

# Terrain Manipulation

This tutorial introduces the Simmetry 3d interactive terrain manipulation and the tools that

## Concepts

In this tutorial you will learn about:

- Geo-referencing
- Terrain Visualisation Modes
- Terrain Editing Tools
- Terrain Selection
- Water
- Importing from real world data

## Prerequisites

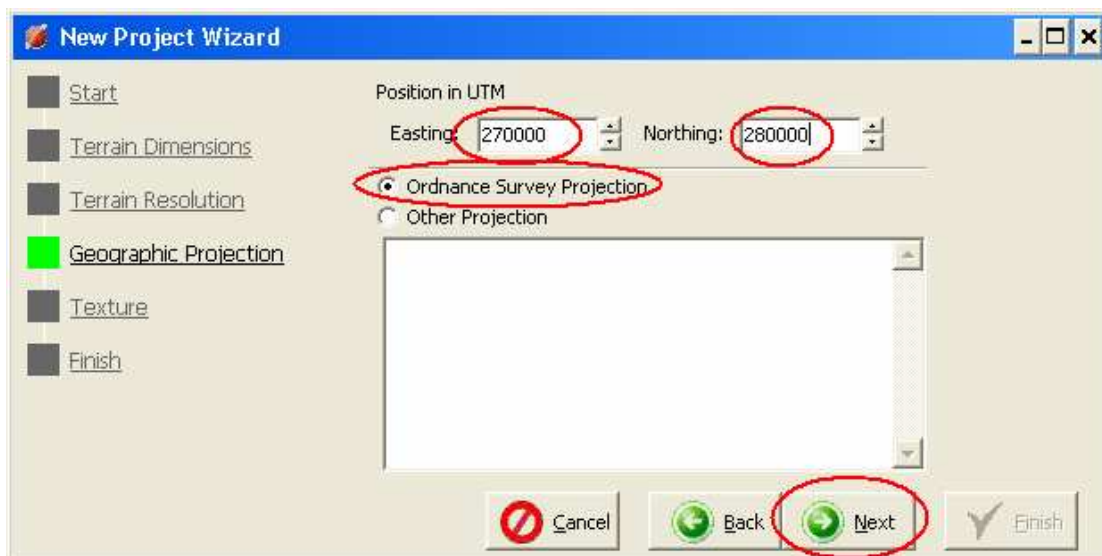
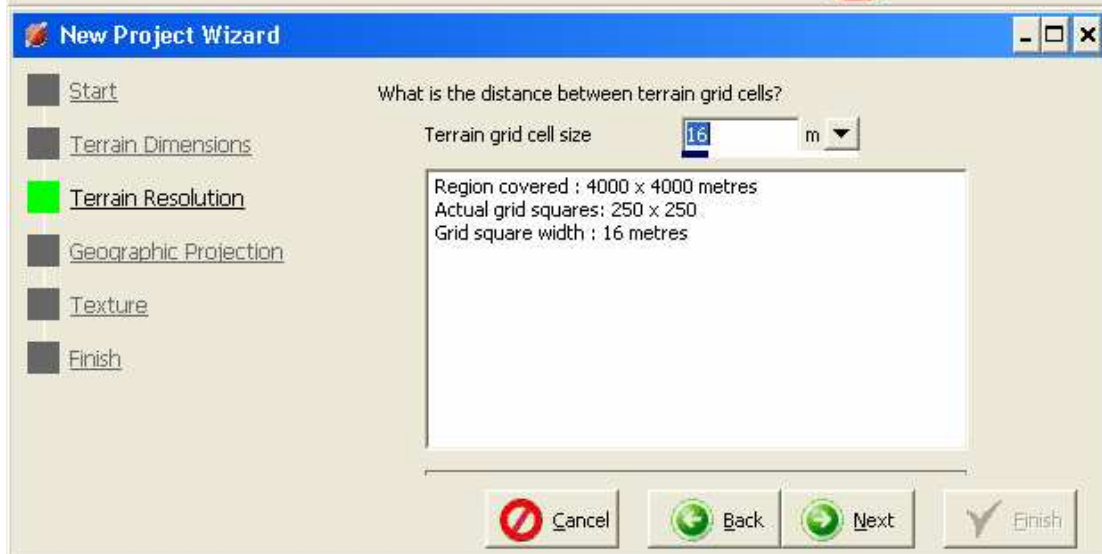
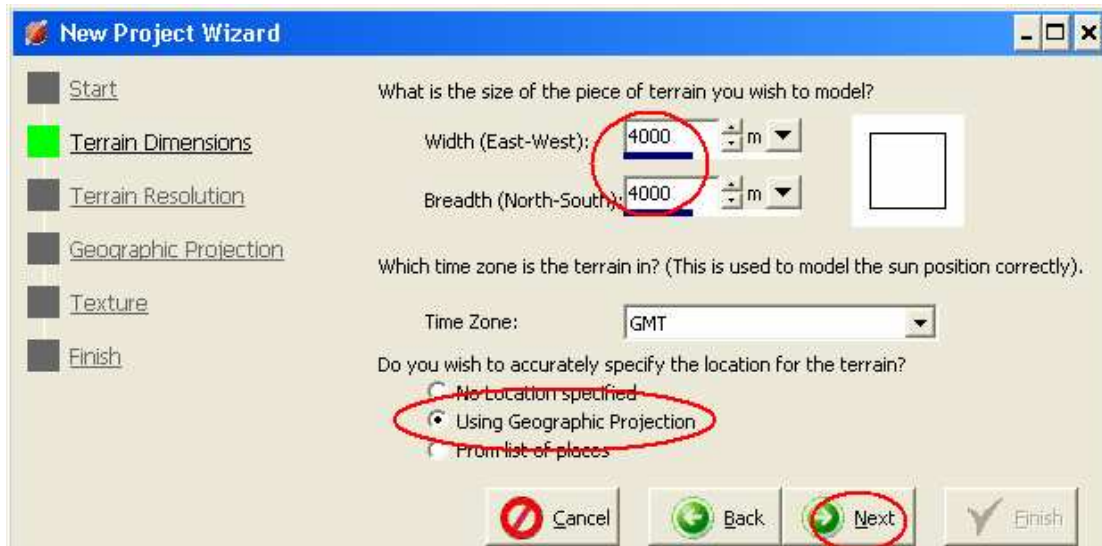
- Introduction to Simmetry3d Tutorial

