# STATEMENT OF THE PROBLEM OF ADAPTIVE MANAGEMENT OF THE DISTRIBUTION OF ENERGY (TIME) RESOURCES OF MULTIFUNCTION RADAR IN MODE OF EXPOSURE IN THE DETECTION MODE

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Combat actions in the east of Ukraine are characterized by new forms, the nature of the armed struggle and the use of the latest types of weapons and equipment, which have a new technical level and continue to develop rapidly.

Taking into account the changes in the nature of the armed struggle, as well as the intensive development of promising air defense systems in the advanced countries of the world, these circumstances determine the urgency of the leadership of the State and the Armed Forces of Ukraine to continue the search for effective directions for increasing the combat capability of the Armed Forces of Ukraine and the air defense system, and the development and improvement of air defense systems (radar stations), which are in service with the Armed Forces of Ukraine.

In this situation, one of the promising ways to develop radar technologies is, firstly, to increase the amount and quality of information provided by radar, and, secondly, to use radar devices in those areas where they have unique capabilities.

One of the ways to improve the effectiveness of radar operation is to increase its throughput, which is understood as the intensity of the flow of objects (targets and missiles) that are being serviced (the number of objects that are serviced during the control cycle) with quality indicators not lower than those specified [1–3]. At the same time, maintenance refers to the full range of operations performed by the radar in accordance with its functional purpose [4].

Currently, the most effective means of obtaining radar information are radar stations (radar) with active phased antenna arrays, which are called multi-functional radar stations abroad. Thanks to two-dimensional electronic scanning, such radars can implement a sectoral survey of space, a short time for tying tracks and a high tracking rate.

In addition, the detection range can be increased, including under the influence of obstacles, by increasing the exposure time in a given direction.

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All this together ensures an increase in the quality of radar information when working in a complex target and jamming environment. However, despite the higher efficiency of the multi-functional radar stations compared to the circling radar, a complex contradiction arises during the operation of such radars due to its simultaneous operation in target search and tracking modes, as well as missile guidance [5].

The contradiction lies in the optimal distribution of his limited energy and time resources between these modes. At the same time, it is necessary to ensure the necessary target detection characteristics. With a large number of targets, there comes a time when the multi-functional radar stations will be forced to either reduce the target detection range to reduce the time for the search mode, or reduce the tracking rate for a certain number of targets to reduce the time for the tracking mode.

As a result, in a complex target and obstacle environment, the capabilities of the BF radar are not fully realized in any of the main modes of operation.

One of the ways to solve this situation is the use of adaptive control of multi-functional radar stations modes.

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