AN INNOVATIVE APPROACH TO ENHANCING ACCURACY IN GEOSPATIAL DETERMINATION OF OBJECTS IN THE 'MAPA' SOFTWARE-HARDWARE COMPLEX WITH CONSIDERATION OF ABSOLUTE HEIGHTS

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The software-hardware complex "MAPA" is designed for topo geodetic preparation of firing positions, starting positions for tactical missiles, artillery firing positions, command and control points, observation posts, and artillery reconnaissance positions, as well as for determining rectangular coordinates and heights and calculating azimuthal angles of reference directions.

The results obtained from the assessment of the accuracy of the cartographic support in the "MAPA" system indicate that the cartographic support meets the requirements for the accuracy of topogeodetic positioning of positions, points, and posts to a satisfactory degree. However, the determination of azimuthal angles of reference directions using the coordinate method based on the cartographic representation in the "MAPA" system is limited.

When there's a 5-meter error in coordinates over a distance of 1000 meters, the error in the directional angle is 0-04.8 divisions of the theodolite for a precision of 0-02. To achieve this precision, the distance between points in the coordinate method must be 3000 meters. However, the error in height determination does not meet the accuracy requirements. The accuracy of coordinate determination in the "MAPA" system meets the requirements for verifying the correctness of electronic and mechanical computation settings, as well as the accuracy of setting parameters for firing. However, in setting parameters for firing, specifically the level, the maximum error in height determination is 15 meters. After conducting research, it was determined that the error is 18 meters, which prevents the use of the "MAPA" system for accurately determining firing point heights.

The error in determining rectangular coordinates is 5 meters, which does not meet the requirements for establishing the primary and backup aiming points. When determining the directional angle of the primary aiming point at a distance of 100 meters with a 6-meter error, the discrepancy will be 0-47 divisions of the theodolite.

Height determination using the "MAPA" system does not meet accuracy requirements, with an average root mean square error of 18 meters, exceeding the allowable discrepancy of 15 meters.

During field research, a certain pattern in determining the absolute heights of objects using "MAPA" became apparent: the higher the absolute height, the greater the error in determining those heights. Furthermore, the research revealed that for absolute heights up to 500 meters, the coordinate determination error ranged from 2 to 5 meters, while from 500 to 1000 meters, the error ranged from 5 to 15 meters. This discovery highlighted the direct influence of absolute height on the accuracy of coordinate determination and absolute heights in the "MAPA" system, which directly affects the precision of target engagement.