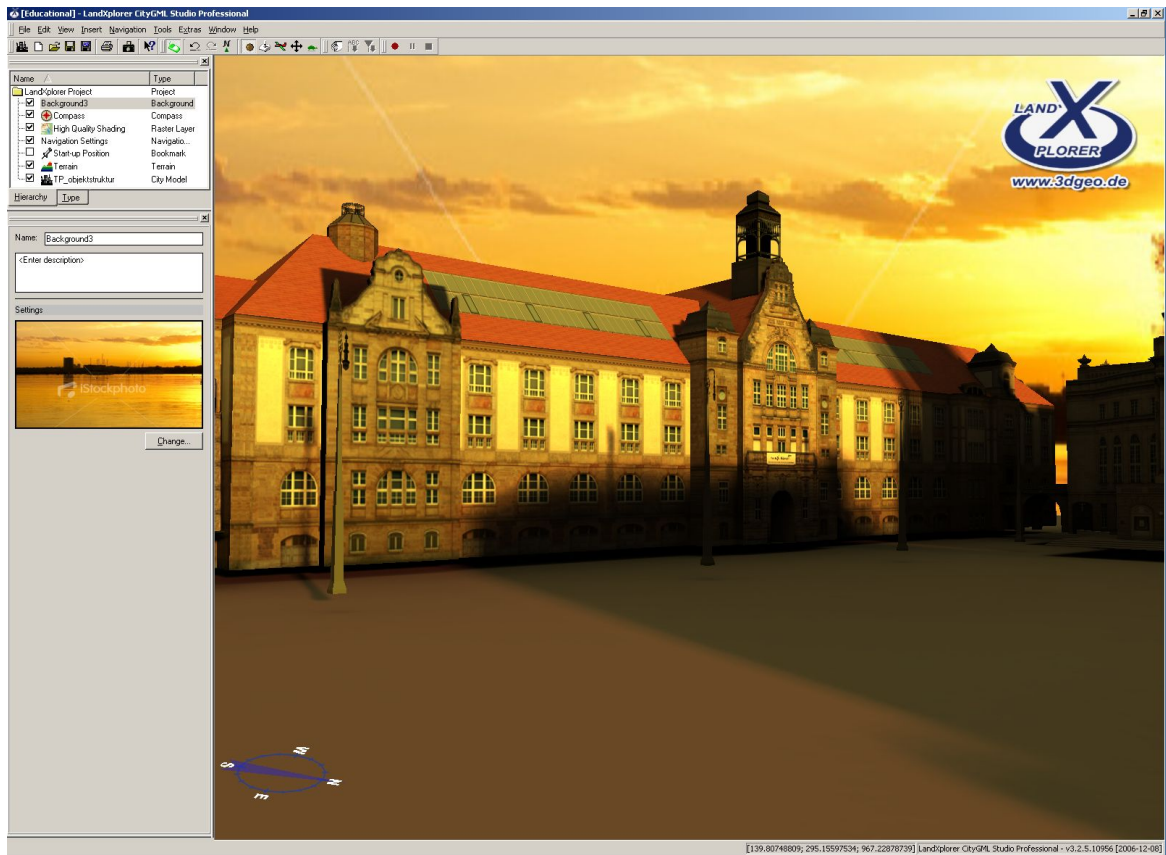
Global Illumination Moods



Once you have clicked on the lighting mood you want your model to appear in, the calculation process will start. This can take a couple of minutes.


Please note that the Global Illumination only works with nvidia graphic cards currently. If you have an ATI graphic cards you might encounter problems when calculating the global illumination.

Example of a City model with global illumination









4.2 Inserting Terrain Models

If you are not working with city models that are already in a CityGML format, you will always need to insert a terrain model as a basis for all further layers and city models.

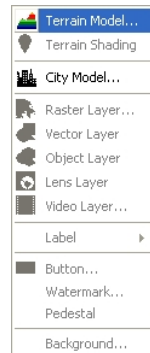
to insert a terrain model you first need to create a new LandXplorer Studio Professional project. Therefore select **New Project** from the **File** menu or click on the **New Project** symbol  on the standard toolbar. This creates an empty project.

The File menu

	New Project	Ctrl+N
	Open Project...	Ctrl+O
	Save Project	Ctrl+S
	Save Project As...	
	Close Project	
Page Layout...		
	Print...	Ctrl+P
	Camera Snapshot...	
	360° Panorama Snapshot...	
	Panorama Movie...	
Properties		
Recent Files		
		▶
	Exit	Alt+F4

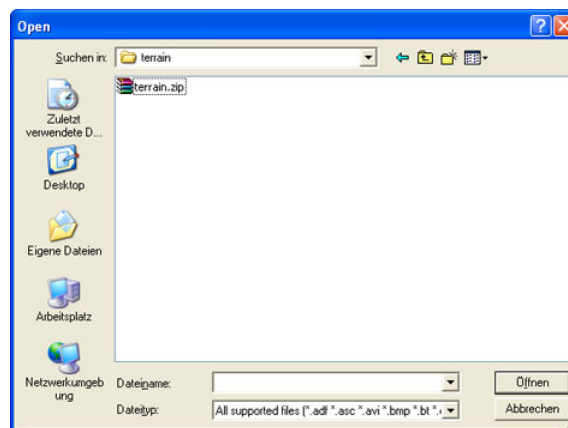
To insert the terrain model select **Terrain Model** from the **Insert** menu. Alternatively, push the  symbol on the insertion toolbar.

The Insert menu



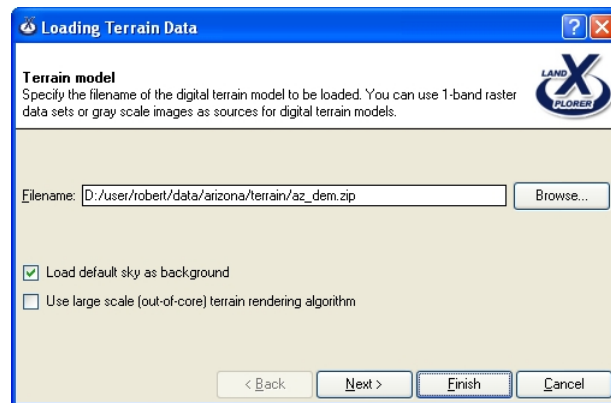
This will open a dialog where you can select the terrain model file you want to insert.

The open file dialog



Once you pressed **Open** the loading terrain data dialog will open. If the Filename text field is empty, click on **Browse** to get to the standard open file dialog that will let you browse your directories and select a file. Check **Load default sky as background** to start the empty project with a blue, slightly clouded background cube map. If the large terrain model is installed, you can check **Use large scale terrain rendering algorithm** to use advanced terrain rendering.

Loading Terrain Data Dialog



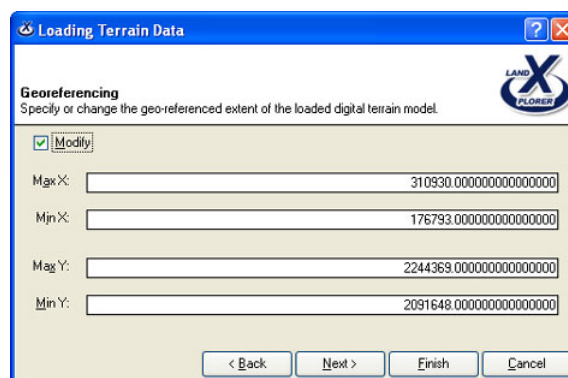
The default sky



Once you have selected a file, you can either go on with the **Loading Terrain Data** dialog and set further properties (as listed below) by adapting settings and pressing the **Next** button, or simply press finish to skip the rest of the dialog and to finally load the model.

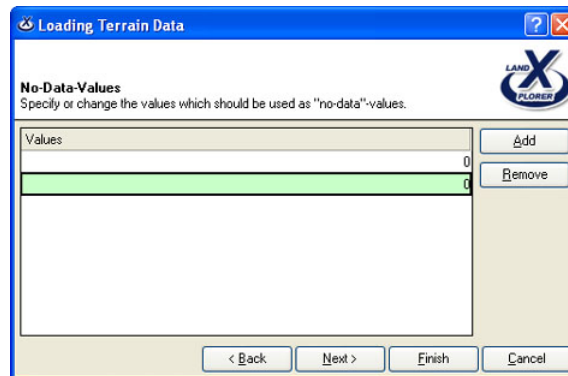
The georeferencing window allows you to change the extent of your terrain model

Georeferencing



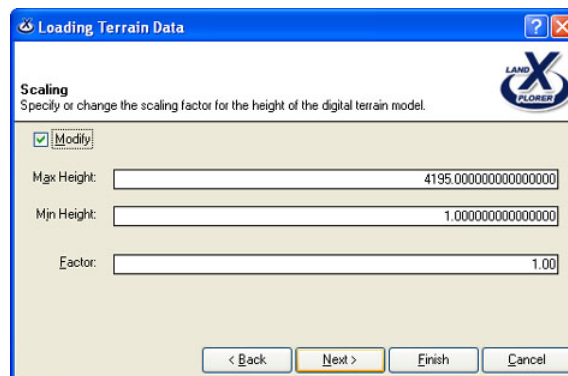
When pressing **Next** you can specify or change the values that should be used as "no data" values.

Include No Data



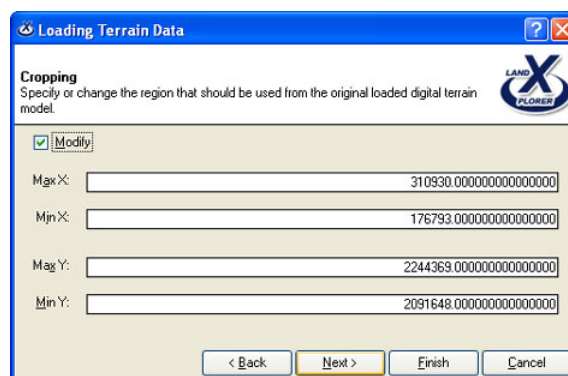
Next you can change the scaling factor for the height of the terrain model.

After the terrain scaling



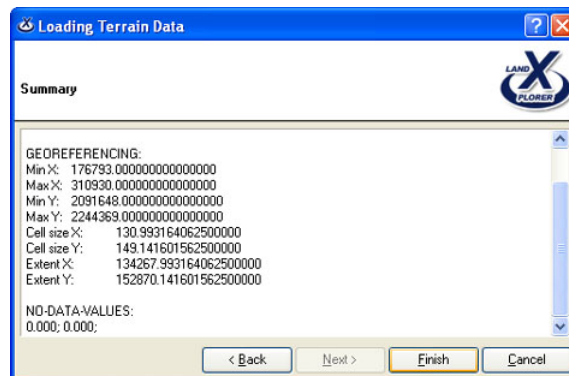
If your terrain model is smaller than the default size you can crop the terrain by specifying the region that should be used.

Crop the terrain



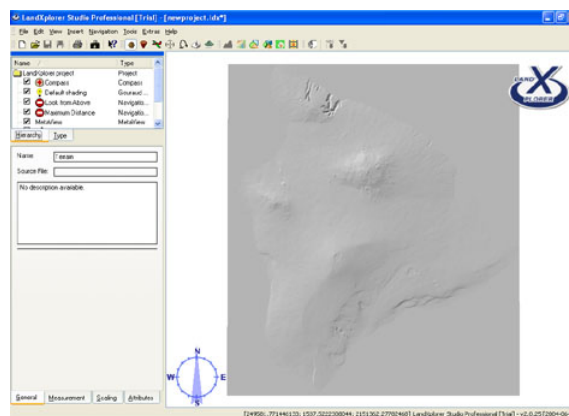
The summary window will give you a summary of the information you have just entered.

The Terrain Data Summary



Click **Finish** and the terrain model will be loaded.

The Terrain Model Loaded



4.2.1 Terrain Model Properties

Once a terrain model is loaded you can navigate it or change its properties. For example you can change the scaling or the illumination.

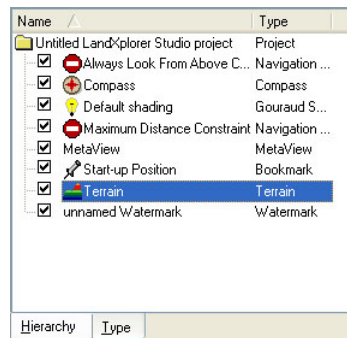
Navigating the Terrain

For navigating through the terrain click into the map and move the mouse while keeping the left mouse button pressed. You can zoom in or out by turning the mouse wheel. Refer to the chapter on [Navigation](#) for more information.

Terrain Properties

The terrain properties give you more information about the terrain model. If the properties window is not already displayed, click on the terrain in the Hierarchy Window. This will open the Properties Window below the Hierarchy Window.

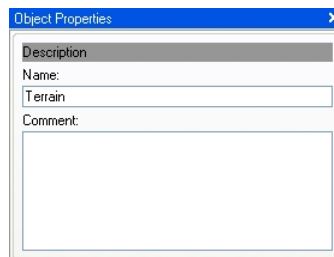
The Hierarchy Window



The Properties Window has three different tabs: the Info, Measurement, and the Scaling tab.

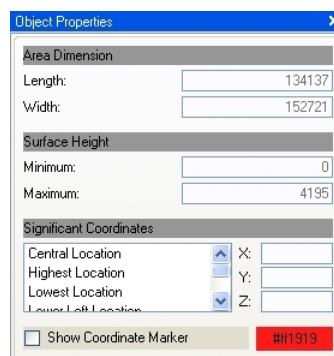
The Info tab gives you the name of the model and allows you to add a comment to enter additional textual information.

Terrain Properties, Info tab



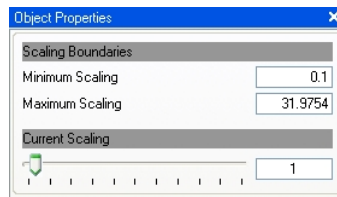
Click on the measurement tab to see information about the size of the terrain.

Terrain Properties, Measurement tab

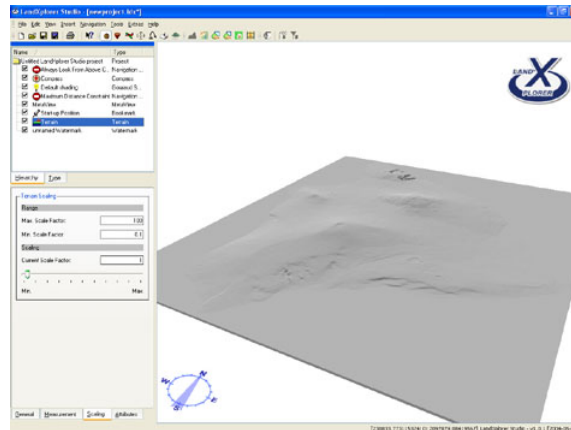


The scaling tab allows you to set the height. Move the slider to change the scaling of the terrain.

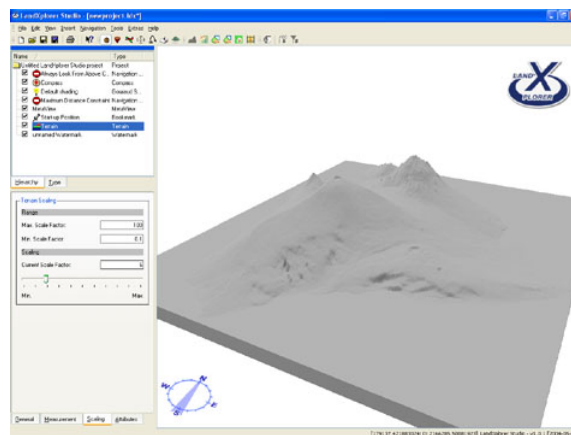
Terrain Properties, Scaling tab



Terrain with scaling factor 1



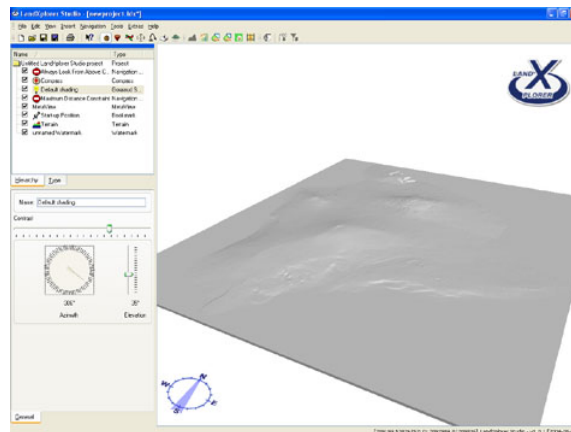
Terrain with scaling factor 6



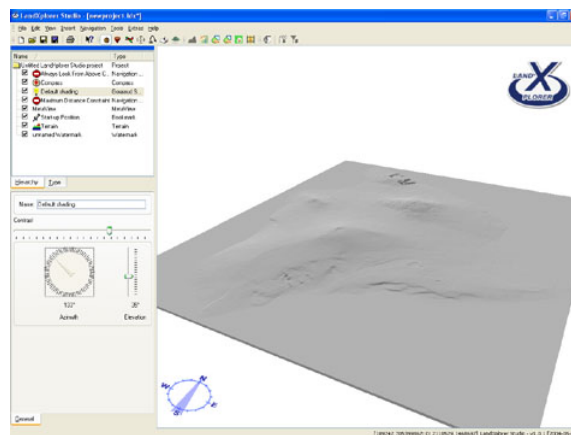
Illumination

Select the **Default Shading** from the **Hierarchy Window**. This will open the shading properties in the properties Window. Here you can change the settings of the light source that illuminates the terrain. The upper slider controls the contrast of the light source; the azimuth and elevation sliders below change the position of the light.

The terrain illuminated




...from different directions



4.3 Inserting Raster Layer

You can insert raster layers such as arial photos to give your terrain model a more natural look. Make sure that your raster file is georeferenced.

Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

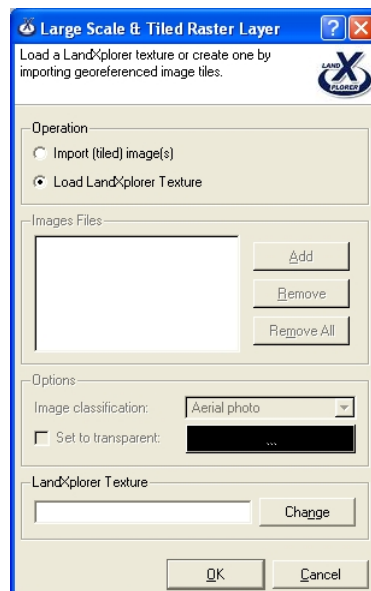
For inserting a raster layer select **Raster Layer** on the **Insert** menu or click the Import/create a raster layer symbol  on the insertion toolbar.