## Geo-referencing

Simmetry 3d can maintain a geo-referenced co-ordinate system for each project. This allows you to view accurate longitude and latitude values in the status bar.

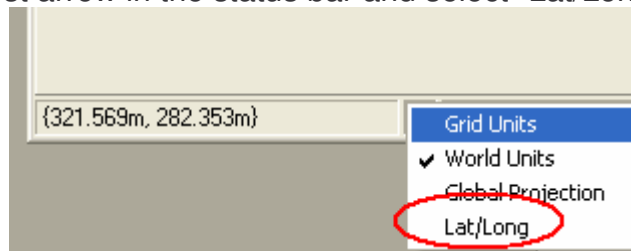
## EXERCISE 1

- Create a new project



- Set the width and breadth of the new terrain to 4000m x 4000m
- Set Use Projection

- Set Left Position to 270,000 and Top to 280,000
- Set the Ordnance Survey Projection option
- Press “Ok” button
- Click the first arrow in the status bar and select “Lat/Long” option



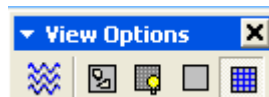
- Move the mouse over the terrain in the 3d view and you can see the longitude and latitude appear in the first panel of the status bar





## Terrain Visualisation Modes

Simmetry 3d can display the terrain in a variety of different viewing modes depending how you wish to work.

