

sufficient level of service and a minimum level of total costs. Failure to comply with any of these requirements may result in loss of customer or market share.

The Ukrainian distribution system determines the uneven functioning of existing distribution channels. At the same time, there are inefficiencies in the various distribution channels used by members of the retailer network. To solve this problem, it is rational to combine several material flows. Joint customer service avoids seasonality and makes the products more durable. The application of distribution centers in the areas of customer consolidation increases distribution system efficiency and improves logistics performance.

The fact is that sufficient and good logistics contributes to the integration of the region into the global supply chain. In addition, the study of regional logistics potential allows not only to determine the direction of its further development, but also to help managers make decisions in the development of the enterprise distribution system. In turn, an adequate regional logistics potential offers significant competitive advantage for the region and its distribution system in future.

Decision-making in the area of distribution should take into account product design and development. This involves both the channels of distribution and intermediaries through which the goods will be sold, sales places, forms of sales which greatly influence the way of goods movement from the manufacturer to the consumer. The type of product, its range and all the detailed characteristics determine the choice of distributive operations. There is a link between distribution of goods and sales promotion. It exists mainly between the type of distribution channel and the intensity of the use of measures to stimulate sales. It should be noted that in spite of the higher cost, more advantageous are direct sales targeting retailers or even end-users because wholesalers are not interested in supporting the sales of the manufacturer's products. If indirect and combined distribution channels are used, the manufacturer pays more attention customer interests supporting it through intensive and direct advertising.

An important direction in optimizing distribution systems both in terms of improving customer service and in terms of reducing overall costs in the event of an acceptable level of customer service is logistics outsourcing, that is, the delegation of certain logistical functions (or all) of the distribution of goods to specialized logistics organizations.

*Scientific supervisor: Kozeletska I.S.,  
Senior Lecturer*

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**Hordyniak V.E., Hrytsak N.V.**  
*National Aviation University, Kyiv*

## **INNOVATIVE TECHNOLOGIES OF SOUND-METRIC POSITIONING OF OBJECTS ON THE TERRITORY OF THE AIRPORT**

The use of aviation ground equipment is directly related to ensuring safety and regularity of aircraft flights at any time of the year. Unauthorized intrusions of airplanes and land vehicles on runways can bring catastrophic results. The number of air traffic accidents occurring on the ground is almost three times as many as the number of accidents in the air. This problem is compounded by poor visibility. The use of acoustic

horns for sound-precision positioning of objects would solve this problem as the information would be obtained instantly.

The urgency of this topic is also related to the fact that the requirements for security and aviation safety of the airport area are constantly increasing. Radio beacons and locators used on the territory of the airport frequently fail under the influence of the electromagnetic field. However, acoustic locators do not have this problem as they can receive high-frequency and low-frequency signals from any aircraft, unmanned aerial vehicles or unintelligible objects inside and outside the airport, determining their location.

Mobile system of sound-metric positioning is a manipulator, which is located on the wheelbase, while the engines are made in the form of wheels with pneumatic tires. The application of such engine design is supposed to be due to the simplicity of its technical implementation as well as the simplicity of traffic control algorithms, which differ little from the algorithms of driving. At the same time, minimum computational and other resources are used for the implementation of the algorithm of motion of the wheel mechanisms, which is no less important in the conditions of their limitation. This mobile mechanism includes six systems: the system of movement, the manipulation system, the information measuring system and the control system, the system of technical vision, the communication system with a control point and the energy system.

The most important element in the mobile system for sonicometric positioning is a binary system consisting of two receivers of an acoustic signal or acoustic cones. Acoustic cone details are made of composite materials.

A special feature of the acoustic system is the proposed original system with a triple turn of the acoustic signal. The general view of the proposed acoustic system with a triple deployment of an acoustic signal is shown in fig. 1.

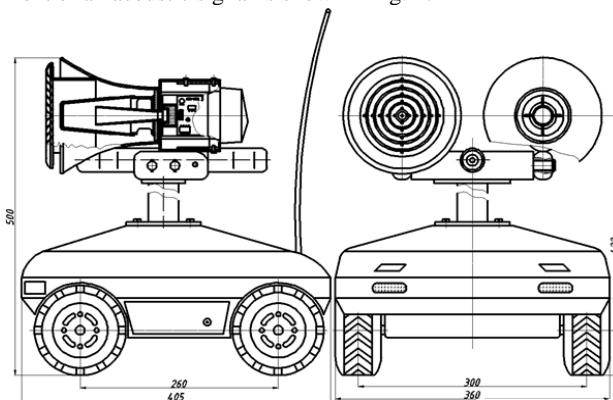


Fig.1. General layout of the mobile system for sound-positioning

All things considered, we can summarize the following advantages of the mobile acoustic positioning system for sound-metric positioning: its universal design; good maneuverability; a possibility of remote control; inter-changeability of design details; ease of maintenance and repair.

Scientific supervisor: Shulga T.V.,  
Senior Lecturer