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Determination of Land Types Using Remote Sensing on the Example of Rishtan District

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Annotation: *this article analyzes remote sensing of land in the Rishtan district of the Republic of Uzbekistan to analyze and identify land types, as well as identify and monitor various types of land.*

Keywords: *geoanalysis, geodetic sensing, monitoring, perennial trees, human settlements, remote sensing, land types.*

INTRODUCTION.

Radars and lasers have long ceased to be just exciting attributes of science fiction movies, as it was decades ago. These innovations have been widely used for remote sensing of the Earth since science has taken a giant step forward. [1-3]

Over time, remote sensing of the Earth from space has found application in various fields of human activity. For example, farmers enjoy the benefits of remote sensing in agriculture on a daily basis. Many important decisions are made using data RADARSAT, TerraSAR-X, SRTM, EOSDA, ERS, Sentinel, Landsat and other remote sensing satellites. [1-10]

THE MAIN PART.

The classification of remote Earth sensing methods is based on the type of signal source for studying the object – active or passive. Active remote sensing instruments themselves can emit a signal or have their own light source, while passive remote sensing uses reflected sunlight. Radiation also has different wavelengths and can be short-wave (visible, near-and mid-infrared) and long-wave (microwave). [1-15]

In Figure 1, you will be able to get acquainted with the latest support for sensing the earth from space.

Active Remote Sensing Tools. Each active Earth surface remote sensing sensor sends a signal and analyzes the result-the intensity of the received signal. Most remote sensing devices use microwaves because they are relatively unaffected by weather conditions. Active remote sensing technologies vary depending on what they transmit (light or waves) and what they measure (for example, distance, altitude, atmospheric phenomena, etc.):

A radar is a device that uses radar signals to measure range. A distinctive feature of the radar is an antenna that emits pulses. When the radar signal “bumps” into an obstacle, it returns in one way or another. Based on the intensity of the returned signal and the elapsed time, you can determine how far from the radar the object under study is located.

Lidar detects distance using light. The lidar remote sensing method involves transmitting light pulses and measuring the intensity of the returned signal. The location of the object under study on Earth and the distance to it is calculated by multiplying the time taken by the speed of light [5-15].

A laser altimeter (altimeter) measures altitude using lidar.

Range measurement tools (rangefinders) determine the range using one or two identical devices on different platforms that transmit signals between each other.

The echo sounder studies weather conditions vertically by emitting pulses (if it is an active remote sensing device).

A scatterometer – reflectometer) is a special device for measuring the returned (scattered) radiation.



Figure-1. Sensing the earth from space.

Various methods of remote sensing of the Earth by satellites have found application both in the scientific sphere and in applied industries.

The Space Shuttle's Radar Topographic Mission (SRTM) collected data on the Earth's topography [16-22].

Active remote sensing of the surface of our planet from space using lidar allowed us to create a digital model of the altitude map of the planet Earth.

Remote sensing of the world's oceans and remote points of our planet is critically important for oceanology, ecology, the oil industry, as well as during search and rescue operations.

Remote sensing of forests helps to detect forest fires, deforestation, assess the state of forest assets (including due to tree diseases) and monitor reforestation.

Remote sensing of the soil is actively used in agriculture.

Echo sounders are essential for weather forecasting, as they vertically probe atmospheric layers and provide data on humidity, precipitation, temperature, and the absence or presence of cloud cover [23-30].

Unfortunately, at this time, Uzbek researchers do not have access to life sensing using spacecraft. And at the moment we use Internet images and flying machines. On table-1, you can view a picture taken from the Internet platform and find out the division of land types using the example of Rishtan district of the Ferghana region (Uzbekistan).

Table-1

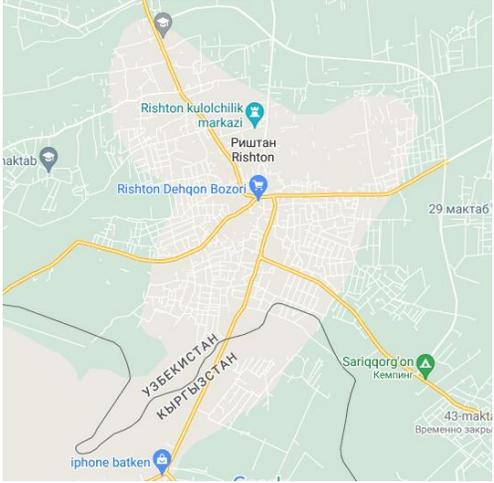
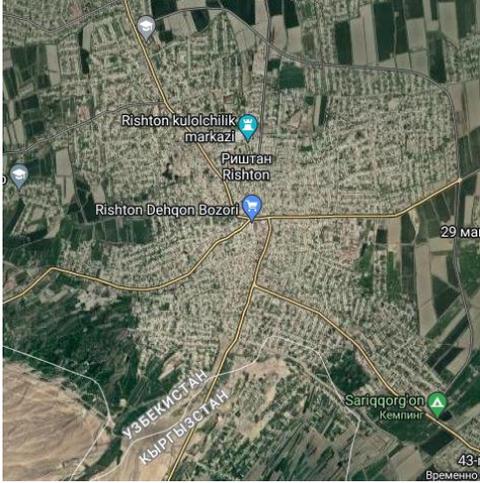
	
Cart layer	Satellite layer

Table-1. Division of land types on the example of Rishtan district.

In the figures in Table 1, you can view land types such as agricultural land, localities, and other types of land.

Passive Remote Sensing Of The Earth. Unlike active sensors, passive remote sensing sensors do not have their own source of energy to direct it to the object under study or the Earth's surface. Passive remote sensing depends on natural energy – the sun's rays reflected by the object. For this reason, this method of remote sensing of the Earth is possible only with a sufficient amount of sunlight-otherwise there will be nothing to reflect.

Passive remote sensing uses multispectral and hyperspectral sensors that measure the received amount of signal using combinations of various bands. These combinations may include a different number of channels (with two or more wavelengths)[31-34]. The ranges cover the spectra within and beyond the perception of the human visual organs (visible, infrared, near, thermal infrared).

This remote sensing technology is used in many industries. In particular, hyperspectral remote sensing in geological mapping made it possible to detect and map mineral deposits, rocks and minerals, hydrothermal manifestations, and determine the geological situation based on indicator minerals [35-37].

CONCLUSION.

Currently, a number of measures will be introduced to improve and update various maps of the republic and their regions for remote sensing. To improve the quality of monitoring of all types of land in the republic.

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