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## **PROSPECTS FOR RESUMPTION OF THE METEOR RESEARCH ON THE BALAKLIIA GEOPHYSICAL COMPLEX**

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In recent years, studies of meteor trails, that remain after the destruction of cosmic particles in the Earth's atmosphere, have become increasingly popular. The number of countries participating in meteor research programs is constantly growing. Ukraine also has the necessary facilities for such research. These are two meteor radars located on the territory of the Balakliia geophysical complex of the Kharkiv National University of Radio Electronics. However, at the moment the equipment is outdated, badly worn out and requires repair and modernization. This work is devoted to assessing the prospects for resuming meteor research at the Balakliia geophysical complex.

When a cosmic particle enters the Earth's atmosphere, it heats up and breaks down, leaving behind a trail of ionized gas. This trail is called a meteor trail and is capable of reflecting radio waves. A radio signal reflected from a meteor trail can contain a fairly large amount of useful information. Long-term observations make it possible to form statistics on changes in meteor activity and the distribution of meteoric matter in outer space [1]. For research, special meteor radars are used. In Ukraine, this direction is represented by the Balakliia Geophysical Complex (BGC) of the Kharkiv National University of Radio Electronics.

At the moment, the BGC is not operated and is in a state of conservation. Long downtime has negatively affected the condition of the equipment. Therefore, the first priority is to assess the prospects for the renewing of meteor research, taking into account the possibilities for the restoration of worn or damaged equipment.

The Balakliia geophysical complex has two installations for meteor research: the Meteor Automated Radar System (MARS) and the VETA complex. MARS is designed to collect data on meteors for astronomical, geophysical and applied problems.

It allows to determine the time of the appearance of the meteor; coordinates of the meteor trail; the speed of the meteoroid and many other parameters. The VETA system is designed to study the dynamic parameters of the Earth's atmosphere. More detailed information about these complexes is presented in [2]. The task of restoring systems and resuming their work can be divided into two stages. At the first stage, it is necessary to restore the functionality of the complexes. It is recommended to start with the VETA complex, as the most economical in

terms of maintenance costs and electricity consumption. It is planned to develop new transistor transmitter modules instead of obsolete tube transmitters to reduce power loss in antenna-feeder systems.

The digital block also should be modified, since it is made on an outdated element base. In addition, it is necessary to provide protection against hindrances. Equipping the complex with a modern computer will allow using more complex and advanced data processing algorithms.

The MARS complex is more advanced and informative than VETA, but at the same time more complex in terms of technical composition. Due to the high complexity of the device, it is recommended to automate the process of restoration and modernization at least at the level of checks and calibrations. It should also be noted the need to improve the outdated anti-jamming system.

The greatest difficulty is restoring the operability of the MARS transmitter, since it uses radio tubes that have already been discontinued. The greatest modernization potential is the creation of a more advanced high-voltage rectifier for powering the anodes of lamps of a powerful output stage. Also, over many years of operation, some elements of the MARS antenna-feeder device have become unusable.

Repair and replacement of various structural parts, such as high-frequency cables, is required. The second stage of modernization should include: transition to digital methods of processing and storing information; application of complex signals; automation of the measurement process; improving the means of measuring and controlling the characteristics of the equipment; development of new algorithms for primary and secondary processing.

In recent decades, there has been an increase in both the number of meteor radars around the world and the number of countries participating in meteor research programs. This indicates the relevance of this direction [1]. From this we can conclude that the resumption of meteor studies at the Balakliia geophysical complex is promising. However, the process of restoration and modernization of the complex is associated with significant difficulties due to the technical complexity of the systems and the outdated element base.

List of sources used:

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