The Insert menu



The large scale & tiled raster dialog will open.

The Large Scale & Tiled Raster Layer dialog



For displaying a raster layer, a LandXplorer Studio Professional texture must be created from one or several georeferenced image files. Once created, a LandXplorer Studio Professional texture can be directly inserted.

For importing image files into a LandXplorer Studio Professional texture, select **Import (tiled) image(s)**. Press the **Add button** and select the georeferenced image files to import. Additionally, you can select a classification for your raster data and select a colour that is interpreted as transparent value.

Finally, specify the path and filename for your LandXplorer Studio Professional texture file in the LandXplorer Studio Professional texture box.

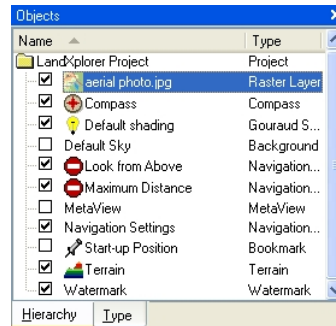
When all settings are done, press the **OK** button. Now the LandXplorer Studio Professional texture will be created and saved to the specified filename. If the import was successful, the raster layer is added to the project.

To load a previously created LandXplorer Studio Professional texture, select **Load LandXplorer Studio Professional Texture** and enter the path and filename of your

LandXplorer Studio Professional texture into the LandXplorer Studio Professional texture box. Pressing the **OK** button will load the LandXplorer Studio Professional and insert the raster layer to the project.

To change the visibility of the raster layer check or uncheck the according item in the hierarchy tree.


The Raster Layer in the Hierarchy tree



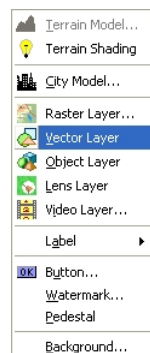
4.4 Inserting Vector Layer

You can insert vector layers such as point, lines, poly lines, polygons or shape files into your project.

To insert a vector layer you must first create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Models or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**

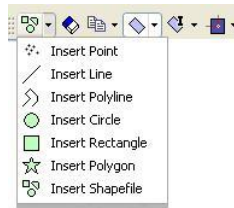
Then select Vector Layer from the Insert menu or click on the **Insert/ Create empty Vector Layer**  symbol from the insertion toolbar. This will add an empty vector layer in the object window.

The Insert menu



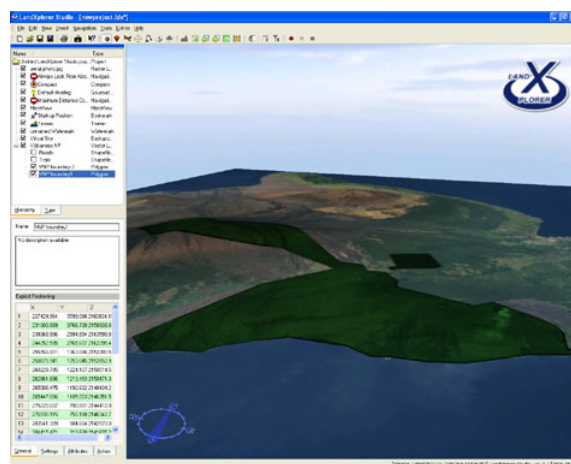
To add vector data (for example a shape file) to the layer use the **Insert Shape File** button on the vector layer tool bar.

Insert Shape File on the Vector Layer Tool Bar




With this menu you can also insert points, lines, play lines, circles, rectangles and polygons.

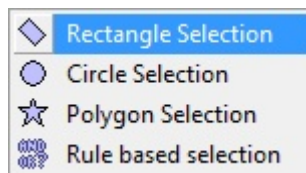
Vector Data (Hawaii Volcanos National Park); boundary polygon



4.4.1 Editing Vector Layers

You can select individual polygons by pressing the **Rectangle Selection Button**  and then clicking on the polygon you want to select. You also have the possibility to select other shapes by pressing on the arrow next to the rectangle selection button.

Selection Submenu



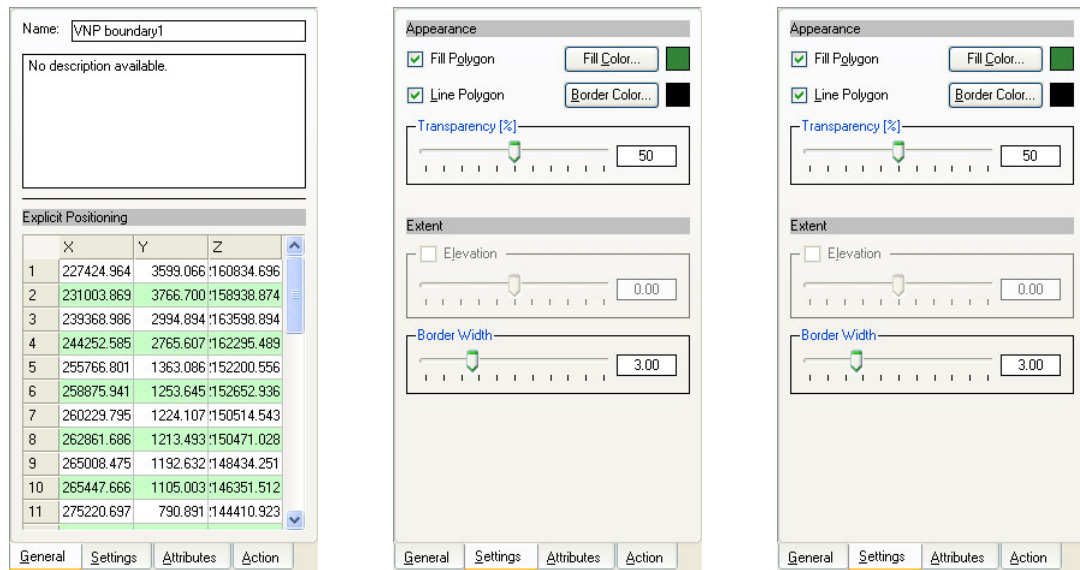
When you have selected a polygon you can change single shapes by accessing their properties through the **Object Properties** dialog. Their vertex positioning, fill colour, border colour or transparency can be configured via **General** and **Settings** dialog of the **Object Properties**. In the action dialog an instruction can be assigned to the shape (e.g. open internet site), which appears when double clicking the shape.

Property Dialog;

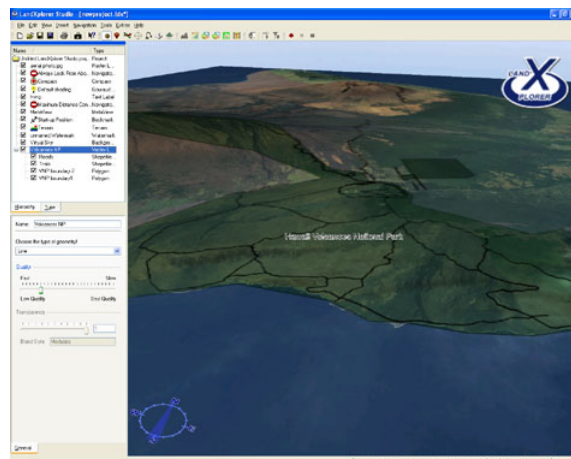
General tab Property Dialog;

Settings tab Property Dialog;

Action tab



Vector Data (Hawaii Volcanos National Park)



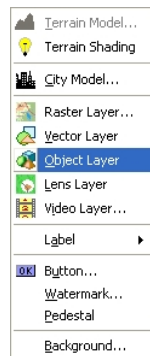
4.5 Inserting Object Layer

To insert an object layer create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

Then select **Object Layer** from the **Insert** menu or click on the Insert empty Object layer

 symbol on the insertion toolbar.

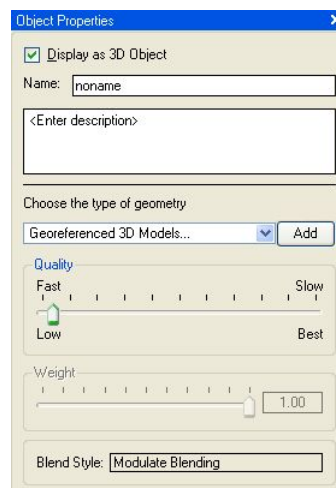
The Insert menu




An empty object layer will be inserted in the hierarchy window. To add an object to the layer access the object layer dialog by selecting the inserted empty object layer in the object tree and choose the desired geometry type.

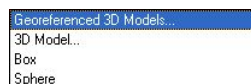
When selecting 3D Model an **Open File** dialog appears, where you can choose a 3D model (e.g. .3ds format).

The Object Layer dialog



When selecting a type the editing mode is activated automatically, double click onto the terrain to insert the shape. The inserted object is represented by a grasp point. It can be displaced by dragging it with the left mouse button and dropping it at the desired position. Press  or CTRL+E to leave the editing mode.

Object Layer geometry types



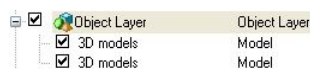
A Box and a Sphere, which can be inserted into an Object Layer



To configure single shapes access their property dialog by selecting them in the object tree or by clicking onto the object in the map with the left mouse button. Their appearance, behaviour or their elevation, scaling and rotation can be configured in the **Settings** dialogs.

The **General** tab allows positioning of the object, in **Settings (1)** you can choose colour, transparency, if there shall be a pole plumbing the object, and if it shall turn around with the model, or stay parallel to the view plain (bill boarded). Fading can also be activated for a specific distance. In **Settings (2)** you can adjust the elevation, scaling, and rotation. In the **Action** dialog an instruction can be assigned to the shape (e.g. open internet site), which appears when double clicking the shape.

Not only box or sphere objects may be inserted but also 3D Models. In the Object layer properties dialog, choose Georeferenced 3D Models for geometry type, and push the **Add** button. Then choose a 3D Model file. e.g. .x3d or .3ds formats which will appear in the hierarchy tree like this:



Here is an example how it might look like in the map:

Georeferenced 3D Model



4.6 Inserting Lens Layer

Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

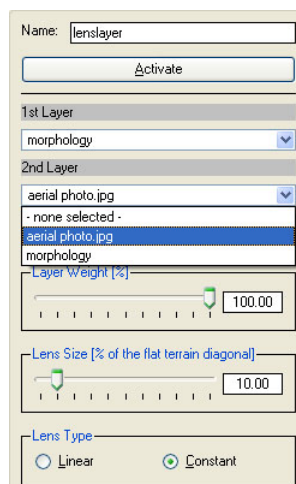
For inserting a Lens Layer select **Insert/Lens Layer**.

The Insert menu

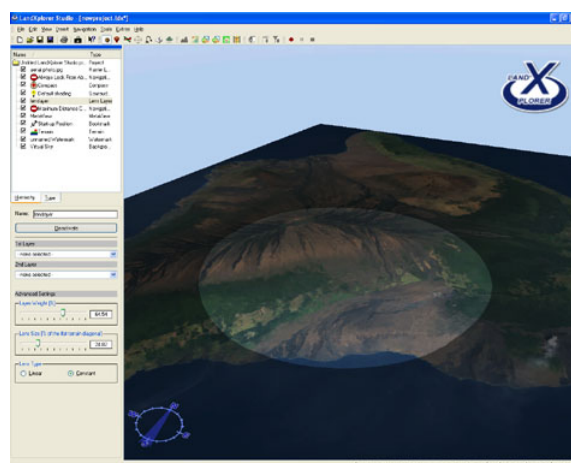


To configure the size or the type (linear or constant) of the lens access the lens layer dialog by selecting the corresponding map object in the object tree. To change the position of the lens press **Activate** button and click into the map. Move the lens by keeping left mouse button pressed and moving the mouse to the desired position. If done press the same button, now **Deactivate**. Additionally it is possible to select two layers, which are inserted into the project, for displaying them within and outside the lens.

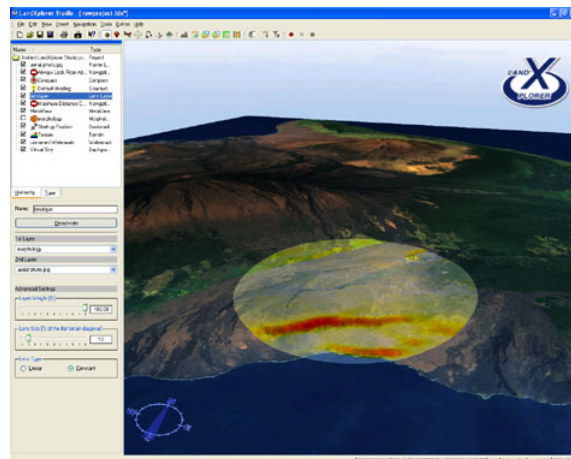
The Lens Layer dialog



A Lens Layer without...



...and with selected 1st and 2nd layers



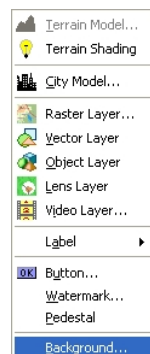
4.7 Inserting a Background

You can insert different backgrounds for your LandXplorer Studio Professional project.

To do this you first have to create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

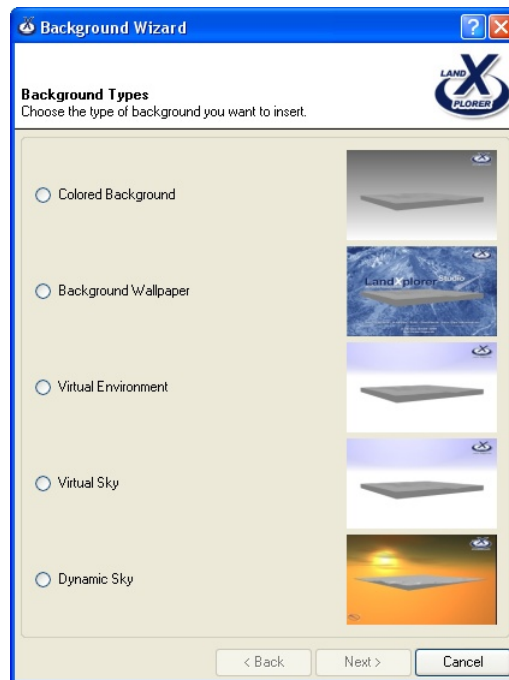
To select your background click **Insert/Background**.

The Insert menu



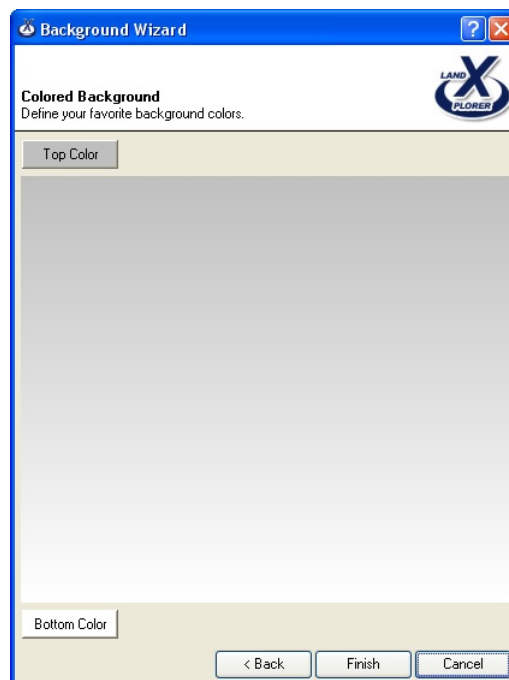
This will open the background dialog. On the first page you have to possibility to choose between just a colored background, a Wallpaper, a virtual environment, the virtual sky, or the dynamic sky.

The Background dialog



For the colored sky, click **Colored Background** and then **Next**. You can then choose the top as well as the bottom color.

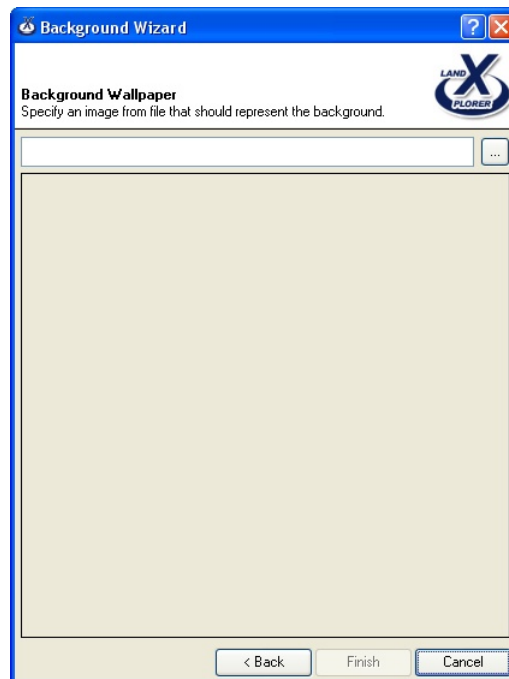
Colored Background Dialog




To insert a wallpaper as a background, click **Wallpaper** and then **Next**. Click on the  to choose the picture you want to use as a wallpaper. The dialog will show the picture you

have chosen in the preview area below.

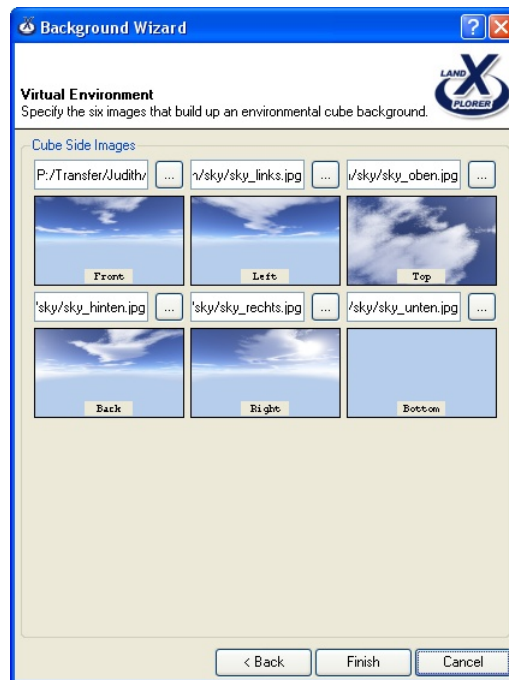
Background Wallpaper Dialog



If you want to insert a virtual environment select the option **Virtual Environment** and press **Next**. The virtual environment consists of six images which you need to specify on the next

dialog. For each direction of the 3D space an image is required. Click on the  to select the image file for the according direction. After selecting the images for Front, Back, Left, Right, Top and Bottom as shown, press Finish to insert the sky to the project.

Virtual Environment Dialog



If you want to use the virtual sky as a background, select **Virtual Sky** and then press **Next**. The next dialog will give you the possibility to choose active lens flares. Click finish to insert the virtual sky.

