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MODERN ASPECTS OF AEROSPACE MONITORING OF GEOTECHNICAL SYSTEMS BASED ON
UNMANNED AERIAL VEHICLES

Abstract

The proposed work explores the possibility of using airborne measuring systems based on Unmanned Aerial Vehicles and equipped with a thermal imager, a video camera, an ultraviolet camera, a laser scanner, and a gas analyzer for solving modern RS problems. Solved problems cover geology (searches for mineral deposits on land and offshore - oil, gas water), ecology, forestry, diagnostics of the state of the main oil and gas pipelines. Scientific novelty of the proposed article is the innovative technology of volumetric modeling of the thermal field of the Earth, which allows solving modern problems of remote sensing based on aerospace survey in the optical wavelength range, which significantly reduces financial costs in studying the geological structure of natural objects, searching for minerals and environmental monitoring of natural and technogenic systems. The proposed technology of thermal imaging modeling of the geological environment is based on the processing of images in the thermal infrared range of 8-14 m. The article shows the advantages of using UAV in solving the tasks of the RS, which, first of all, include: -economy; -low operation cost; - mobility during transportation; - Simplicity of piloting control; -The possibility of take-off and landing in various conditions; - the possibility of operation at extremely low altitudes and in the low-speed mode; -environmental friendliness; -high flight safety.

In conclusion, the authors give the main scientific results obtained in the work:

- A new technology for rapid assessment of the technical condition of the main oil and gas pipelines, environmental monitoring of the geological environment; - The usage of a high-resolution thermal imaging system built on the basis of UAV makes it possible to detect oil spills and gas leaks, unauthorized tie-ins, potentially dangerous tectonic zones; - The use of a thermal complex based on UAV makes it possible to study the geological structure of natural systems, assess the oil and gas potential of licensed blocks on land and sea, and conduct an environmental study. - The proposed methodology makes it possible to compile electronic maps of the most promising areas of oil and gas accumulation, on which, first of all, it is necessary to conduct seismic exploration operations. - When using a UAV, the terms and costs of exploratory work are significantly reduce