IAF EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations - IAF EARTH OBSERVATION SYMPOSIUM (IP)

Author: Prof. Fuad Hajizada
Azerbaijan

# ON THE USE OF SPACE RESEARCH MATERIALS TO IDENTIFY UNDERGROUND STRUCTURES

**Abstract**

Remote sensing from artificial satellites has been considered an important technological component in matters of studying the Earth's surface, solving environmental, meteorological, military and other tasks. To solve these problems more successfully, integration of a large array of data obtained from various sources in different time periods is required. One of these very important tasks is to study the issues of recognition and identification of underground structures and communications of various types and purposes on the ground.The use of modern satellite instruments of medium and high resolution in the corresponding spectrum ranges is quite appropriate and necessary to obtain the desired results. Along with the data of such devices, it is also necessary to use satellite images, including from the Azerbaijani low-orbit satellite "AzerSky". The presence or absence of underground structures or communications as a result of changes in the spectral feature of vegetation at all phenological stages (spectral signature - the process of reflection or absorption of an object by wavelengths) makes it possible to detect areas whose surface is covered with natural soil. For this purpose NDVI – Normalized Difference Vegetation Index, SR – Simple Ratio, EVI – Enhanced Vegetation Index, VI – vegetation index are used.The vegetation index SR is extremely useful for determining the relevant features of the studied objects. It is known that underground structures (tunnels, bunkers, archaeological sites) affect the surrounding landscapes to varying degrees. This can manifest itself through parameters such as soil moisture, degree of drainage, composition and vegetation vegetation. Vegetation can be traced using samples taken above the soil (crop mark). The samples obtained can be compared with the information obtained from satellite images and used to demonstrate the existence of underground structures. If obtaining the necessary samples is not possible, it is necessary to use satellite images. In this case, satellite images and 3D (DEM – Digital Elevation Model) terrain models determine unsuitable areas for detecting underground structures. The directions of water flows and watersheds are calculated using the DEM model.In this case, the results allow us to exclude unsuitable areas from the field of research, which reduces the amount of work. The next stage allows you to determine the temperature variability of the soil. So, in places with underground structures, temperature indicators, as a rule, differ from others.