Virtual Sky Background Dialog

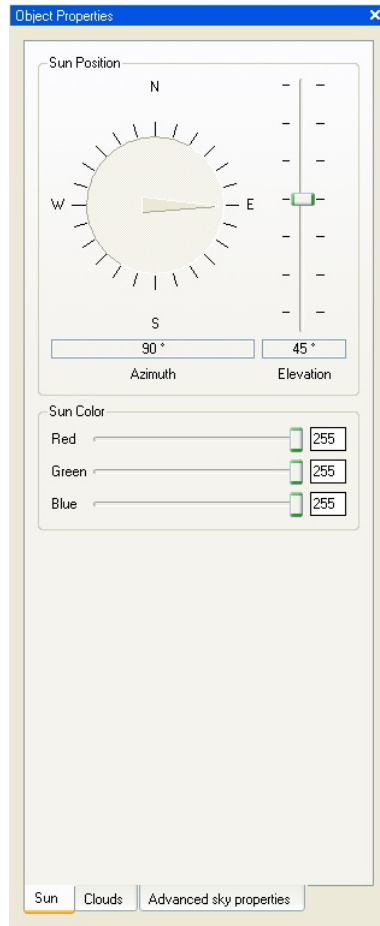


To insert the dynamic sky, click **Dynamic Sky** and the press **Next**. Then click **Finish**.

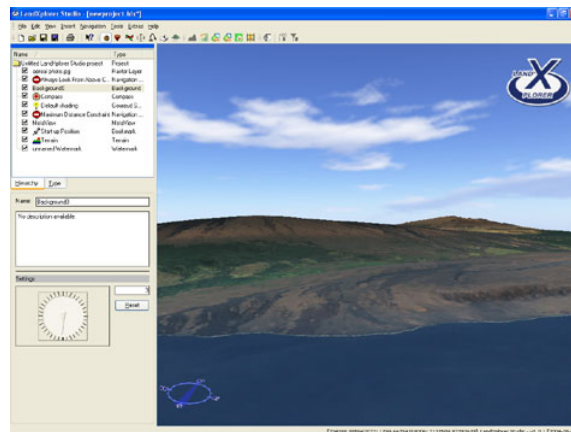
For all background possibilities, it is possible to change settings manually in the Properties Window.

For the dynamic sky you can change the settings for the sun as well as the clouds. The Advanced Sky Properties give you the possibility to change the rayleigh scattering, the mie scattering, the Inscattering Scale, as well as changes for the Earth radius and the atmosphere.

Object Properties Sun settings for Dynamic Sky



LandXplorer project with Virtual Sky and Background properties on the left

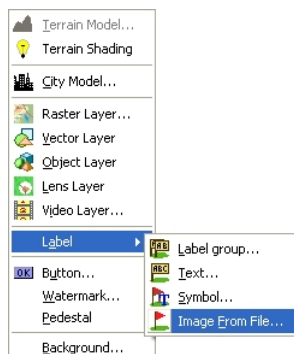


4.8 Inserting Labels

To insert labels you first need to create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

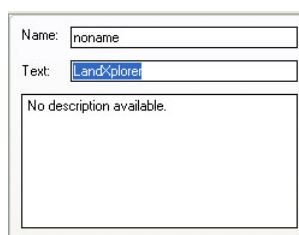
To insert a text label select **Insert/Label/Text** from the main menu. This will create a new label at the position in the model your screen is displaying.

The Label Menu



Use the text edit field in the properties window to enter a text that is displayed on the label.

The Label Properties



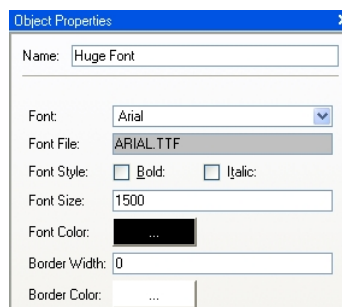
In the type tree, labels are arranged according to their font size. You can access the font properties by clicking on the label in the type tree. This will open the label font properties in the properties window.



Labels in type tree



You can change the font name, font style, font size and colour in the font properties dialog.

The Label Font properties



For moving the label to another position click on the small box (grasp point) at the bottom of the label and drag it to the desired position. The grasp point is shown in the edit mode only. If you are not already in the edit mode, you can activate it by clicking  or pressing CTRL+E. After finding the desired position for your label leave the edit mode by clicking  or pressing CTRL+E again. The grasp point will disappear.

A text label with grasp point:



Click on the Settings tab in the properties window of the label properties to change the appearance and the behaviour of the label:

- Transparency

- Elevation
- Show Pole – If enabled, the pole from on the ground is displayed
- Centre – If enabled, the text is centred above the label position
- Autoflipped – If enabled, the text is projected to the ground if you watch the terrain from above
- Billboarded – If enabled, the label always faces to the viewer
- Fading – If enabled, the label is faded out at a certain distance (use the slider to set the distance)
- Dynamic Size Adaptation – If enabled, the label will keep a constant size on the screen at a certain distance (use the slider to set the distance)

A label billboarded...



...and not billboarded



An autoflipped label:

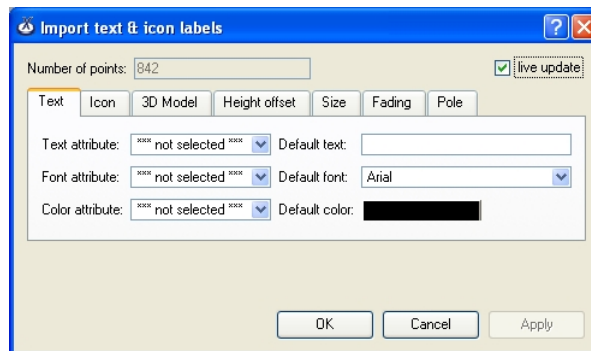


For inserting an image label select **Image From File** from the **Label** menu and select the image file to be displayed on your label in the following file dialog. The image label is inserted at the position your screen is currently showing. You can reposition it as described above.

An image label:



You may also insert groups of labels using vector data files, e.g. Shapefile (.shp) format. After loading the file, you can define how the labels shall be represented, including text attributes, icons, height, and size.



Be sure to set the size scaling large enough. Depending on the view distance, you might not see the labels if scaled too small.

A group of labels could look like this:

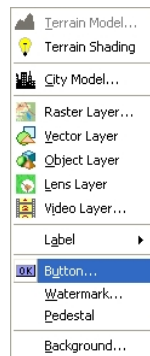


4.9 Inserting Buttons

To insert buttons you first need to create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

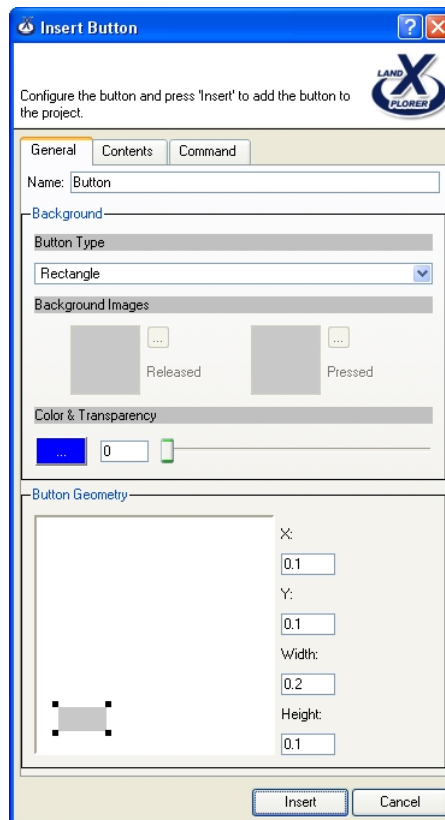
For inserting a button select **Insert/Button**.

The Insert menu



In the following dialog press **Insert** to add a button to the map. Here you can also change the buttons properties, its appearance, colour and size.

The Insert Button dialog



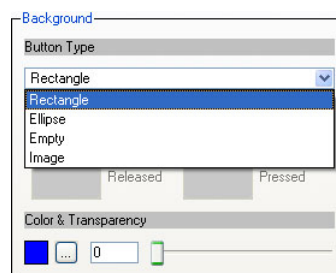
To configure the button, access the button dialog by selecting the inserted button in the object tree.

Buttons in the Hierarchy Tree

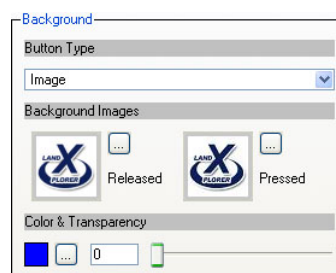


For editing the buttons appearance choose the **General** tab. There you can choose a button type (e.g. rectangle, ellipse or image from file) and configure its colour and transparency. When selecting the image as the buttons type, it is possible to select an image from file for the released and for the pressed button.

The Button dialog (General tab) with open type list...



and with selected button images

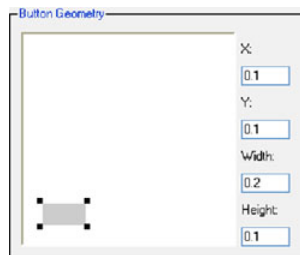


Different button types; rectangle, ellipse, empty, image (left to right)




For editing the buttons geometry choose the general tab. The position of the button can be changed by editing the X and Y entry fields or by clicking left mouse button onto the buttons representation in the meta view and displacing it by keeping the mouse button pressed and moving the mouse to the desired position. The buttons width and height can be changed by editing the **Width** and **Height** entry fields or by clicking left mouse button onto a corner of the buttons representation in the meta view and moving the mouse, while keeping the mouse button pressed, to adjust the buttons size.

The Button dialog (General tab)

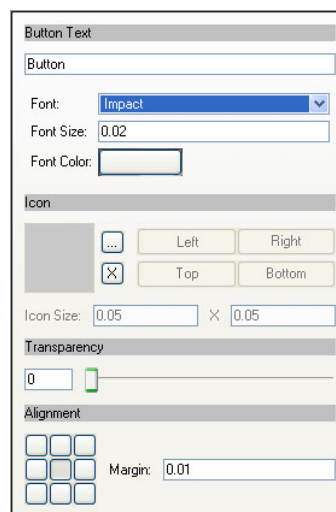


Buttons of different geometry



For editing the buttons content choose contents tab. Here you can edit the size, transparency, font, colour and alignment of the buttons text. Additionally you can choose an icon from file, by pressing , which shall be displayed as content of the button. With the buttons left, right, top and bottom the alignment of the icon relatively to the buttons text can be defined.

The Button dialog (Contents tab)

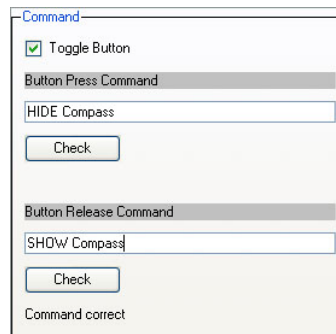


Buttons with different content (icon or text), alignment, font and font size



For editing the buttons functionality choose the command tab. A command can be assigned to a button by using a simple script language. This script language contains multiple different commands, which are described below. If the button is a toggle button, different commands can be assigned to the button, one for pressing the button and a second for releasing the button. Press **Check**, to check if the entered command is syntactically correct.

Buttons dialog (Command tab)



A **SHOW/HIDE** button will also work for a vector data, like a park boundary.

Park shown



Park hidden



Syntax:

<command>	::=	<action> <object> [USING <parameter>+]
<action>	::=	DO SHOW HIDE PLAY GOTO LOOKAT USE
<object>	::=	<sceneobject> <animation> <token> <applicationcommand>
<sceneobject>	::=	object in the project tree
<animation>	::=	animation object
<token>	::=	DEFAULTPOSITION ANIMATION SPHERENAV CONENAV GAMENAV UFONAV
<applicationcommand>	::=	EXIT SNAPSHOT EXEC USING CMD=<value> [<parameter>+]
<parameter>	::=	<name> = <value>
<name>	::=	DIR PARAMS
<value>	::=	string literal

Semantic:

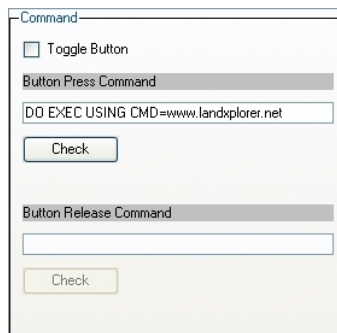
- DO + <applicationcommand>
- SHOW + <sceneobject that has visual representation>
- HIDE + <sceneobject that has visual representation>
- PLAY + <animation> | ANIMATION | <sceneobject of type videolayer>

- GOTO + DEFAULTPOSITION | <sceneobject of type bookmark> | <sceneobject that has visual representation>
- LOOKAT + <sceneobject that has visual representation>
- USE + *NAV

Examples:

- DO EXEC USING CMD=notepad.exe,DIR=c:\windows
- SHOW Compass
- GOTO MyBookmark
- LOOKAT MyImageLabel
- USE UFONAV

Using a button to call a website



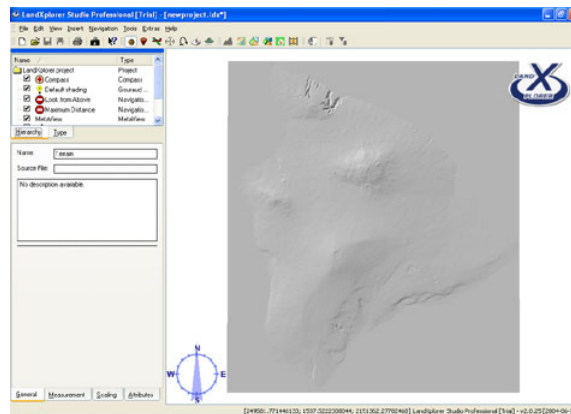
4.10 Watermark

By default, the LandXplorer logo is the watermark of any new project.

LandXplorer Logo



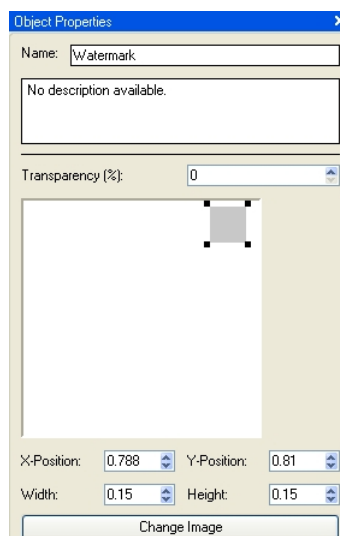
Terrain with Watermark



You can turn the watermark on or off in the **Object Window** by checking or unchecking the box next to the watermark layer.

Use the watermark properties dialog (in the properties window when the watermark is selected in the object window) to specify the desired position of the watermark in the view plain, and its appearance. The small grey square gives you a preview of size and position of the watermark according to the current values. You can also change the image being displayed by clicking on **Change Image**.

Watermark properties dialog



4.11 Compass

By default, the compass is part of any new project. It always moves with the model in order to let you know about the model's orientation. The outer ring indicates the line of vision. The inner ring indicates the inclination using a virtual horizon as a measure.

The compass is a unique map object. It can neither be removed, nor can you insert another compass. However, you may hide it by unchecking its visibility mark in the object tree.

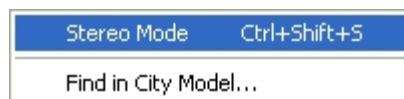
Compass



4.12 Stereo Mode

Stereo viewing offers a stereoscopic visualization of the 3D scene while using 3D shutter glasses. But this will only work if your graphics hardware supports such functionality. If not, a fallback mode for using red/cyan glasses is provided. To activate stereo viewing select **Stereo Mode** from the tools menu or use the keys Ctrl+Shift+S.

Tools menu



Furthermore you can enable this mode by activating the corresponding checkbox in the toolbar. To achieve an optimal result you can adjust the setting for your eye distance in the edit field.

Stereo Mode toolbar





LandXplorer Studio Professional

Terrain Analysis

Part 5

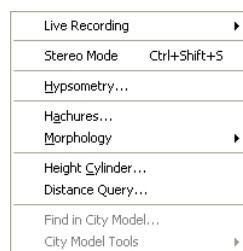
5 Terrain Analysis

There are five different terrain analysis tools available in LandXplorer Studio Professional :

- Hypsometry is the visualization of heights in a terrain model by applying different colours.
- Hachures are lines helping to indicate or visualize the slope on the terrain.
- Morphology allows you to visualize morphological characteristics of the terrain model.
- Height Cylinder allows to calculate a terrain's height.
- Distance Query gives you the possibility to calculate distances in your terrain or city models.

All five analysis possibilities are accessible from the tools menu.

Tools Menu



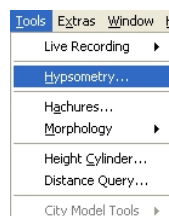
5.1 Hypsometry

Hypsometry visualizes the height of parts of the model through different colours.

Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

To compute and visualize the hypsometry of the terrain select **Tools/Hypsometry**. In the following dialog press **Insert** to calculate the hypsometry.

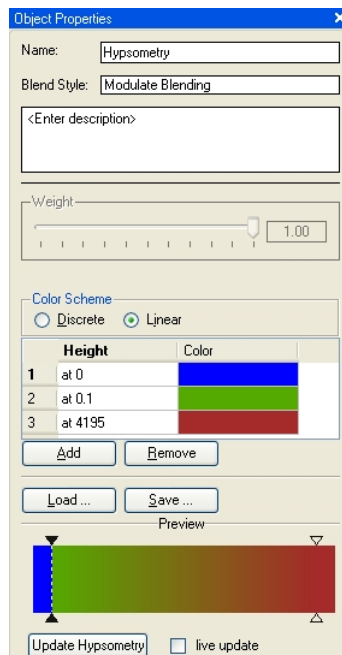
The Tools menu



In the Hypsometry dialog you may adjust the pre configured height intervals and colours

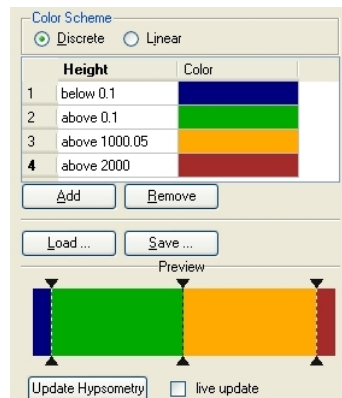
or define additional intervals to customize the hypsometry. When done press **Update Hypsometry**.

