

Project Case Study: DTM Feature Extraction and 3D Surface Modeling - Case Study  
**3D Surface Modeling**

DTM Features Extraction from toposheets of different Scales like 1:50K, 1:100K and 1:200K with capturing of desired set of attributes including elevation values for more than 10,00000 SQKM.

**Business Need:**

The client aimed to create more accurate and precise 3D Surface Model (DTM) from the captured toposheet features. The desired set of features for this extraction area Contour, Spot, Hydro Spot, Lake, Hydro line, Hydro Polygons, Cliff Area, Coast Line, Islands etc.. This will be most critical element in surface assessment and determines the efforts required in planning & managing the future needs of the development and to have better control.

**Area Covered:**

This project covers more than 10,00000 SQKM belonging to various locations over USA, Soviet, Japan, Germany, UK, Saudi etc,

**Inputs Used:**

Topomap:

Toposheets containing all desired DTM features information are used for digital data extraction along with respective attributes.

**Business Solution:**

The most accurate solution to derive the well-precised 3D Surface Model is the DTM technique. For this, the set of DTM Features containing Contour, Spot, Hydro Spot, Lake, Hydro line, Hydro Polygons, Cliff Area, Coast Line, Islands etc feature classes are captured with high digitizing precision with an attention to well- align the vector to respective raster maps. The contour, Spot and Hydro Spot features are populated with respective elevation Values, using which the 3D Surface Model is generated in ESRI Platform. Along with elevation Values, a few further attributes are to be assigned to different features like Type (Normally the Attribute and categorization Protocols are specified from Client). After creating the 3D Model from Contour, Spot and Hydro Spot features, captured Hydrography features are overlaid to the DTM to generate an accurate and improved Surface Model. Also, a set of Psyiography features like Cliff, Elevoida, Dike; Gullies are captured as vector though these are not included to 3D Model. Thorough QC, Feature Connectivity and Topological relations are well-validated to ensure a good vector data preparation. Certain logical queries like contour should not intersect Lakes, Hydrospot should not be contained by contours, Hydro Spot should have connectivity to respective Hydrography features etc. are checked and corrected before final data delivery.

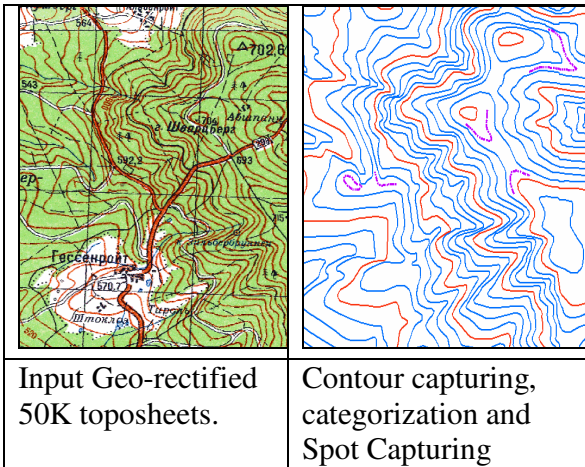
**Project Shipment:**

The data shipment to client contains

- i. 2D Shape vector dataset of captured DTM features incorporated with attributes.
- ii. 3D Surface Model(DTM) containing both Elevation and Hydrography Features.

**Software Used:**

- i) Arc GIS 9.3
- ii) AutoCAD Map 2008



Input Geo-rectified 50K toposheets.

Contour capturing, categorization and Spot Capturing

Figure 1. Input 50K toposheets with Captured DTM features.

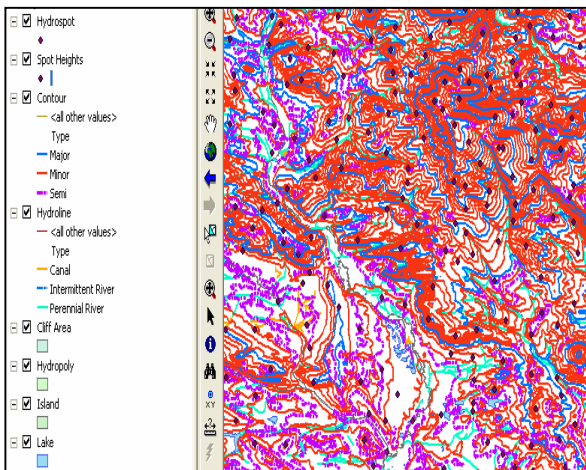


Figure 2. Captured DTM vector data with desired set of attributes.

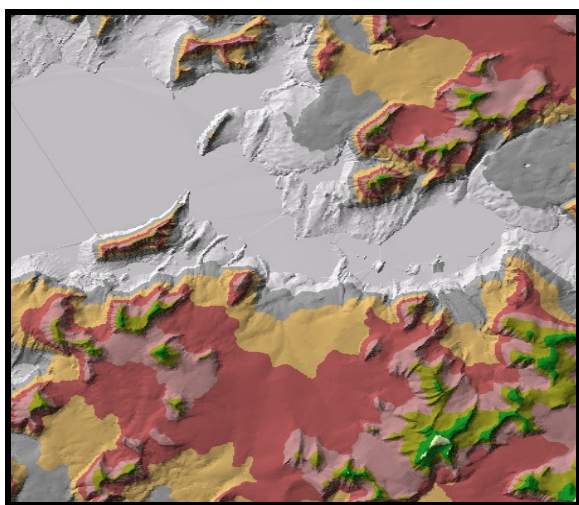


Figure 3. Surface 3D Modeling (Digital Terrain Model)

**Highlights:**