## EXERCISE 2

- Load “Terrain\Project1.s3d”
- Locate the View Options tool Bar



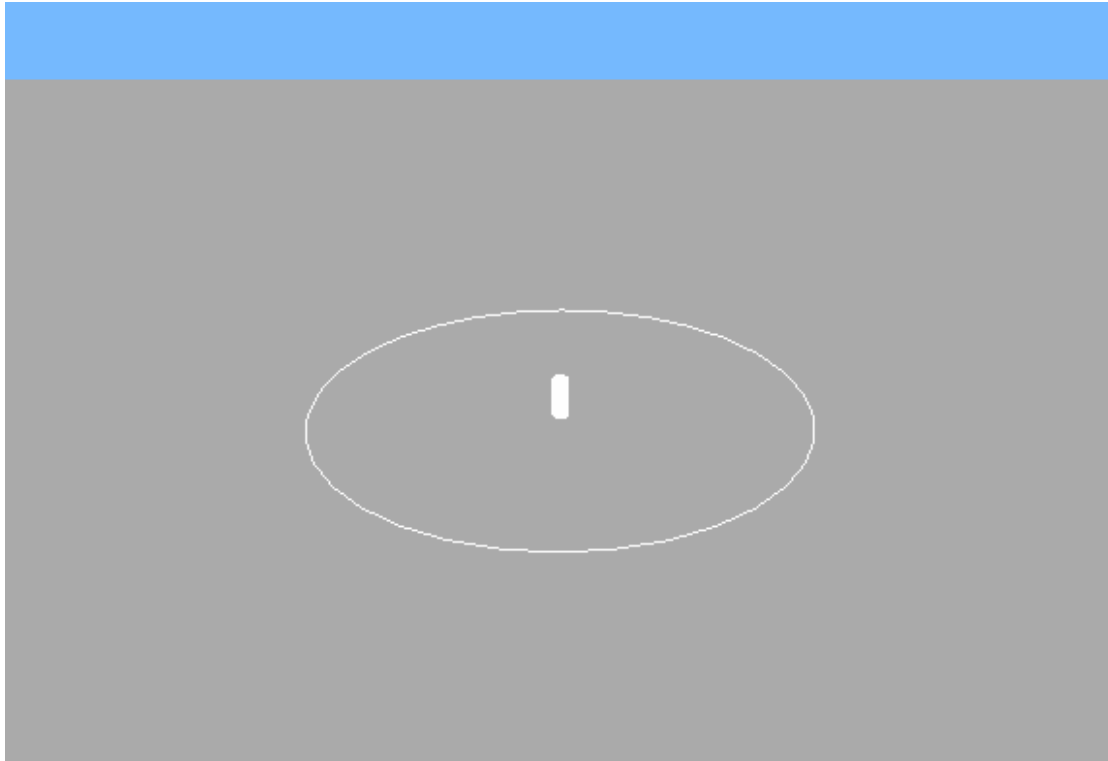
- Press the Textured Tool Button 
- Press the Lit Textured Tool Button 
- Press the Shaded Tool Button 
- Press the Shaded Wireframe Terrain Tool Button 

## Terrain Editing Tools

Simmetry 3d provides a series of different terrain editing tools that allow you to manipulate the terrain interactively. The tools all edit a bit of the terrain at a time and the area that is affected is determined by the tool “brush”. All the terrain tools all work with the concept of a “brush”. The brush simply encapsulates a series of parameters that determine how the tool alters the terrain and each terrain editing tool has a separate brush that allows you to perform different terrain editing tasks. Thus, the Build tool adds terrain with its brush and the Level tool flattens terrain to a specified height.

Each tool has a brush cursor on the 3d view that allows you to see the area that will be affected when you click on the terrain.