Hypsometry dialog

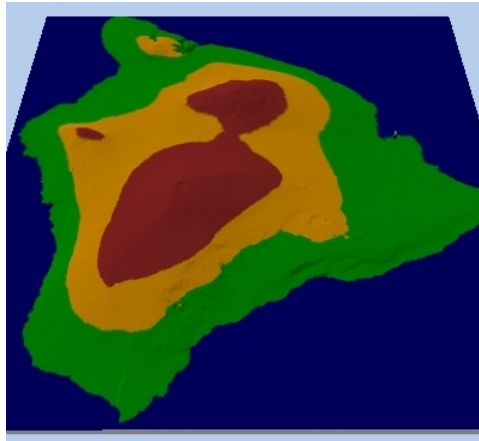


Hypsometry can be visualized in a discrete or linear colour scheme. In both cases, you can add and remove colour definitions for specific height ranges. The discrete colour scheme will use the specified single colours for height ranges, whereas the linear colour scheme blends the colours smoothly between the values for each height.

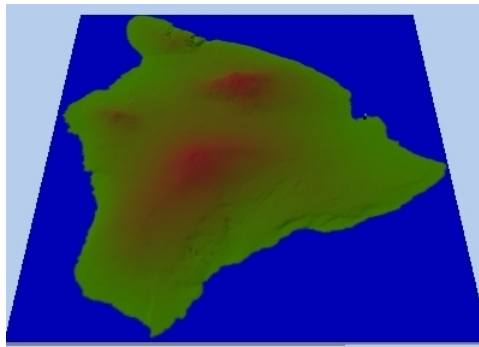
Discrete colour scheme dialog



Terrain with Hypsometry; discrete colour scheme



linear colour scheme



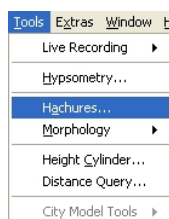
5.2 Hachures

Hachures are lines helping to indicate or visualize the slope on the terrain. You can influence their behaviour by specifying distance, height and slope.

Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

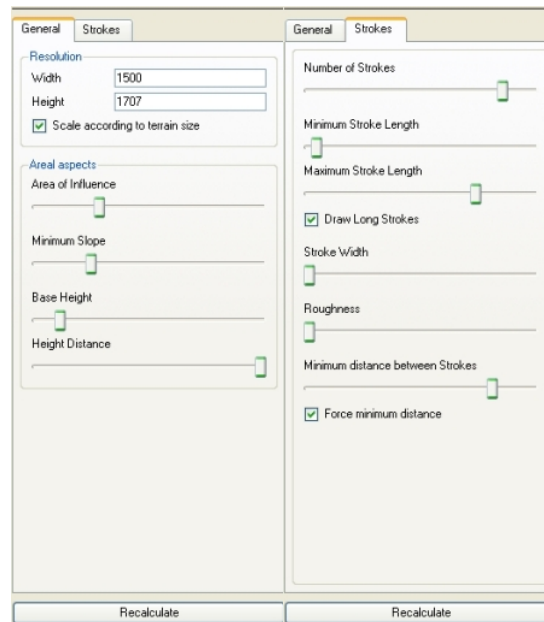
To compute and visualize the hachures of the terrain select **Tools/Hachures**. In the following dialog press Insert to calculate the hachures.

The Tools menu

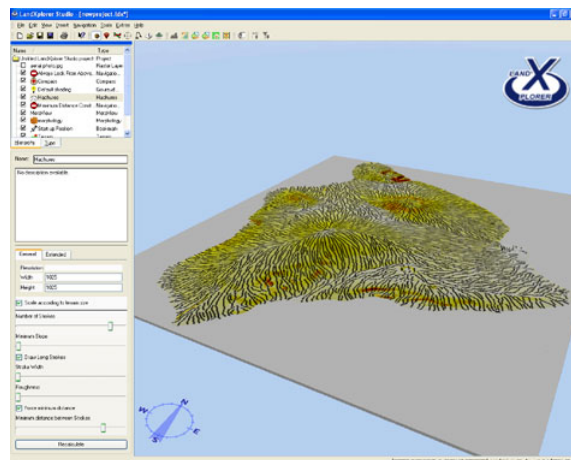


In the Hachures dialog you can configure different general and extended parameters to customize the hachures. When done press **Recalculate**.

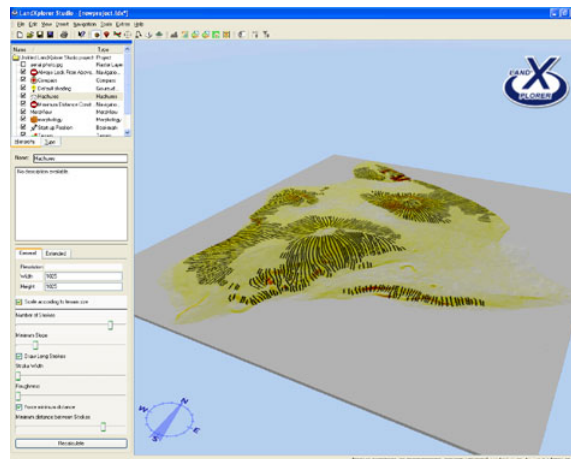
Hachures dialog with General tab (left) and Strokes tab (right)



Terrain with Hachures; small minimum slope value and small influencing area



medium minimum slope value and great influencing area

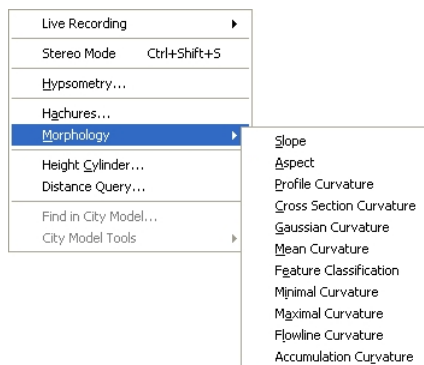


5.3 Morphology

Through the Morphology Function you can visualize morphological characteristics of a terrain model.

Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

The Morphology Submenu



To compute and visualize morphological characteristics select **Tools/Morphology**. In the cascading menu, you have the choice between multiple morphological tools to analyse your terrain.

To adjust the settings for the computation of the morphological layers you can use the properties window. To have changes take effect, you have to click the Rebuild button first.

Object Properties Window

Object Properties

Name:

Blend Style:

<Enter description>

Weight:

Settings:

Convexity Threshold:

Curvature Factor:

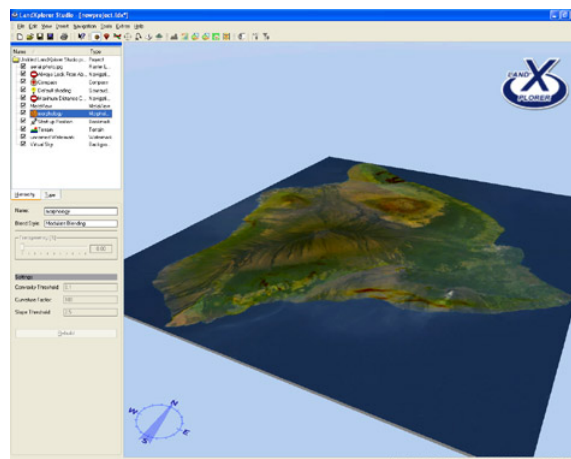
Slope Threshold:

Color Scheme:

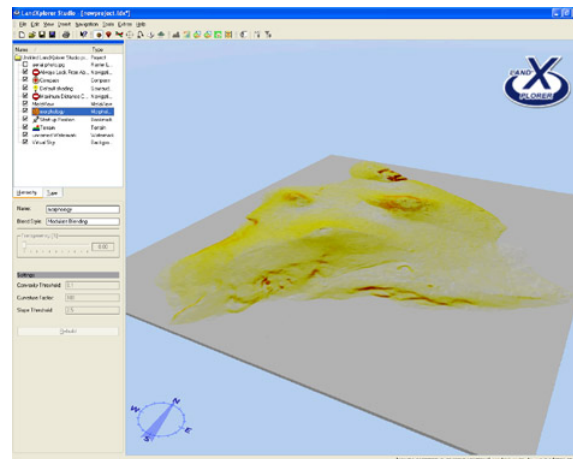
	Degree	Color
1	at 0	
2	at 10	
3	at 30	
4	at 90	

Preview:

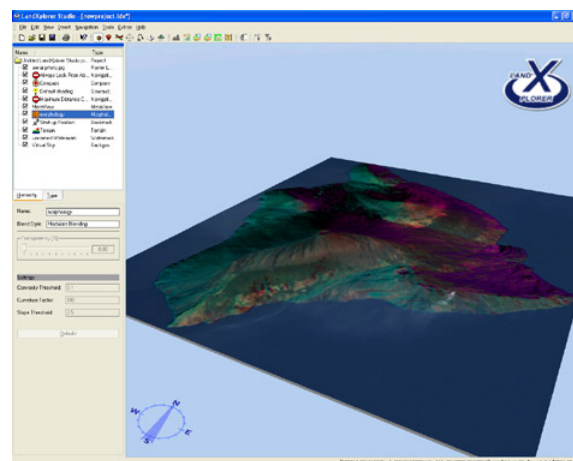
Visualization of the terrain's slope, with activated raster layer



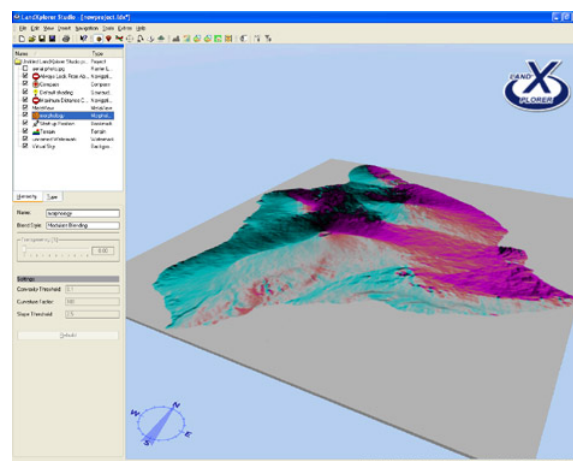
Visualization of the terrain's slope, with deactivated raster layer



Visualization of the terrain's aspect, with activated raster layer



Visualization of the terrain's aspect, with deactivated raster layer



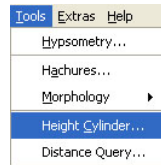
5.4 Height Cylinder

You can analyse the terrain's height with a Height Cylinder.

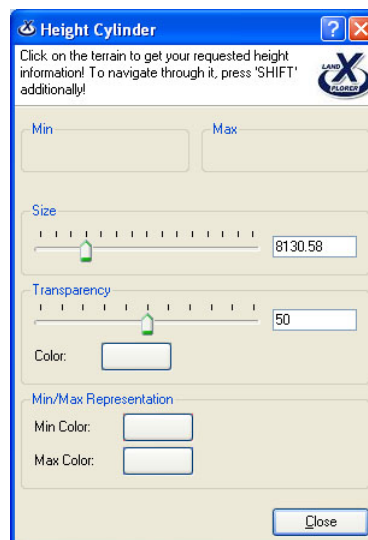
Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

For analyzing the terrain's height select **Tools/Height Cylinder** and the height cylinder dialog appears.

The Tools menu

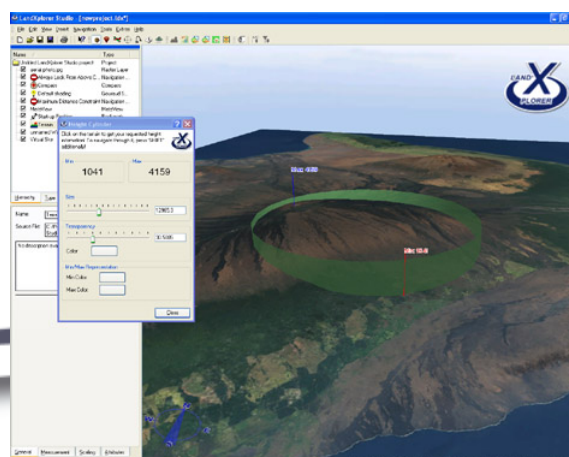


The Height Cylinder dialog



To query the height cylinder press left mouse button onto the desired position in the map. The appearing height cylinder displays the highest and the lowest position of the terrain in the bounded area. Additionally these values are displayed in the height cylinder dialog, where you can configure the opacity and the diameter of the cylinder.

A Height Cylinder query



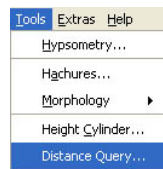
5.5 Distance Query

Distance Query gives you the possibility to calculate distances in your terrain or city models.

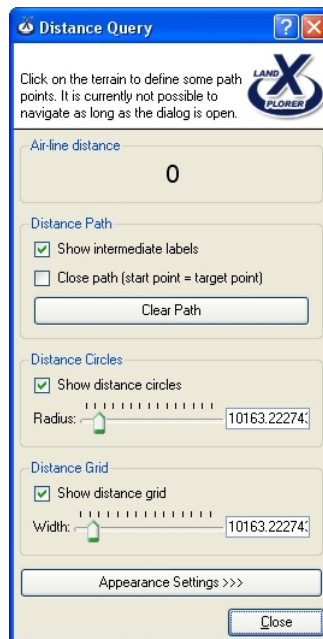
Create a LandXplorer Studio Professional project and insert a terrain model as described in Inserting Terrain Model or open an existing LandXplorer Studio Professional project by selecting **File/Open Project**.

For querying a distance select **Tools/Distance Query** and the distance query dialog appears.

The Tools menu

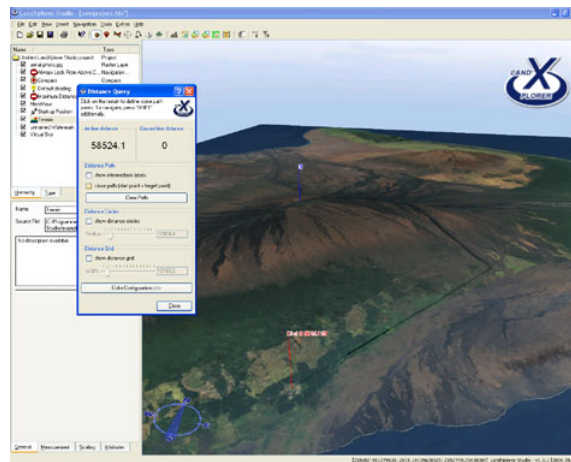


The Distance Query Dialog



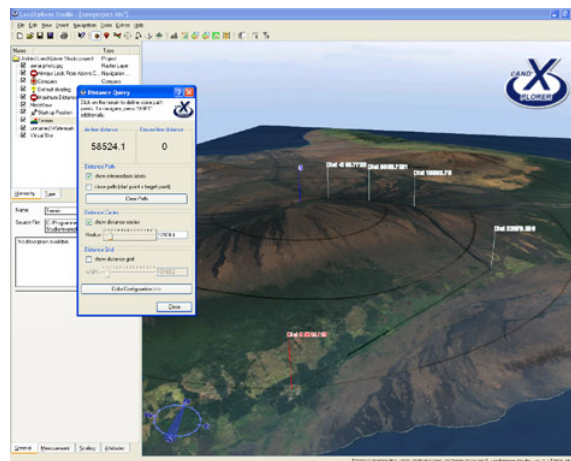
To query a distance click left mouse button onto the desired starting position. Every further click into the map calculates and visualizes the distance between that and the previous position. The distance query dialog displays the overall distance of your queries. Additionally, concentric circles or a grid can be displayed to evaluate distances.

A Distance Query

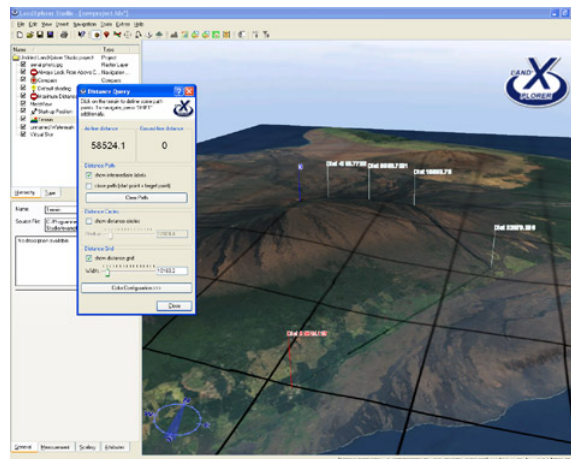


You can specify the existence and colour of distance circles and/or a grid to enable faster measurements. The colours of start label, intermediate labels, and target label can also be specified.

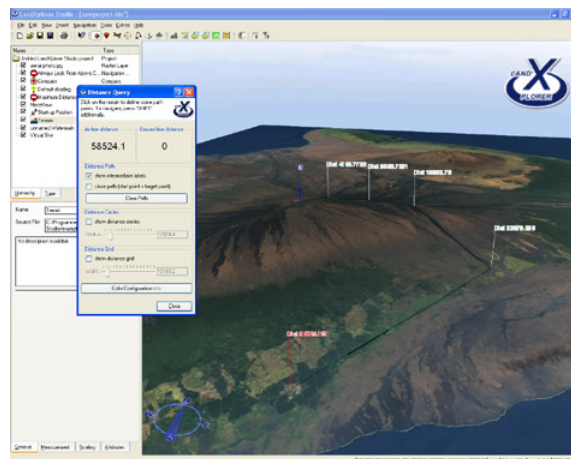
A Distance Query (circles)



A Distance Query (grid)



A Distance Query (intermediate)





LandXplorer Studio Professional

Capturing Tools


Part 6

6 Capturing Tools

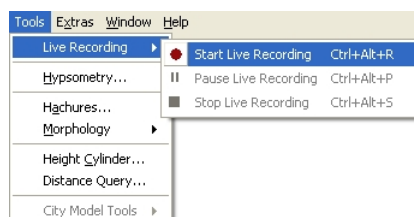
The printing and capturing tools included in LandXplorer Studio Professional provide you with the following functionality:

- Live recording
- Panorama Movies
- Panorama Snapshots
- Snapshots

6.1 Live Recording

To start a live recording of the scene you are currently viewing go the **Tools/Live Recording/Start Live Recording**. Alternatively you can press the record button  in the live recording tool bar.

Life Recording in Tools menu



In the Life Recording dialog, specify a video resolution, the number of frames per second, the desired name of the movie file, an installed video codec, and the compression quality. The resolution will by default be kept in the current aspect ratio. If you want to specify individual values for width and height, uncheck Keep aspect ratio. When done press **OK**.

Life Recording dialog

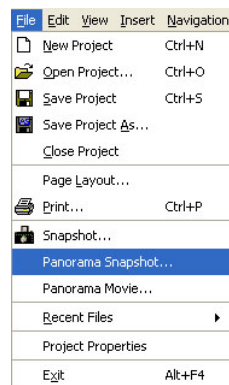


After pressing **OK** the live recording starts, signalled by a blinking, red "Recording" next to the live recording tool bar . The 3D scene is now recorded to an AVI file. To stop the recording press stop button  to finish the movie or press pause button  to resume later.

