

ABSTRACT

The modern gas and oil industry faces ongoing challenges in ensuring the reliability and safety of gas and oil pipelines. Gas leaks can pose risks to human life, environmental contamination, and economic losses.

This Master's dissertation explores the process of developing and implementing an automated dual-channel system that combines optical and infrared observation with the use of unmanned aerial vehicles (UAV) for the detection of gas leaks.

The research encompasses a theoretical analysis of control methods and system parameter determination, equipment selection, the development of software for data processing and analysis, as well as the deployment of the system under real-world conditions.

The research findings demonstrate that the developed system effectively detects gas leaks, providing reliable monitoring of gas and oil pipelines. The use of UAVs allows for monitoring in remote and hard-to-reach areas, making the system versatile and suitable for various conditions and industries.

This dissertation contributes significantly to the advancement of gas and oil pipeline safety systems and can be applied in the gas transportation industry, environmental organizations, urban monitoring, and other sectors where reliable monitoring is critically important.