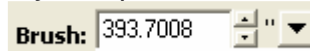
To activate the functionality of a tool, simply left click the mouse on the 3d view and the terrain will alter underneath the brush cursor




For each terrain editing tool are a series of parameters that control the brush on the Tool Options Bar. You will also notice the standard entry component.




This shows the distance (or sometimes height) in which ever units you have chosen to work in; in this example it is showing metres – hence the “m” symbol. Here is the same entry component after changing to inches:








### EXERCISE 3

- Create a new project ( 5000m x 5000m )
- Move into Shaded Wireframe View Mode 
- Choose the “Terrain” tool mode:



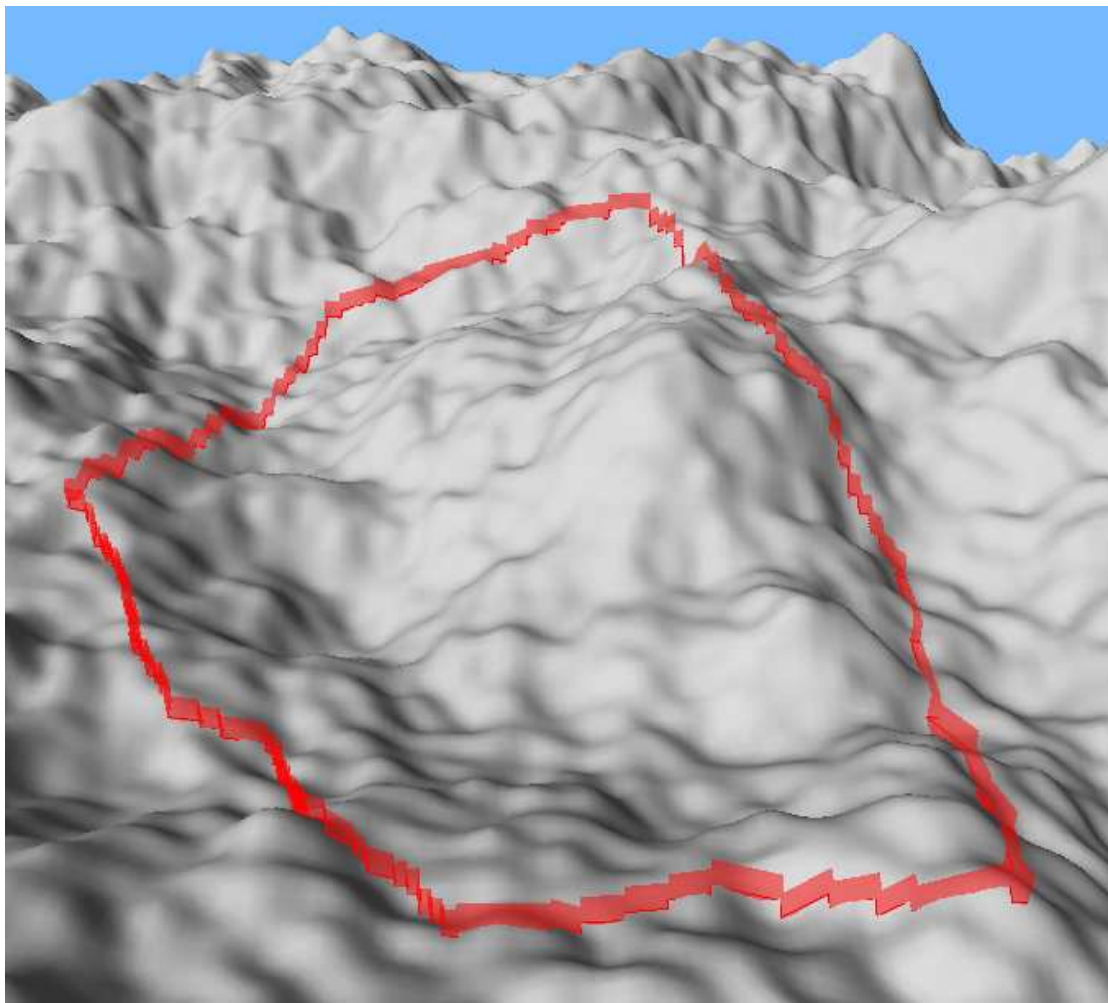
- Start the Build Tool 
- Move the mouse over the 3d view and observe the brush cursor

