EXERCISE 4
Surface Modelling

A 3D view of the surface of the Earth provides an intuitive visualization with landforms such as mountains and valleys immediately recognized as features of the landscape. Such 3D visualization is possible through the creation of a surface model consisting of the mathematical representation of a geographical region.

The model is generation from the altitude or elevation data (called spotheights) derived from GPS devices, surveying instruments or existing maps with topographic information. The TIN (Triangulated Irregular Network) generates a surface model by creating adjacent triangles defined by nodes consisting of the spotheights.

Objectives (at the end of this module, the user should be able to)

1. Add spotheight data into an existing map layer
2. Generate and display a 3D surface of the area covered

Requirements:

1. Software required include ArcMap Version 10
2. Knowledge of ArcMap use.
3. Spotheight data available from http:// (download and unzip to your working folder)

Generating a TIN

1. Open a New Blank Map in ArcMap
2. Add the waypoints shapefile provided (Points_ge.shp)
3. Click on the search Tab and look for the "Create Tin" tool
4. Run the Create Tin (3D Ana- lyst) tool that comes out in the Search Window)
5. Name the Output TIN "surf- TIN"; Select "rWaypts" as the input feature
6. Click on the Height Field of the "rWaypts" file and select shape.z as the elevation or altitude field
7. Click on OK
8. The modelled TIN surface is displayed

Generating the Contours and converting to Raster

1. Look for the tool "Surface Con- tour" in the Search Window
2. When the tool comes up, set the Input surface to be the "surf- TIN" file
3. Provide the name for the Output Feature Class as "surfContour"
4. Set the contour intervals to 0.2
5. Leave the rest of the fields as is
6. Click on OK and the contours should be generated showing the contours at the specified inter- vals.
7. Using the Search, create a TIN to Raster (3D Analyst), convert the surfTIN into a raster format and name it "surfRaster"
8. Click on OK

Generate Aspect and Hillshade from Raster

1. Search for the Tool "Aspect" in the Search Window
2. Use the previously saved "surfRaster" as input
3. Name the output "aspectsurf "
4. Click on OK
5. Search for the Tool "Hillshade" in the Search Window
6. Use the "surfRaster" as input
7. Name the output "hillshadsurf "
8. Click on OK