6.2 Panorama Snapshot

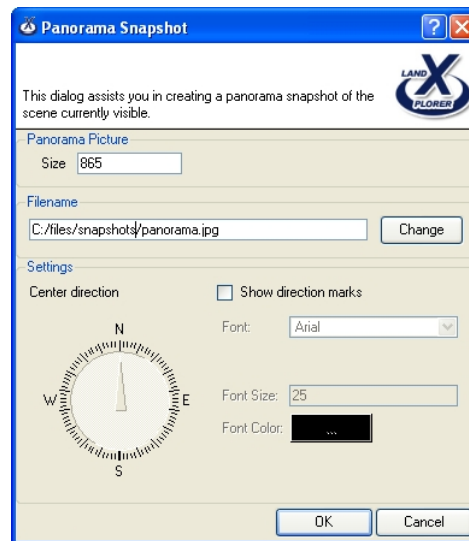
For creating a 360° panorama snapshot of the scene, navigate to the desired position, arrange your view to the direction your snapshot shall be taken and select **File/Panorama Snapshot**.

The File menu



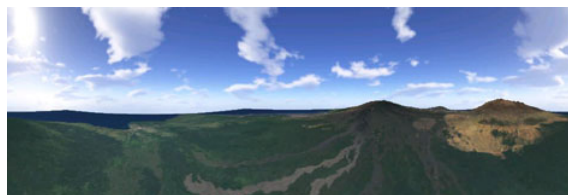
In the following dialog configure the size and the destination path of the snapshot and press button **OK**.

The Panorama Snapshot dialog



In the Panorama Snapshot dialog, you can alter the direction that shall be in the centre of the snapshot, and you can enable marks that show the directions in the snapshot.

360° Panorama Snapshot of Hawaii



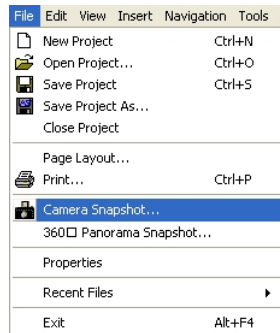
360° Panorama Snapshot of a City Model



6.3 Snapshot

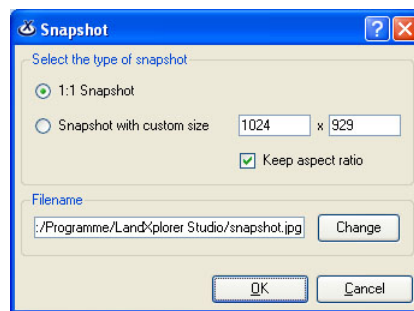
For creating a snapshot of the scene, navigate to the desired position, arrange your view the direction your snapshot shall look like and select **File/Snapshot**.

The File menu

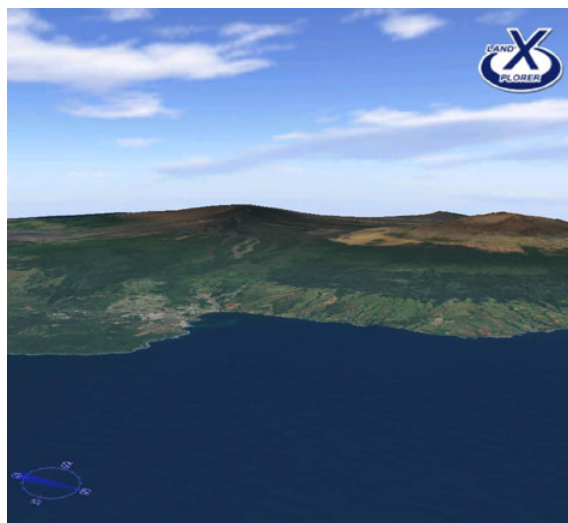


In the following dialog configure the resolution and the destination path of the snapshot and press **OK**

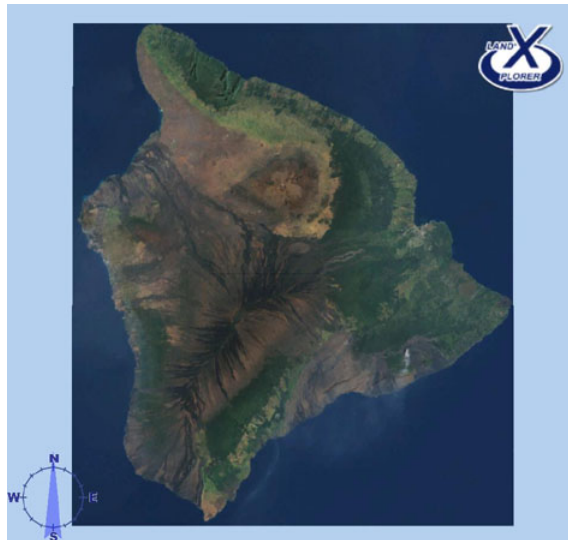
The Snapshot dialog



Snapshot of Hawaii from perspective view...



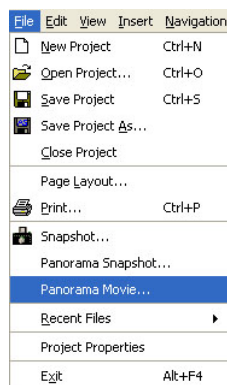
...and bird's eye view



6.4 Panorama Movie

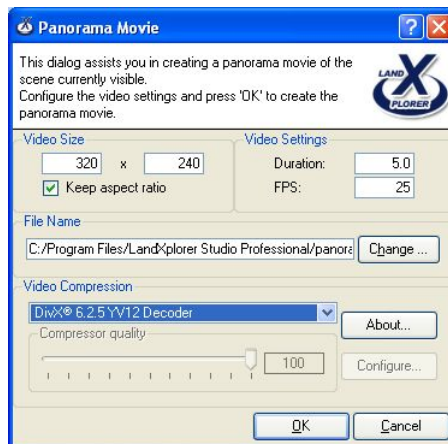
For creating a panorama movie of the scene, navigate to the desired position, arrange your view the direction your movie shall start and select **File/Panorama Movie**.

The File menu



In the following dialog you can configure size, duration and number of frames per second. Select one of the installed video codes like DivX to compress the panorama movie and press **OK**.

The Panorama Movie dialog





LandXplorer Studio Professional

Pack & Go

Part 7

7 Pack & Go

The Pack & Go function forms the interface between LandXplorer Studio Professional and the viewer application LandXplorer Xpress. This makes it possible for LandXplorer Studio Professional projects to be automatically exported and processed and afterwards made accessible to a large user group as a independent geo-documents. These can be viewed with LandXplorer Xpress and distributed, for example, as a DVD. As LandXplorer Xpress uses its own encrypted data format, it is possible to deliver geodata securely without delivering the original data.

With Pack & Go web-streaming, products can be created that enable access to geo-documents over the Internet. With LandXplorer Xpress, a large number of users can therefore view geodata stored on central servers.

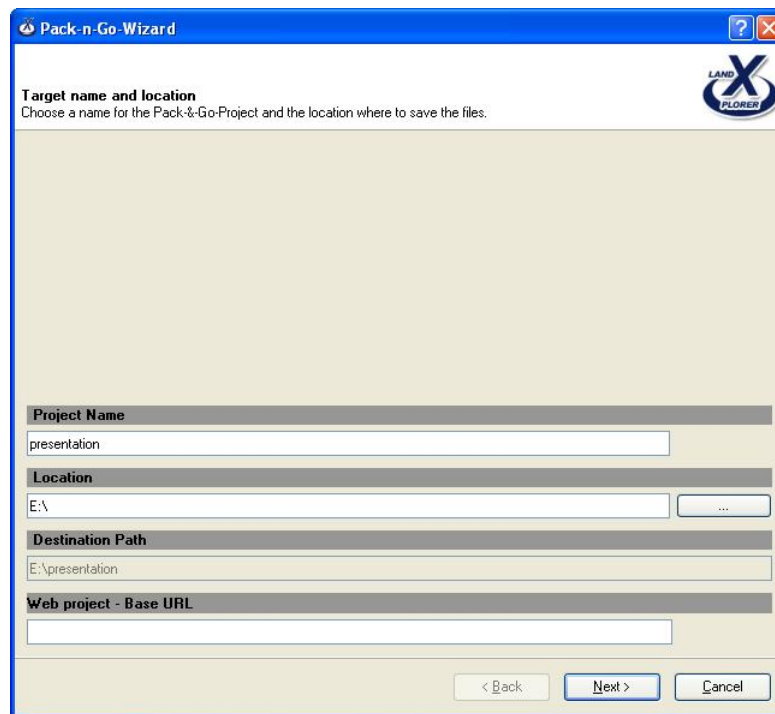
To start a Pack & Go export, select **Pack & Go** from the **File** menu.

This will open the Pack & Go Wizard which will guide you through the configuration and export process. A detailed description is available for each wizard page:

- Target name and location
- Main Selection
- Tree Settings
- Vector Layer Settings
- Point-Of-Interest Settings
- Texture Settings
- City Model Settings
- Navigation Settings
- Appearance Settings
- Miscellaneous Settings
- Project Export

7.1 Target name and Location

On this page you can define a name for your Pack & Go project and where the exported data shall be stored.



Project Name

The name for the exported LandXplorer Xpress project.

Location

The directory where you want the exported data to be stored. Enter it manually or use the directory dialog.

Web project - Base URL

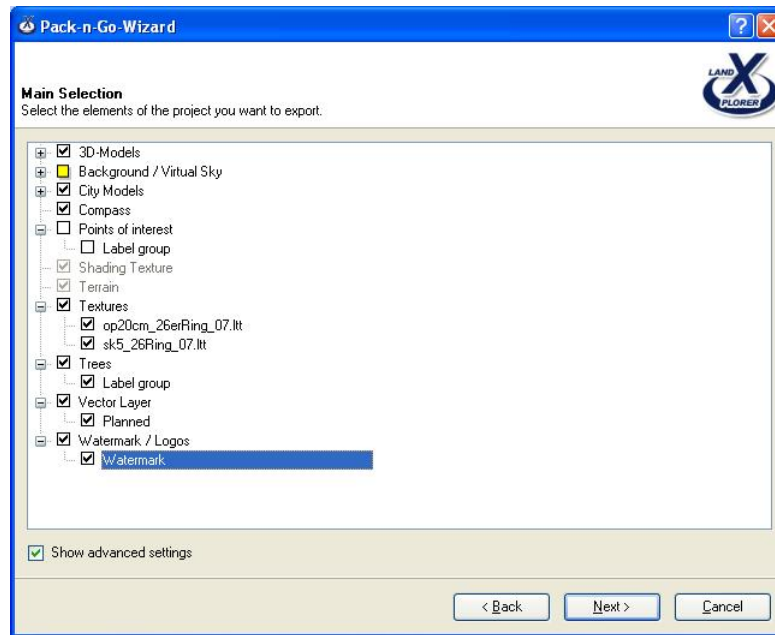
For publishing your project as a Web Project the exported data has to be stored in a directory on a web server. Enter the URL to this directory here.

After the Pack & Go export has finished, copy all exported data, including the sub directories, to this directory. For making the delivery of data via the internet available you have to define the MIME type application/octet-stream for the following file types: .lxwp, .lwg, .lwt, .lxpd

7.2 Main Selection

This page shows an overview of the contents of your LandXplorer Studio Professional project. It allows you to select the elements you want to export into the LandXplorer Xpress project.

All objects that are selected here will be included into the LandXplorer Xpress project. They will be arranged in the object tree of Xpress as they appear in the Hierarchy tree of LandXplorer Studio Professional. This includes object names and folder names.



Show advanced settings

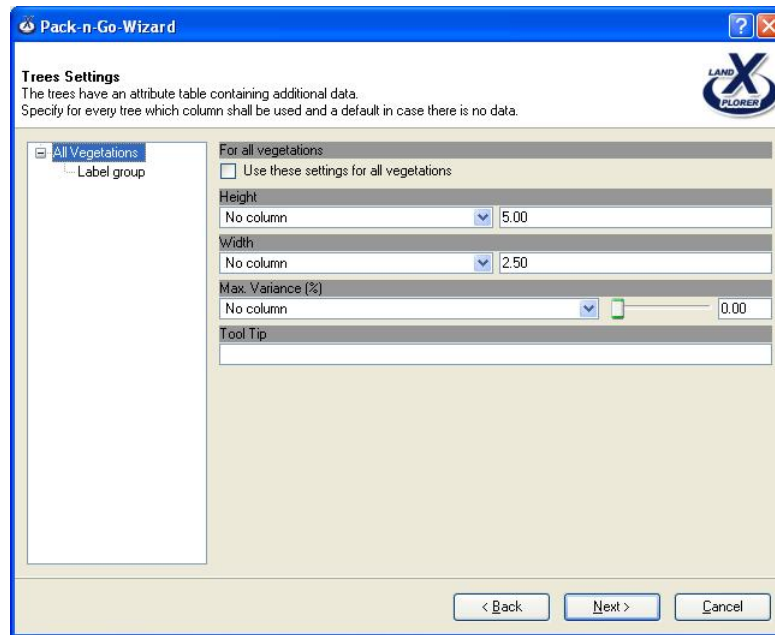
If you select this option, you can define additional settings for your data on the following wizard pages. Otherwise, default settings are used and the relevant pages are skipped.

7.3 Tree Settings

This wizard page allows to define additional settings for trees. Trees can be created from Label Groups that use an icon for visualization.

You can do the configuration for each single tree layer or use common settings for all layers. Therefore fill the settings on "All Vegetations" and select "Use these settings for all vegetations".

The page is only visible if you selected at least one Layer to be exported as tree and activated the option "Show advanced settings".



Height

The tree height. The height can be read from the layer's attribute table. Therefore select the column to use for the height or enter a default value if no appropriate height data is available.

Width

The tree width. The width can be read from the layer's attribute table. Therefore select the column to use for the width or enter a default value if no appropriate width data is available.

Max. Variance

For a more realistic appearance the width and height of the trees can be varied randomly. This value defines the maximum percentage the original tree width and height are varied. A value of 0 means that the original values are used, a value of 50 means that width and height are varied by at most half of the original value.

Tool Tip

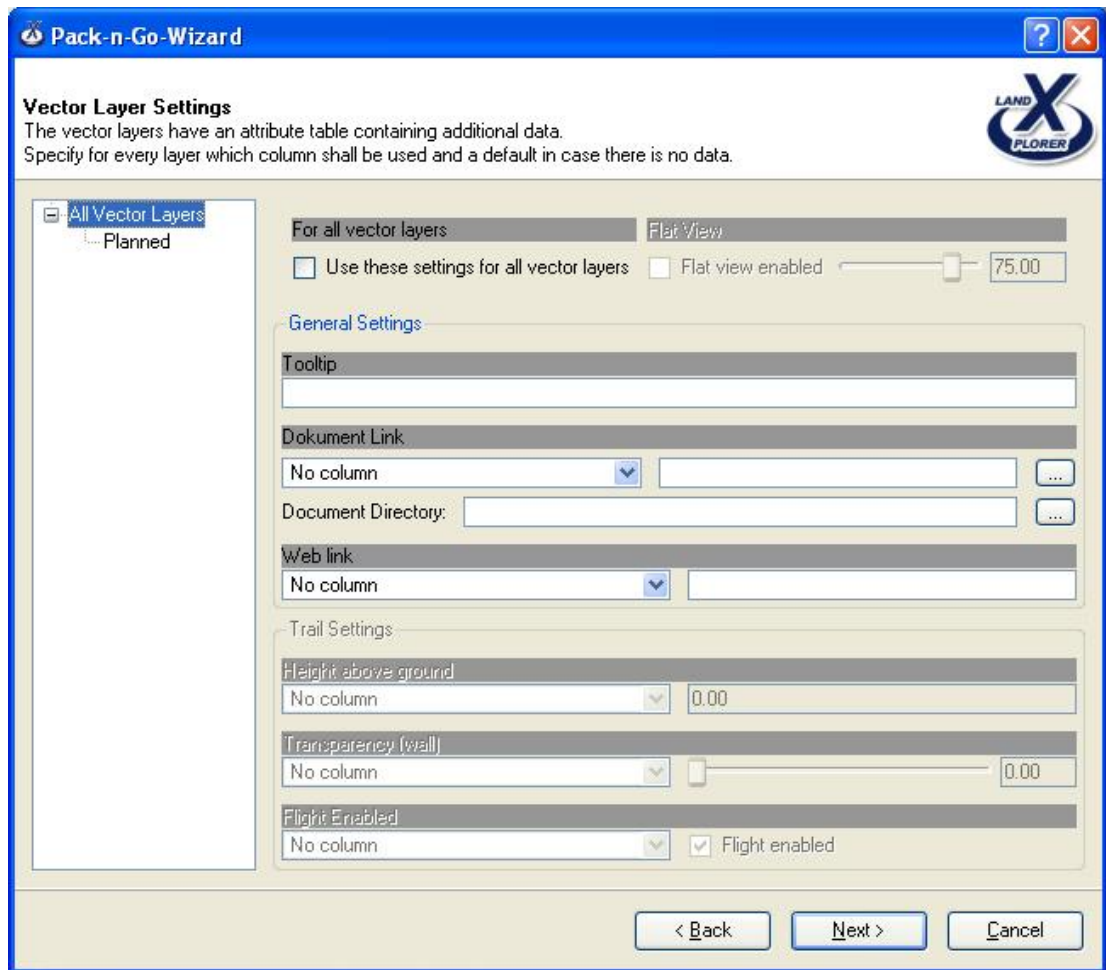
The tool tip text that is shown if the mouse stays above a tree in the 3D view. To include data from the layer's attribute table put the attribute column name in curly braces.
Example: Tree no.: {TREE_ID}

7.4 Vector Layer Settings

This wizard page allows to define additional settings for Vector Layers that contain polygons and lines. Polygons are displayed on the terrain surface and lines are converted to trails. A trail is a three-dimensional visualization of the line with a certain height above the terrain.

You can do the configuration for each single vector layer or use common settings for all layers. Therefore fill the settings on "All Vector Layers" and select "Use these settings for all vector layers".

The page is only visible if you selected at least one Vector Layer to be exported and activated the option "Show advanced settings".



Tool tip

The tool tip text that is shown if the mouse stays above a polygon or trail in the 3D view. To include data from the layer's attribute table put the attribute column name in curly braces.

Example: Area: {AREA}

Document Link

For each Vector Layer element an additional link to a local document or a web site can be defined. If an element has a document link, a button that opens the document will be visible in the info area if the element is selected.

The document can be read from the layer's attribute table. Select the column to use for the link or enter a default document if no appropriate data is available. Additionally the directory must be entered where the documents can be found. During the export process all documents are copied into the project folder.

Web Link

A web link that can be opened by clicking the polygon or the trail in the 3D view. The link address can be read from the layer's attribute table. Select the column to use for the link or enter a default value if no appropriate data is available.

