

# Digital elevation models based on the topographic maps

This article focuses on the technology of creating a digital elevation model (DEM) with the help of the geographic information system (GIS)



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This article focuses on the technology of creating a digital elevation model (DEM) with the help of the geographic information system (GIS). The geodetic measurements, topographic maps at a scale of 1:500 000, remote sensing, GNSS data and Central Asian Tectonic Science (CATS) are used for creating of DEMs. The advantages of the GIS in comparison with traditional methods of creating maps are given in this work. The ways for use of the European Remote-Sensing Satellite (ERS1) and the Synthetic Aperture Radar (SAR) for creating of the digital map of the Tashkent region are described. Development of digital terrain models using GIS PANORAMA for 4 regions of Uzbekistan is described in more detail. The analysis of the trajectory of the ERS1 during the passage to the territory of Uzbekistan was also made.

From the perspective of the development of the Global Geodetic Reference Frame (GGRF) Uzbekistan's commitment envisages the further improvement the national geodetic infrastructure. The goal is to develop spatial data in accordance with required accuracy and to contribute to

the development of an accurate, accessible and sustainable GGRF. In this country, the development of homogeneous distribution of geodetic infrastructure is related to the upgrading the reference system and Datum, the cartographic projections for topographic maps. Data sharing is also limited because of not well defined geodetic standards and an absence of open geodetic data. This paper covers only one of the issues of the development GGRF and Global Spatial Data Infrastructure.

In 1980-1990, information about the terrain was recorded on the national topographic maps. The information was obtained on the basis of geodetic measurements (triangulation and leveling), aerial surveys and optical remote sensing. Currently, these maps must be corrected and improved because of deformation of the coordinate grid due to global and local plate shifts. First of all, this refers to the mathematical basis of the maps. Accurate topographic maps are in need not only to navigate, but also to indicate geometric relations between points of landmarks depicted on the map, to display information on areal extent of different land use, to design large infrastructure and transportation problems, and so on. They will be in demand for a long time and can be used as an addition to digital maps. A refined rectangular and spatial coordinate system is a base for development of an accurate digital map and a digital elevation model. A spatial reference system defines the coordinate system and Datum in which all landmarks have a unique "address" or position.

Many areas of the world are poorly or insufficiently mapped, and any existing information is often out-of- date. Additionally, the rapidly growing market

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