

## ABSTRACT

### Relevance of the topic:

The aircraft industry remains one of the key sectors of modern technology development, where ensuring the safety and efficiency of aircraft production is an important task. The problems of detecting defects and malfunctions in the design of aircraft wings remain relevant. Ultrasonic technology has become a powerful tool for non-destructive testing of materials and structures in recent years. The use of the impedance method in ultrasonic systems allows to obtain detailed and accurate data on the condition of wings, which makes this topic extremely relevant.

### Purpose and objectives of the study:

The main goal of this study is to develop and implement an ultrasonic system for monitoring aircraft wings using the impedance method. The research objectives include the development of a high-performance hardware base, determination of control parameters, optimization of the data collection and processing process, and creation of algorithms for automated information analysis.

### Scientific novelty of the results:

The obtained results of the study will have scientific novelty due to the use of a combination of ultrasonic technology and the impedance method to detect invisible defects and assess the condition of aircraft wings. The innovation will be to improve the accuracy and speed of diagnostics, as well as to introduce automated data analysis processes that will increase the efficiency of the control system.

**Keywords:** ultrasonic technology, impedance method, aircraft wing control, non-destructive testing, automated data analysis, structural defects, aircraft construction efficiency, hardware base, composite materials