Flat View (All Vector Layers)

This option applies to trails and is only available if the selected vector layers contains line elements.

If checked, the visualization of the trails is switched to a 2D flat line if the pitch angle of the camera exceeds a certain angle. This can be helpful to avoid graphical artifacts when the project is viewed from a big altitude. The switch angle can be set with the slider.

Height above ground

This option applies to trails and is only available if the selected vector layers contains line elements.

Defines the height of the 3D trail above the ground. The height can be read from the layer's attribute table. Select the column to use for the height or enter a default value if no appropriate data is available.

Transparency (wall)

This option applies to trails and is only available if the selected vector layers contains line elements.

The transparency of the wall that represents the height of the trail. The transparency can be read from the layer's attribute table. Select the column to use for the transparency or enter a default value if no appropriate data is available. 0 means no transparency, 100 means completely transparent (no wall visible)

Flight Enabled

This option applies to trails and is only available if the selected vector layers contains line elements.

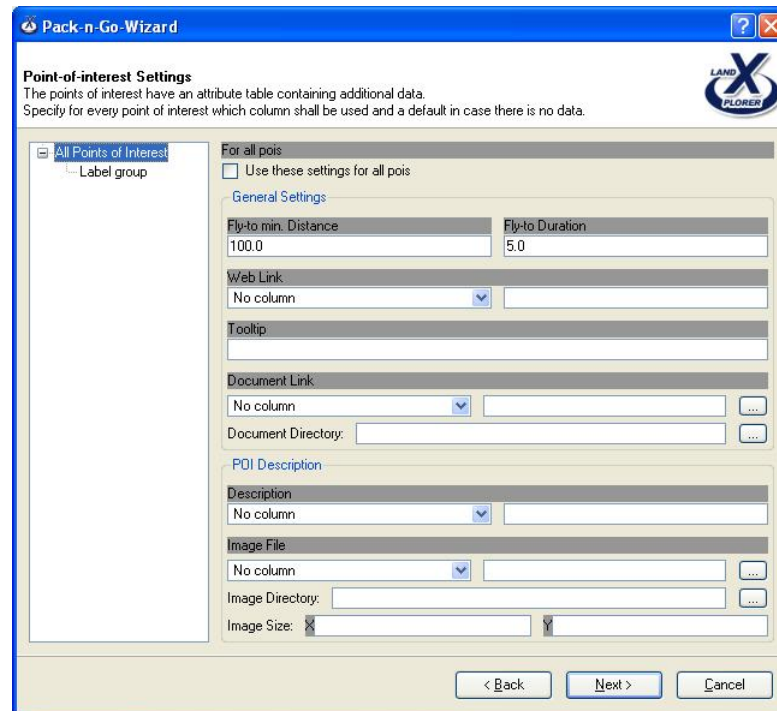
Defines whether a flight along the trail is available. This value can be read from the layer's attribute table. Select the column to use or enter a default value if no appropriate data is available. The column must contain "true" or "false".

7.5 Point-Of-Interest Settings

This wizard page allows to define additional settings for Point-Of-Interest (POI). POIs can be created from Label Groups and single labels.

You can do the configuration for each single label layer or use common settings for all label layers. Therefore fill the settings on "All Points of Interest" and select "Use these settings for all pois". If your POIs originate from a Label Group, make sure to have text set for the positions. This text is used to create the POI items in the object tree. If no text is specified, the POI will appear as "Unnamed POI".

The page is only visible if you selected at least one Layer to be exported as POIs and activated the option "Show advanced settings".



Fly-to min Distance

The distance to the POI position on which the camera flight stops. The flight is activated by a double-click on the POI item in the object tree.

Fly-to Duration

The time for the camera flight in seconds. The flight is activated by a double-click on the POI item in the object tree.

Web Link

A web link that can be opened by clicking the POI symbol in the 3D view. The link address can be read from the layer's attribute table. Select the column to use for the link or enter a default value if no appropriate data is available.

Tool Tip

The tool tip text that is shown if the mouse stays above a POI in the 3D view. To include data from the layer's attribute table put the attribute column name in curly braces.

Example: Name: {NAME}

Document Link

For each POI an additional link to a local document or a web site can be defined. If a POI has a document link, a button that opens the document will be visible in the info area if the poi is selected.

The document can be read from the layer's attribute table. Select the column to use for the link or enter a default document if no appropriate data is available. Additionally the directory must be entered where the documents can be found. During the export process all documents are copied into the project folder.

Description

The text that is shown in the info area after a POI has been selected in the object tree.

The description can be read from the layer's attribute table. Select the column to use for the description or enter a default text if no appropriate data is available.

Image File

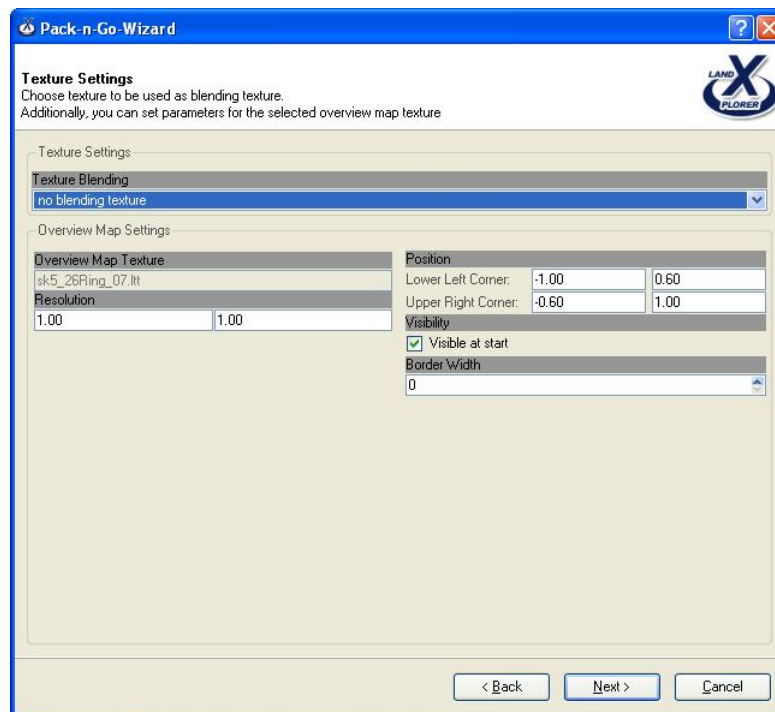
The image that is shown in the info area after a POI has been selected in the object tree. The image file name can be read from the layer's attribute table. Select the column to use for the file or specify a default image if no appropriate data is available.

Additionally the directory must be entered where the image files can be found. During the export process all files are into the project folder.

7.6 Texture Settings

This wizard page allows to define additional texture settings.

The page is only visible if you selected at least one Raster Layer for texture export and activated the option "Show advanced settings".



Texture Blending

You can select one terrain texture to be used as blending texture in LandXplorer Xpress. This texture can be faded in by the user interactively and will overlap all other textures, if faded in completely.

Overview Map Texture

If you have selected a Raster Layer to be visible on the Overview Map, this Layer will be exported to LandXplorer Xpress, too. The name of the Raster Layer used for the Overview Map is displayed here.

Resolution

The resolution of the Overview Map texture in LandXplorer Xpress. The value defines the

size of a pixel in the texture. The first field is for the east-west direction, the second one for the north-south-direction. Usually, the same value can be used for both directions. The higher the values are the smaller the map will appear.

Position

The position of the Overview Map in LandXplorer Xpress. It is defined by its coordinates in the 3D view window. The coordinates range from -1 to 1 whereas (-1, -1) defines the lower left corner of the window and (1,1) defines the upper right corner.

To position the Overview Map enter the coordinates of the lower left corner and the upper right corner of the map.

Visibility

If Visible at start is checked, the Overview Map will be visible after loading the project.

Border Width

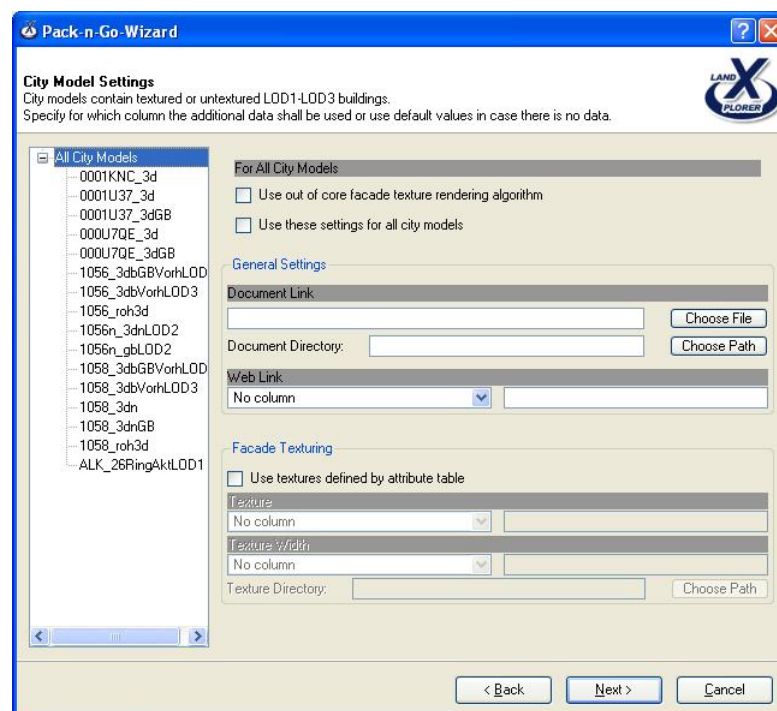
The width of the border that is drawn around the Overview Map.

7.7 City Model Settings

This wizard page allows to define additional settings for City Models.

You can do the configuration for each single City Model Layer or use common settings for all layers. Therefore fill the settings on "All City Models" and select "Use these settings for all city models".

The page is only visible if you selected at least one City Model Layer to be exported and activated the option "Show advanced settings".



Use out of core facade texture rendering algorithm (All City Models)

If this option is checked, an enhanced rendering algorithm will be used in LandXplorer

Xpress that uses facade texture streaming. This allows to manage a larger number of facade textures.

Note: Currently, this mode doesn't support object identification, so tool tips and web links for buildings are not available. The export process will create a large number of temporary files on your hard disk. Make sure you have enough free disk space.

Document Link

For each City Model an additional link to a local document or a web site can be defined. If a City Model has a document link, a button that opens the document will be visible in the info area if the City Model is selected.

Define a document by choosing a file with the "Choose" button. Additionally the directory must be entered where the document can be found. During the export process the document is copied into the project folder.

Web Link

A web link that can be opened by clicking a building in the 3D view. The link address can be read from the layer's attribute table. Select the column to use for the link or enter a default value if no appropriate data is available.

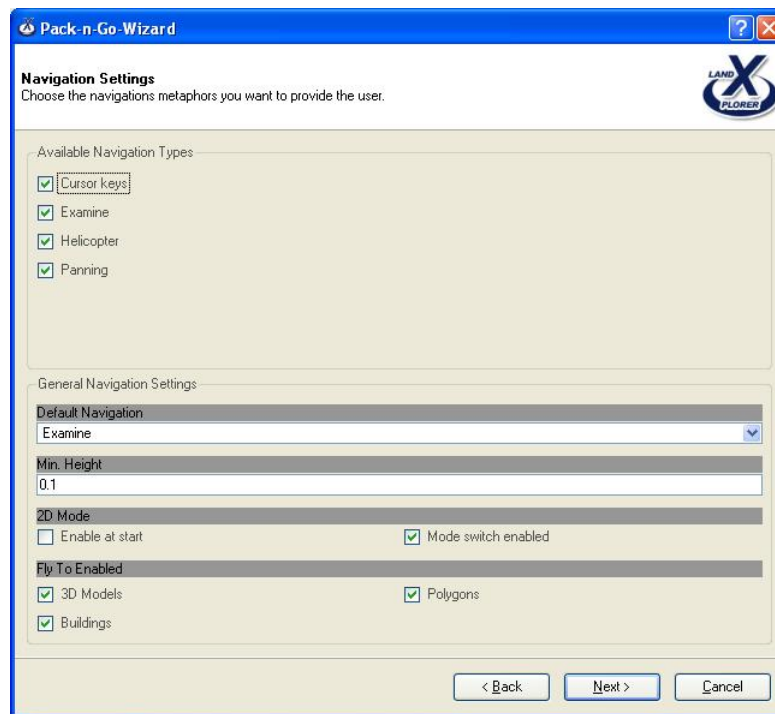
Facade Texturing

Per default, the City Models are exported with the textures defined in LandXplorer Studio Professional.

For LOD 1 block buildings there is the option to apply an alternative facade texturing. Therefore check "Use textures defined by attribute table". Now you can define attribute columns that contain the facade texture file names and the values for textures width. Additionally, you must define the directory that contains the image files.

7.8 Navigation Settings

On this page you can configure the navigation options that are offered to the user of the project.



Available Navigation Types

Select the navigation metaphors you want to provide to the user.

- Cursor keys (same as Game Metaphor in LandXplorer Studio Professional)
- Examine (same as Sphere Metaphor in LandXplorer Studio Professional)
- Helicopter (same as Airplane Metaphor in LandXplorer Studio Professional)
- Panning (same as Panning Metaphor in LandXplorer Studio Professional)

Default Navigation

The navigation that is active after loading the project.

Min. Height

The minimum height above the terrain in meters. It will be not possible to navigate below this height.

2D Mode

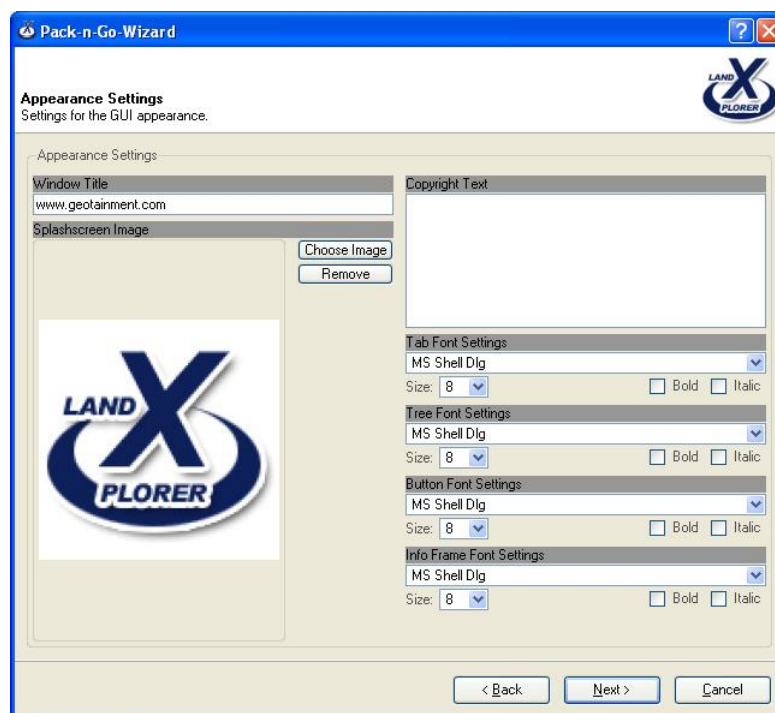
Defines the options for the 2D orthogonal view mode. If "Enable at start" is checked, the project will start in 2D mode. "Mode switch enabled" controls whether the user can switch between 2D and 3D view. If "Enable at start" is selected without allowing the mode switch, only the 2D mode will be available.

Fly To Enabled

Select the object groups for which a double-click in the object tree shall start a fly-to.

7.9 Appearance Settings

The Appearance Settings page contains options for the user interface of LandXplorer Xpress for your project.



Window Title

The text displayed in the window title of LandXplorer Xpress.

Splashscreen Image

The image that is shown during the process of loading your project. Select an image file by using the "Choose Image" button. If no image is set, a default splashscreen will be displayed.

Copyright Text

The text that is shown on the copyright tab of LandXplorer Xpress.

Tab Font Settings

The font that is used for the elements on the tabs left of the 3D view (Except the object tree and the search results list). Define a font, size and styles here. Note that the font must

be installed on the computer the project shall be opened.

Tree Font Settings

The font that is used for the object tree and the search results list. Define a font, size and styles here. Note that the font must be installed on the computer the project shall be opened.

Button Font Settings

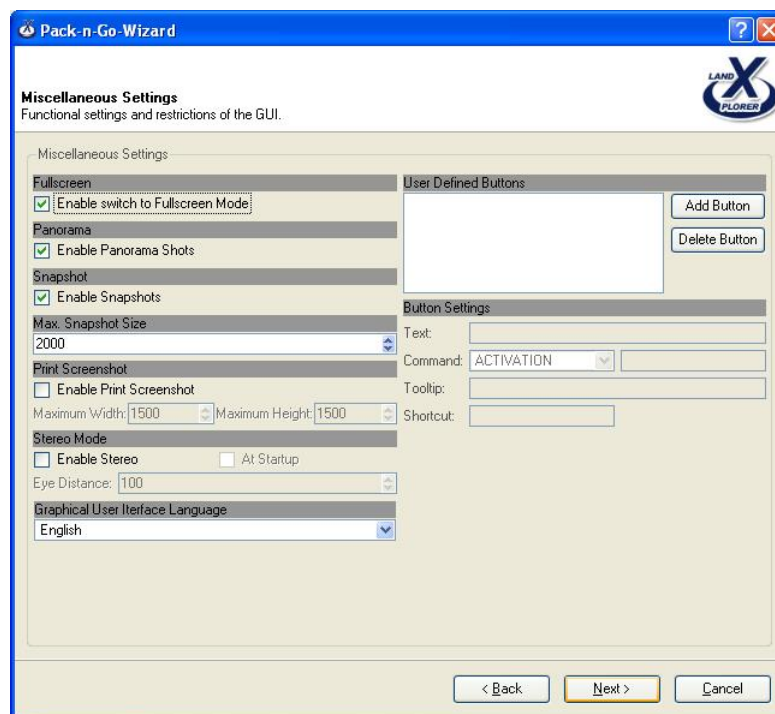
The font that is used for buttons outside the tabs (e.g. Overview Map, Fullscreen, User Defined Buttons). Define a font, size and styles here. Note that the font must be installed on the computer the project shall be opened.

Info Frame Font Settings

The font that is used for the info area below the object tree. Define a font, size and styles here. Note that the font must be installed on the computer the project shall be opened.

7.10 Miscellaneous Settings

You are nearly through the settings pages now. On this page some functional restrictions and configurations can be done.



Fullscreen

Defines whether the fullscreen mode is available for the user of the project.

Panorama

Defines whether the user can create panorama views from your project.

