

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

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AN INNOVATIVE TECHNOLOGY FOR AEROSPACE MONITORING OF GEOTECHNICAL
SYSTEMS BASED ON THE USE OF UNMANNED AERIAL VEHICLES (UAVS)

Abstract

PURPOSE: The proposed set of equipment placed on the UAV is designed to solve urgent problems of remote sensing in the field of geology, including the search for promising mineral deposits, ecology, forestry and agriculture, as well as geotechnical diagnostics of the state of oil and gas pipelines in order to timely detect potentially hazardous areas. **MAIN OBJECTIVE OF THE PROJECT:** The proposed innovative technology for solving remote sensing problems based on UAVs makes it possible to conduct geophysical research in the region based on aerospace surveys in the optical wavelength range using a new technology for volumetric modeling of the earth's thermal field. The developed technology for aerospace monitoring and interpretation of thermal imaging information of the region under study has no analogues and is relevant in the study of the geological structure, the search for minerals and the environmental monitoring of natural and technogenic systems. The technology of thermal imaging tomography in solving remote sensing problems is based on the processing of satellite images in the thermal IR range of 8-14 m. **SCIENTIFIC PRINCIPLE OF THE METHOD:** The scientific novelty of the proposed technique lies in the fact that, according to the given algorithms and programs, the effective density of the thermal radiation flux in geological structures at given depths is calculated. In the process of its interpretation, a three-dimensional model of the medium is calculated. **APPLICATION AREA:** The most important task of applying the technology of volumetric modeling of the thermal field of the earth is aerospace monitoring of the state of oil and gas pipelines. Using a UAV equipped with a high-resolution thermal imaging system, it is possible to detect oil spills and gas leaks, unauthorized tie-ins, geodynamic displacements of pipelines, and potentially dangerous tectonic zones. **SCIENTIFIC RESULTS: METHOD OF REMOTE SENSING OF THE EARTH USING UAV** equipped with thermal imaging equipment allows to carry out tectonic study of territories and provide geological zoning with the allocation of zones of promising oil and gas fields and their presentation in the form of large-scale electronic maps.

On the basis of spectral-zonal survey and the developed technology for obtaining and analyzing the volumetric thermal field of the earth, a Geoinformation model was created that characterizes the features of the volumetric structure of the geological structure of the earth's crust, including the shelves of the seas, to search for oil and gas fields