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

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Abstract

The proposed article shows that the introduction and practical use of unmanned aerial vehicles (UAVs) equipped with special imaging equipment is a priority for the use of the latest geoinformation technologies in solving remote sensing problems. The actual tasks of remote sensing solved with the help of UAVs, first of all, include the tasks of searching for promising oil and gas fields on land and offshore, as well as the tasks of diagnosing the state of geotechnical objects (main oil and gas pipelines, underground communications, automobile roads and railways). To search for promising oil and gas fields, a technique based on the processing of aerospace images in the thermal infrared range (8-14 microns) is proposed. The technique provides for the calculation, on the basis of the developed algorithms and programs, of the effective density of the thermal radiation flux, at given depths, of the studied geological structures. The proposed article examines the extremely urgent problem of using UAVs for the operational assessment of the technical condition of main oil and gas pipelines. The article shows that for conducting multi-height thermal imaging using UAVs equipped with special equipment, the most optimal parameters of aerial photography are: - imaging height HS from 0.02-3 km; - capture strip LZ from 0.01-2.3 km; - resolution on the ground A from 0.01-3.6 m; - sounding depth HZ from 1.2 - 900 m. The measuring aviation complex based on the UAV, for solving the problems of remote sensing formulated in the article, should include the following equipment; thermal imager; video camera; UV camera; laser scanner; multifunctional gas analyzer. Conclusion The use of specialized UAVs is extremely promising in the search for oil and gas on land and offshore. Methods of remote sensing of the Earth based on thermal imaging provide a rapid study of large areas and make it possible to: -carry out a tectonic study of promising territories and provide geological zoning with the allocation of oil and gas accumulation zones; -to compile large-scale electronic maps of the most promising areas of oil and gas accumulation, on which, first of all, seismic exploration should be concentrated; - assess the condition of the main oil and gas pipelines with the allocation of potentially hazardous areas.