Snapshot

Defines whether the user can create snapshot images from your projects

Max. Snapshot Size

The maximum size the size of the snapshots that can be created.

Print Screenshot

Defines whether the user can create print the 3D view. Additionally, you can restrict the size of the printouts by defining a maximum width and height.

Stereo Mode

Defines whether the stereo mode is available for the user. If enabled, you can define if this mode is active after loading the project and a default value for the eye distance.

Graphical User Interface Language

Select the language that is used after loading the project.

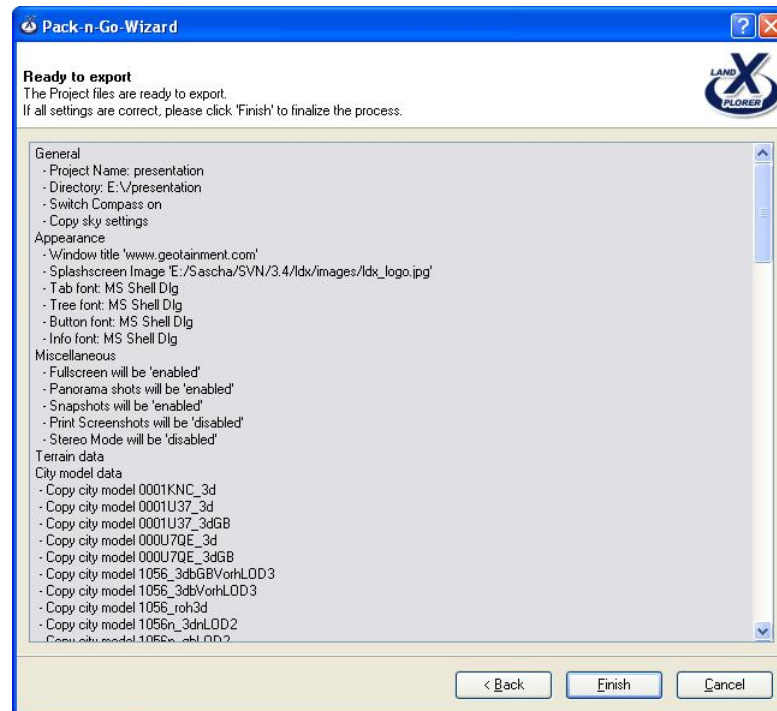
User Defined Buttons

You can add up to 6 buttons to LandXplorer Xpress that invoke a specific action. After adding a button you can configure it with the following options:

- Text: The text visible on the button.
- Command: Defines the action that is invoked by pressing the button
- * ACTIVATION activates an item in the object tree (same as double-clicking the item). Therefore enter the item name in the field behind. Group levels can be separated by ~. (e.g. Traffic~Busses~line 42)
- * VISIBILITY toggles the visibility of an item in the object tree (same as checking/unchecking the item). Therefore enter the item name in the field behind. Group levels can be separated by ~. (e.g. Traffic~Busses~line 42)
- * OPEN_URL opens a web address in the default web browser. Therefore enter the URL in the field behind.
- Tool tip: The tool tip for the button.
- Shortcut: A shortcut for the button. You can use modifiers like Ctrl, Alt and Shift.

7.11 Project Export

This is the final page of the Pack & Go wizard. It concludes your settings. Press the "Finish" button to start the export process. This process may take some time, depending on the data in your LandXplorer Studio Professional project.



After the export has finished, you can view the result in LandXplorer Xpress by opening the created .lxwp file.

Close the wizard with the "Close" button. All your settings will be kept in the wizard for a later export. The settings are also saved in the LandXplorer Studio Professional project.



LandXplorer Studio Professional

Database Plugin

Part 8

8 Database Plugin

The LandXplorer CityDB Plug-In allows the connection to a database to import and export geodata to be used in LandXplorer Studio Professional.

Prerequisites

To establish a connection to the database the LandXplorer CityDB Plug-In needs an installation of the Instant client from Oracle. For further information, please visit:

<http://www.oracle.com/technology/software/tech/oci/instantclient/>

Data Model

The scheme of the database supports the following data currently.

(1) Digital Terrain Models

These can be filed in different forms in the database. Of the three possible forms (Mass point relief, break line relief, and raster relief) only the raster relief is currently supported.

(2) Ortho photos

Apart from the digital terrain models, the ortho photos are also represented as raster data.

(3) 3D-city model data

The database structure maps the current CityGML scheme, for storing all kind of city objects like buildings, vegetation objects or city object groups efficiently.

Data Handling

All data can be exported from the database but the "life span" of the data can be very different. This is why data is treated differently.

Digital terrain models and ortho photos will generally be updated very seldom and therefore also need to be updated quite infrequently in the database. This is why this data will be saved in one file when exported from the database and then stored for 3D visualization.

The data of the city model though will be updated and changed more frequently. Thus these data should be exported more often from the database to get the most recent metadata. Connected to the database, the modified metadata can be written to the database directly. These changes to the city model data will be stored as different versions in the database. For this the workspace mechanism of Oracle DBMS is used which is also used with plannings and planning alternatives. The most important information regarding this will be explained in the next part.

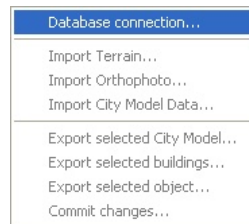
Live-Workspace and Planning-Workspace(s)

Current city model data is stored in the live workspace. Additionally, plannings and planning alternatives can exist and will be saved in a sperate workspace. The idea is to create plannings and one or more planning alternatives which initially contain the same

city objects as the LIVE-Workspace. After the process of urban planning is finished and one of the planning alternatives is approved, the corresponding changes can be merged into the LIVE-Workspace by accepting this planning alternative. All further planning alternatives will be discarded and marked as terminated. As soon as a connection with the database is established, the existing information for the workspaces can be retrieved and the desired workspace can be chosen.

8.1 Connecting to the Database

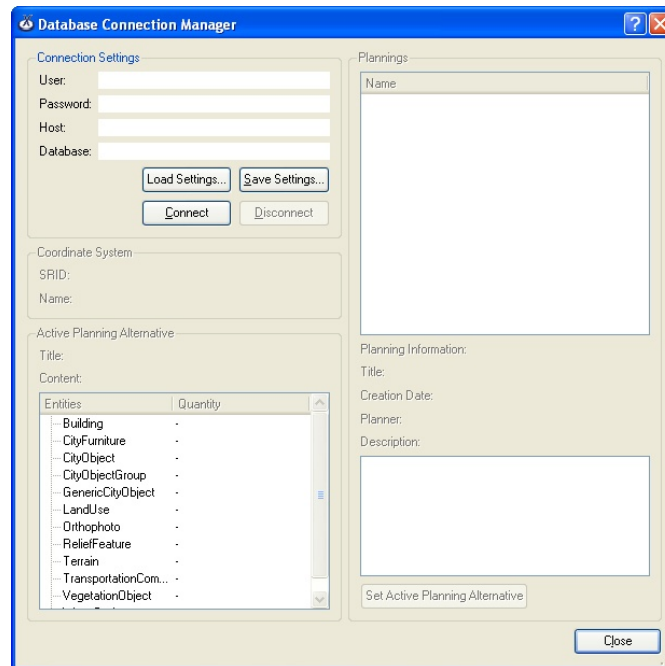
To work with the database, you will first have to establish a connection to it. This is done via the menu **Database -> Database Connection....**



Subsequently a dialog will appear which is able to display all information relevant for a database connection, like the connection settings, information regarding the available workspaces and statistics about contained city objects. Setting up the connection parameters and pressing **Connect** establishes the connection to the corresponding database. It is necessary to enter the user name, the password, the name or the IP Address to the server (Host) and the name of the database service (database). For convenience, you can save these connection settings to a file and load them when connecting to the database the next time. In case the connection with the database should be established through a different port than the standard port 1521, this will have to be entered within the host entry. This entry then includes:

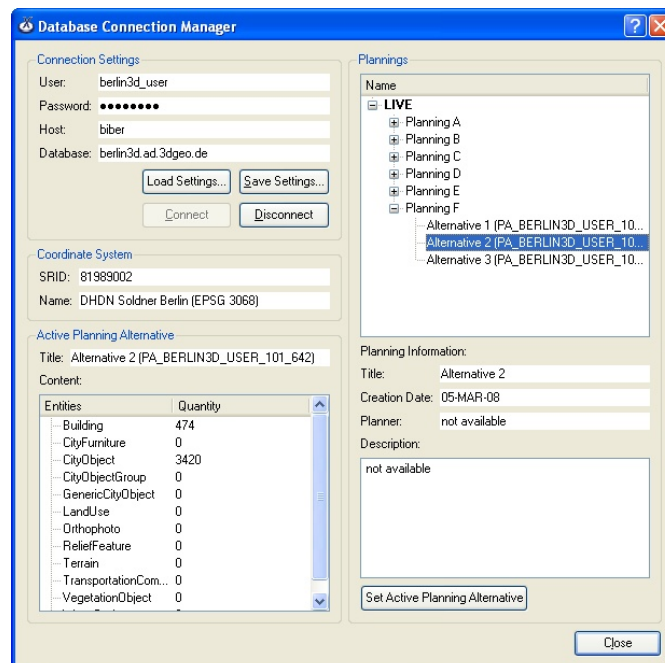
Host[:Port]

If all data is entered, a connection can be established by clicking on **Connect**. To disconnect from the database press **Disconnect**.



Choose Workspace

In the area **Plannings**, existing plans with their planning alternatives are listed. This also includes the LIVE-Workspace, as is depicted as the root element. By default the LIVE-Workspace is chosen after the connection to the database was established. At the left part of the dialog some statistical information for the chosen workspace is shown.



If a planning alternative or the LIVE-Workspace is chosen in the **Plannings** area (entry in the third level of the tree hierarchy), you can activate this by pressing the button **Set**

Active Planning Alternative. An activation through double clicking with the left mouse button is also possible. Afterwards the information for the chosen alternative will be shown in the area **Planning Information**. Apart from the title for the alternative, this includes also the date of creation, the planner and a description.

Please note: As terrain models and ortho photos are not specifically attributed to one planning, these appear in the list of every alternative.

After the connection to the database is established, the data import can be started.

8.2 Data Import

Please note: before importing data a new project has to be created. It is also possible to load an existing project and import data into it.

The data import is arranged according to the data model of the database into three areas: terrain models, ortho photos and 3d city model data. In the three following parts the import of this data is described.

- Import of Digital Terrain Models
- Import of Orthophotos
- Import of 3D City Model Data

8.2.1 Import of Digital Terrain Models

As in all other LandXplorer projects, the digital terrain model is the base of the 3D map.

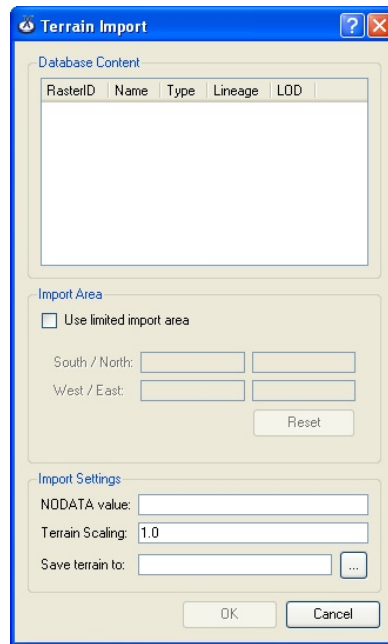
Please note: As only one digital terrain model (DGM) can exist at any time, a new project will have to be opened if the imported terrain model shall be used directly in the project. An import into an existing project, containing a terrain model, is not possible, although the respective file will be saved anyway.

The import of the DGM is done through the dialog that can be opened via the menu: **Database -> Import Terrain....** The upper part of the dialog contains an overview of the terrain models that are included in the database. Information regarding the name, type, origin, as well as LOD are shown.

Apart from the existing information contained in the overview, the overall extent of the terrain model will be asked and used in the part **Import Area**. If you only want to import a part of the terrain model, the button **Use limited import area** must be activated. Subsequently the borders of the import area can be adapted.

Please note: The extension of the area to a size larger than stored in the database is not possible. In case of a mistake this will be signalled with a warning.

Apart from correcting the invalid entries (marked red), it is also possible to reset all values by clicking the button **Reset**.



Press  to conveniently select a place where the resulting file shall be stored.

If all settings are made, the import from the database can be started by pressing the button **OK**. The import can be interrupted by pressing **Cancel**.

After starting the import process all necessary data will be read from the database and processed. The processing takes place in several steps, of which each will inform on its progress via a progress dialog. Here the calculation of the terrain model optimal for 3D visualization will -usually- take the longest time. Outer factors like the bandwidth of the connection can also influence the import process immensely. The pre calculation step is especially influenced by the size of the imported area and the resolution of the data for the area as well as the performance of the system. In addition to the progress indicator a time estimate will be given.

As soon as the reading process is completed the terrain model will be included into the project.

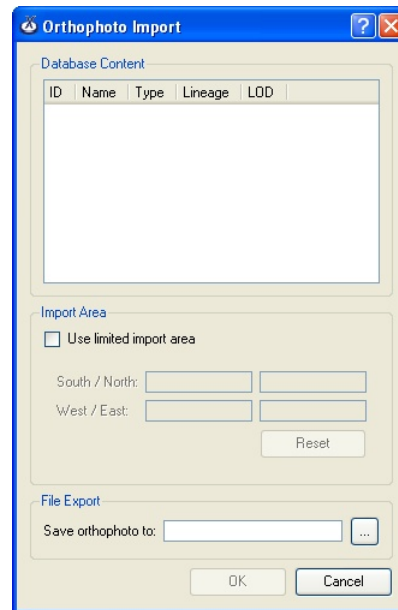
8.2.2 Import of Orthophotos

Similarly to the digital terrain models the import of ortho photos can be done via the menu entry **Database -> Import Ortho photo**. The upper part of the dialog contains an overview of the ortho photos that are included in the database. Information regarding the name, type, origin, as well as LOD are shown.

Apart from the existing information contained in the overview, the overall extent of the ortho photo will be asked and used in the part **Import Area**. If you only want to import a part of the ortho photo, the button **Use limited import area** must be activated. Subsequently the borders of the import area can be adapted.

Please note: The extension of the area to a size larger than stored in the database is not possible. In case of a mistake this will be signalled with a warning.

Apart from correcting the invalid entries (marked red), it is also possible to reset all values by clicking the button **Reset**.



Press  to conveniently select a place where the resulting file shall be stored.

If all settings are made, the import from the database can be started by pressing the button **OK**. The import can be interrupted by pressing **Cancel**.

After starting the import process all necessary data will be read from the database and processed. The processing takes place in several steps, of which each will inform on its progress via a progress dialog. Here the calculation of the ortho photo optimal for 3D visualization will -usually- take the longest time. Outer factors like the bandwidth of the connection can also influence the import process immensely. The pre calculation step is especially influenced by the size of the imported area and the resolution of the data for the area as well as the performance of the system. In addition to the progress indicator a time estimate will be given.

As soon as the reading process is completed the ortho photo will be included into the project. If a terrain model exists, the ortho photo will be added to the project. It is also possible to include the ortho photo from the written file later. This can be done by inserting a raster layer.

Please note: Black rims and borders that appear at the edge of the ortho photo can be changed by setting the blend styles for the textures.

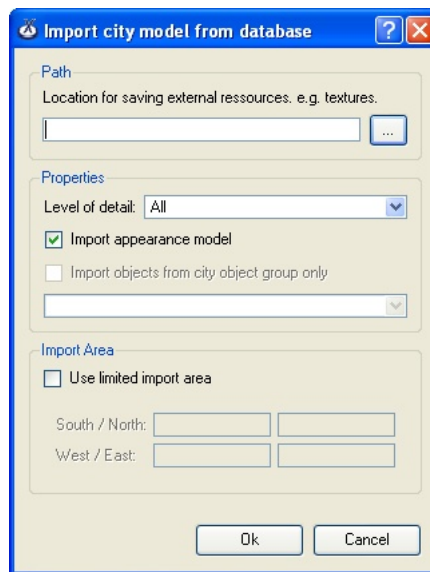
8.2.3 Import of City Models

There is a crucial difference when importing 3D city models compared to the import of terrain models and ortho photos. As mentioned the import of terrain models and ortho photos is independent from a planning alternative. That means they are also available without these (although a workspace has to be active on the database).

Before the import of 3D city model data, you firstly have to choose a planning alternative or the LIVE-Workspace. The import of the 3D city model data will then be done from this workspace. The import dialog can be activated through the menu entry **Database-> Import City Model Data....**

Please note: The import of city model data is possible without a terrain model. In this case

a dummy terrain will be created for the area.



For the import of 3D city models, you can also choose a limited import area. If no import area is set, the whole city model data will be imported from the current workspace. Additionally a city object group from the database can be chosen to import city objects, that are a member of this group only.

To improve the import performance, you can choose to import only one of the existing levels of detail as well as avoid the import of textures and colors, which can improve the import speed enormously.

Press button **OK** to start the import, the progress will be shown via a progress dialog. When the import is done the new city model will be shown as DB Imported Citymodel in the object tree.

Please note: Generic city models will not appear as city models but as 3D objects in tan object layer.

8.3 Data Export

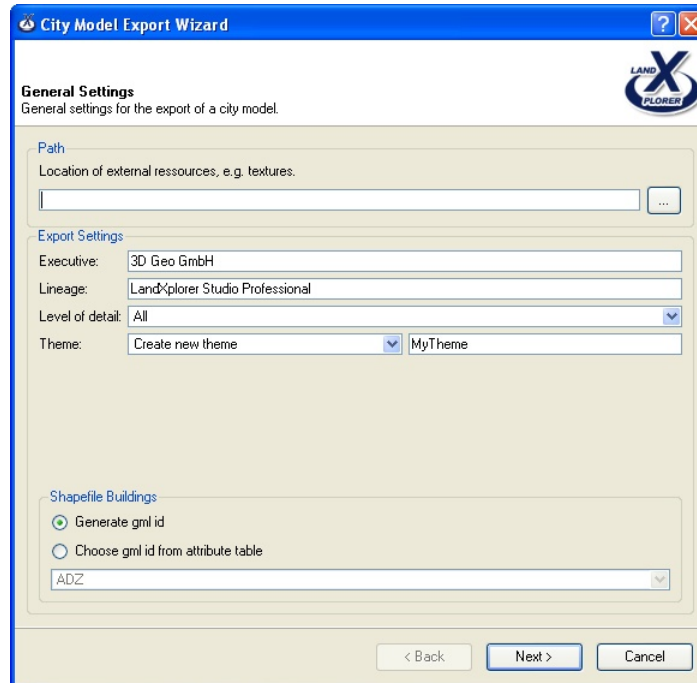
At the moment it is only possible to export city model data into the database. This data can be exported from LandXplorer City Models as well as from 3D models (e.g. .3ds) from an Object Layer.