- Double the “Brush” value and move the cursor back over the 3d view. The brush cursor will have altered size to show you the new area affected
- Set the “Strength” value on the Tool Options Bar to 30m
- Make sure the brush shape is set to the round brush shape  on the tool options bar
- Left Click the mouse on the terrain where you want to build terrain
- Release the mouse button
- Left click and hold the mouse stationary on the terrain to see the build tool repeat build on the same spot
- Release the mouse button
  
- Change the brush shape to the point  on the tool options bar
- Left click and hold the mouse stationary on the terrain to see the build tool repeat build on the same spot. See how the shape of the terrain is different
  
- Left click and hold the mouse button down and move the mouse to add terrain while moving
- Release the mouse button
  
- Start the Dig Tool 
- Remove some terrain
  
- Create a new project
- Start the Level Tool 
- Set the Level Height to 20m
- Check the “Is Absolute Height” tool Option
- Create a large area of 20m height
- Set the Level Height to 40m
- Create a plateau on top of your 20m area
- Make the brush smaller, using the “Brush” tool option
- Repeat for a 60m height area
- Start the Smooth Tool 
- Left click and drag the mouse along the “rough” edges of your 40m plateau and smooth out the edge
- Repeat for the 60m level
- Try using the undo / redo functionality to reverse and recover changes to the terrain

Now spend a few minutes trying out the other terrain editing tools that are available.




## Terrain Selection


Terrain selection is a way of limiting the effect of the terrain editing tools to a specific, or “selected”, area of the terrain. The selected area is represented by a red border in the 3d view.




The terrain editing tools will now only work within the enclosed area of the terrain.

## EXERCISE 4

- Create a new project
- Start the Select Freehand Tool 
- Left click on the terrain and select an area
- Start the Build Tool
- Build terrain on to the existing terrain both inside and outside the selected area
- Run the Select None Tool  to remove the selection
- Run the Select Rectangle  to select rectangular sections of the terrain
- Hold down the Control Key and add some terrain to the current selection



- Hold down the Shift Key and remove some terrain from the current selection
- Run the Toggle Selection Tool  which will make all terrain that is not selected into the current selection and vice versa

## Water

The simplest way to display water in Simmetry 3d is as a single plane of water that can be set to any height and is switched on and off by the water view option  that can be found on the 3d View options tool bar.

You can move the height of the water interactively using the Water Height Tool.


## EXERCISE 5

- Load the project file “Terrain\Project1.s3d”
- Turn on the water for the terrain using the water view option 
- Turn off the water by repressing the same option
- Start the Water Height Tool  from the Tools menu
- Use the “Water Height” Tool Option to set the water to 50m
- Left click the mouse on the terrain at the height you want the water at and hold the button down
- Move the mouse up and down to alter the height of the water
- Release the mouse button when the water is at the height you want

## Importing from Ordnance Survey data

Simmetry3d allows the import of height data from a variety of sources, one of which is the Landform Profile Digital Terrain Map (DTM) data. The importers allow you to quickly create terrains from existing data sets.

## EXERCISE 6

- Create a new project
- Change to the shaded view mode 
- Open the File Menu
- Open the Import Menu, and choose “Import Wizard”, then select “Terrain” as the data type.




- When you press “Next” you will be asked for the file you wish to imports - Choose the dtmss78.ntf file



- Use the camera tools to view the imported terrain

## Advanced Options

Try investigating the custom brush shapes which you can set up using the  tool option button in the Build and Dig tools

Continue to explore the other terrain editing tools on the Terrain Tools tool bar.