The export of city model data into the database is explained in the following chapters:

- Export of City Models
- Export of Object Models
- Change City Model Data

8.3.1 Export of City Models

To export a loaded city model to the database it will have to be selected in the LandXplorer project. Afterwards the export wizard can be started by selecting **Database** -> **Export selected City Model....** Additionally you can export all selected city objects (in the 3D canvas) by choosing **Database**->**Export selected buildings....**



If the city model was created on the basis of a CityGML file then the structure of this CityGML city model will be mapped directly into the database. If the city model was created from a feature file (i.e. ESRI Shape), the buildings will be converted to CityGML buildings automatically. An additional page will be opened which allows a manual mapping between the feature attributes and the CityGML or generic attributes.

City Model Export Wizard

City Model Attributes
Convert city model attributes from the attribute table to specific database entries.

Building | Address | External Reference

	Database Attribute	Datatype	City Model Attribute	Default Value
1	DESCRIPTION	VARCHAR2	▼	
2	CLASS	VARCHAR2	▼	
3	FUNCTION	VARCHAR2	▼	
4	USAGE	VARCHAR2	▼	
5	YEAR_OF_CONSTRUCTION	DATE	▼	
6	YEAR_OF_DEMOLITION	DATE	▼	
7	ROOF_TYPE	VARCHAR2	▼	
8	MEASURED_HEIGHT	BINARY_DOUBLE	▼	
9	STOREYS_ABOVE_GROUND	NUMBER	▼	
10	STOREYS_BELOW_GROUND	NUMBER	▼	
11	STOREY_HEIGHTS_ABOVE_GROUND	VARCHAR2	▼	
12	STOREY_HEIGHTS_BELOW_GROUND	VARCHAR2	▼	
13	NAME	VARCHAR2	▼	
14	NAME_CODESPACE	VARCHAR2	▼	

☐ Convert unknown attributes into generic attributes

Date format:

< Back Next > Cancel

Furthermore a city object group can be used for export. All exported city objects will be members of this group. Therefore it is possible to choose an existing group from the database or create a new one by selecting **Create new city object group**.

City Model Export Wizard

City Model Object Groups
Create a new group or use an existing group for arrangement of multiple city objects.

Create new city object group ▼

Name:

Class:

Function:

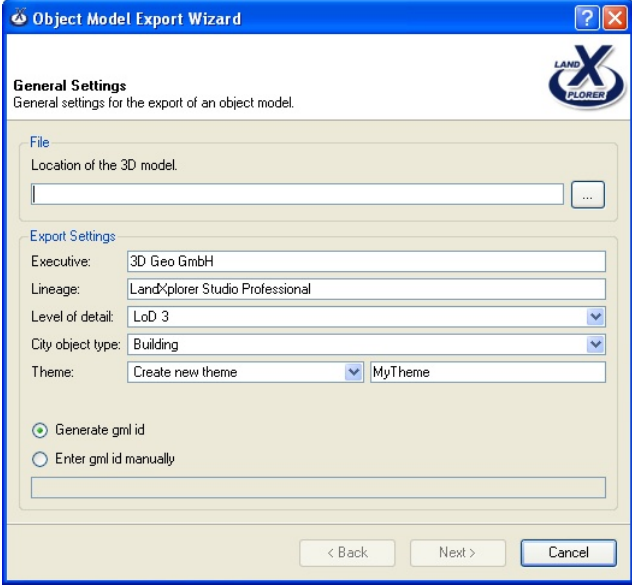
Usage:

Description:

< Back Finish Cancel

8.3.2 Export of Object Models

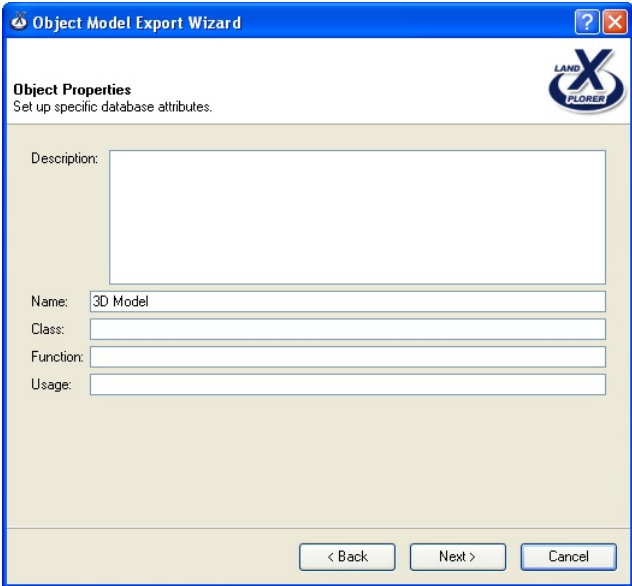
To export a loaded object model to the database it will have to be selected in the LandXplorer project. Afterwards the export wizard can be started by selecting **Database** -> **Export selected Object Model....**



The screenshot shows the 'Object Model Export Wizard' window, specifically the 'General Settings' tab. The window has a blue title bar with the text 'Object Model Export Wizard' and standard window controls. Below the title bar is a sub-header 'General Settings' with the description 'General settings for the export of an object model.' and the LandXplorer logo. The main area is divided into two sections: 'File' and 'Export Settings'. The 'File' section has a label 'Location of the 3D model:' followed by a text input field and a browse button (...). The 'Export Settings' section contains several fields: 'Executive:' with '3D Geo GmbH', 'Lineage:' with 'LandXplorer Studio Professional', 'Level of detail:' with a dropdown menu showing 'LoD 3', 'City object type:' with a dropdown menu showing 'Building', and 'Theme:' with a dropdown menu showing 'Create new theme' and a text input field 'MyTheme'. There are two radio buttons: 'Generate gml id' (selected) and 'Enter gml id manually' (unselected), followed by a text input field. At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'.

Within the **Export Settings** you can choose an appropriate level of detail, a city object type (e.g. GenericCityObject, CityFurniture) and the theme to which all appearance data should be assigned. Therefore it is possible to choose an existing theme from the database or create a new one by selecting **Create new theme**.

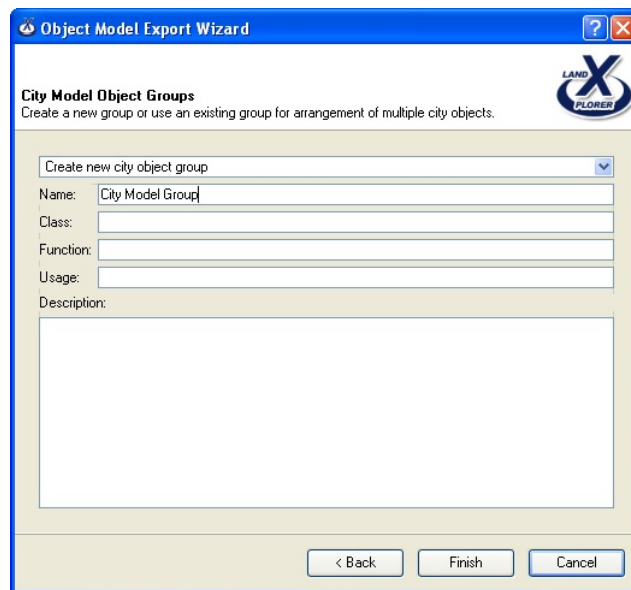
The object model will be converted to the corresponding CityGML object automatically. On the following page some specific CityGML attributes can be set manually.



The screenshot shows the 'Object Model Export Wizard' window, specifically the 'Object Properties' tab. The window has a blue title bar with the text 'Object Model Export Wizard' and standard window controls. Below the title bar is a sub-header 'Object Properties' with the description 'Set up specific database attributes.' and the LandXplorer logo. The main area contains a 'Description:' label followed by a large text input field. Below this are four labels with corresponding text input fields: 'Name:' with '3D Model', 'Class:', 'Function:', and 'Usage:'. At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'.

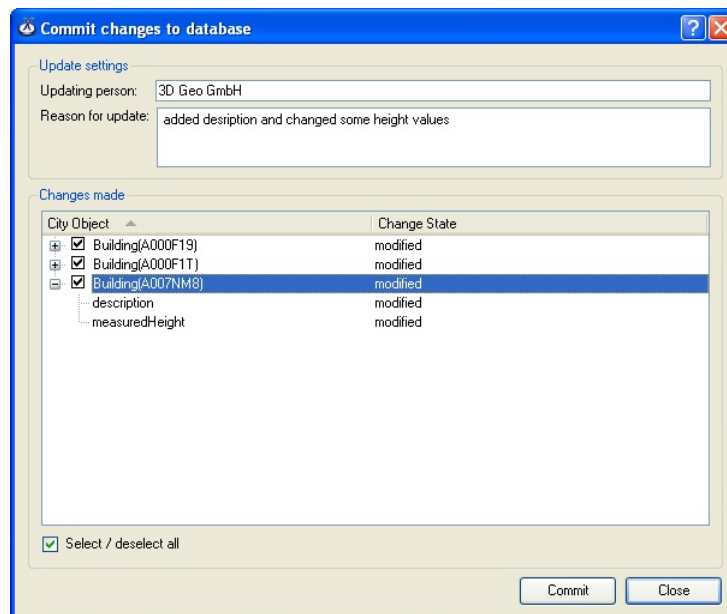
Furthermore a city object group can be used for export. The exported city object will be a member of this group. Therefore it is possible to choose an existing group from the

database or create a new one by selecting **Create new city object group**.



8.3.3 Change City Model Data

It is common that attributes of single city objects change frequently. After importing a city model from the database, it is possible to modify these attributes with the CityGML browser. To transfer these changes to the database the menu **Database->Commit changes...** has to be selected.



Here it is possible to declare a reason for updating the data and the updating person. All changes made can be reviewed and committed individually.



LandXplorer Studio Professional

Troubleshooting

Part 9

9 Troubleshooting

We hope you will not experience any problems using LandXplorer Studio Professional. If you do, please refer to the following chapters:

- [Problems During Installation](#)
- [Problems while using the Programme](#)
- [GPU Settings / Driver Download](#)
- [Error Handling](#)

9.1 Problems during Installation

If you have problems during Installation that are not described below please contact Support@3dgeo.de.

Error description:

The installation-process aborts during the copying of files.

Answer:

You have to login as administrator or at least use a login with sufficient administrative rights in order to be able to properly install LandXplorer Studio Professional.

9.2 Problems while using the Programme

If you experience any problems while using LandXplorer Studio Professional, please refer to the answers below or contact Support@3dgeo.de.

Error description:

The program lags/ Display does not adapt fluently while moving through the model

Answer:

Please shut down all applications running in the background.

Error description:

The program does not properly display surfaces and objects.

Answer:

Please make sure that you have installed the most recent driver for your GPU

9.3 GPU Settings / Driver Download

This page currently contains guidelines for GPU Settings concerning high-quality visualization as well as download-links to drivers for Hardware produced by the following companies:

- nVIDIA



If you encounter problems regarding your GPU's visualization and performance, please install the following current driver for GeForce and TNT2 GPUs:

Driver Download Forceware 56.72

Windows 2000/XP

Driver (english 10.2 MB)

Driver (international 17.7 MB)

Driver Download Forceware 56.64

Windows 98SE/ME

Driver (english 8.7 MB)

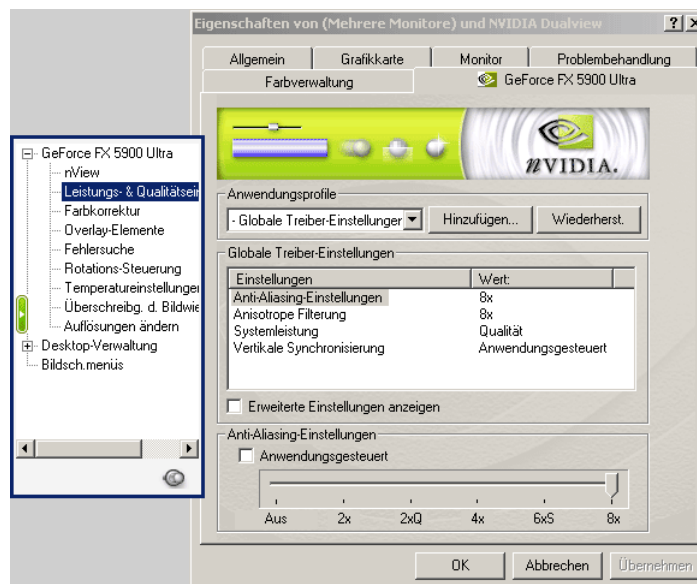
Driver (international 14.3 MB)

Official nVIDIA-Website:

<http://www.nvidia.de>

For the highest visual quality, please apply the following settings(assuming that overall performance is sufficient):

Visual Quality Settings nVIDIA



Complete the driver's installation and switch to following dialog:

Rightclick on Desktop > Properties > Settings > Extended > GeForce > Quality & Performance Settings.

The higher the value you set for Anti-Aliasing, the higher the visual quality of the VK3. However, this technique takes up much of the GPU memory. If programs start crashing, set this option back to the default.

- ATI



If you encounter problems concerning your GPU's visualization and performance, please install the following current driver for Radeon GPUs:

Driver Download Catalyst 4.4

Windows 2000/XP

(Service Pack 1 is needed for WindowsXP)

Driver incl. ATI Control Panel (27.7 MB)

Windows 2000/XP

(Service Pack 1 is needed for WindowsXP)

Driver only (9 MB)

Driver Download Catalyst 4.3

Windows 98SE/ME

Driver incl. ATI Control Panel (24.9 MB)

Windows 98SE/ME

Drivers only (9.3 MB)

Official ATI-Website:

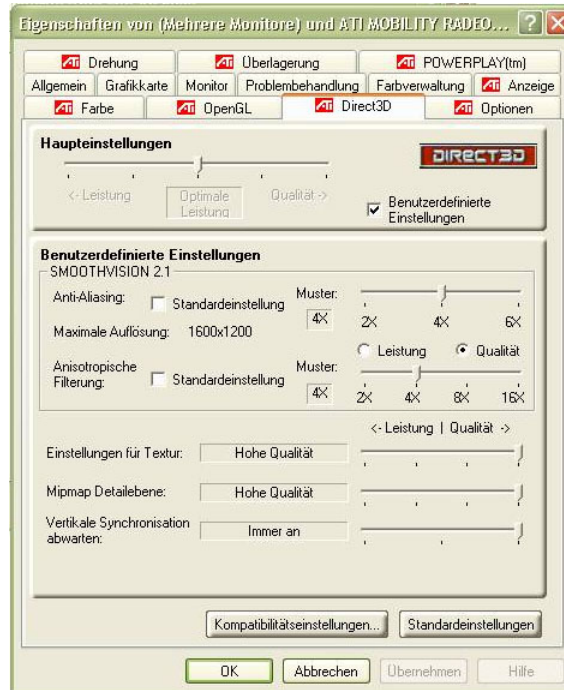
<http://www.ati.de>

If you are using a laptop with a mobile ATI GPU, please ignore all of the following directions, the recommended settings below will not work correctly because of driver bugs at this time.

After the driver-setup, switch to following menu:



Rightclick on your Desktop > Properties > Settings > Extended > 3D. Now, select 'Open GL'. Set the check mark for "user-defined settings" and configure all settings as shown in the screenshot below.



The higher the value you set for Anti-Aliasing, the higher the visual quality of the VK3. However, this technique takes up much of the GPU memory. If programs start crashing, set this option back to the default.

Furthermore, adopt the following settings.



9.4 Error Handling

In the unlikely case that LandXplorer Studio Professional causes an unexpected shutdown or system-crash, a message box containing information about the error will be displayed. If you want to help us improve our products, please copy the contents of the message box into an email message and send it to Support@3dgeo.de.



LandXplorer Studio Professional

Glossary

Part 10

10 Glossary

Accumulation Curvature	Accumulation curvature is a measure of the probable degree of flow accumulation. Accumulation curvature is used in combination with mean curvature to map accumulation, transit and dissipation zones of the land surface.
Aspect	the direction of a plane; that position which enables one to look in a particular direction; position in relation to the points of the compass;
Azimuth	horizontal direction expressed as the angular distance between the direction of a fixed point (as the observer's heading) and the direction of the object
Blend Style	method for intermixing sections and layers
Collision Detection	the systematic check to see if any intersections are occurring between significant polygons
Cross Curvature	SectionConvexity of the surface at a cell on a plane intersecting the slope normal and perpendicular to the aspect direction
Curvature	a measure or amount of curving; specifically : the rate of change of the angle through which the tangent to a curve turns in moving along the curve and which for a circle is equal to the reciprocal of the radius
Distance Query	method used for determination of distances
Flow line Curvature	a property unique to implicit surfaces, which measures how much the surface normal tilts as you move off of, or further into the surface.
Gaussian Curvature	curvature with symmetrical curves representing the normal distribution
Gouraud Shading	Gouraud shading is a method for linearly interpolating a colour or shade across a polygon. It was invented by Gouraud in 1971. It is a very simple and effective method of adding a curved feel to a polygon that would otherwise appear flat.
Hachures	a short line used for shading and denoting surfaces in relief (as in map drawing) and drawn in the direction of slope
Height Cylinder	cylinder object for height visualization
Hypsometry	measurement of the elevation of land above sea level
Maximal Curvature	The maximum curvature occurs perpendicular to the major curvature axis (by definition) and the minimum curvature occurs at from the maximum
Mean Curvature	Mean curvature (H) presents flow convergence and relative deceleration with equal weights. Mean curvature can be more representative topographic attribute than horizontal and vertical curvatures in relation to description of landscape processes.
Minimal Curvature	deterministic mapping technique, e.g. for calculating and applying corrections from measured depth. to true vertical depth

Morphology	the external structure of rocks in relation to the development of erosion forms or topographic features
Profile Curvature	Profile curvature is the curvature of topography as seen from a cross-section view
Raster Layer	A raster layer is a grid of pixels over the geographic region of concern. Every pixel is square and its size defines the resolution of the layer.
Slope	The part of a continent descending toward, and draining to, a particular ocean; as, the Pacific slope. An elevated geological formation
Terrain Scaling	method for altering of the vertical exaggeration of the terrain model.
Vector Layer	A vector layer is composed of georeferenced lines that define spatial objects



LandXplorer Studio Professional

Imprint

Part **11**

11 Imprint

3D Geo GmbH offers business customers and value-added integrators the 3D Geo GmbH LandXplorer technology with the goal to establish a leading position among enterprises in geo visualization technology using its technological advantage. 3D Geo GmbH is providing fast, reliable, and outstanding solutions in real-time 3D visualization, management, and distribution of geo information, wrapped into software solutions that can be directly used as desktop applications as well as integrated into third-party products and systems.

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