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Current Status and Prospects for the Development of Methods for Determining the Motion Parameters of Low-Orbit Spacecraft with a High Accuracy

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Abstract. Determination of spacecraft motion parameters with high accuracy (at the level from decimeters to centimeters) is required for solving target tasks by a certain class of low-orbit spacecraft (SC). The paper considers the methods of obtaining high-precision parameters of low-orbit SC motion using GNSS-receivers measurements from the onboard navigation equipment of the consumer, the control methods, and the confirmation of the accuracy of the results obtained. The information on the achieved accuracy of the results according to foreign and domestic sources and promising approaches to improve the accuracy of determining the parameters of motion is presented.
The authors note that the joint refinement of ephemeris-time information of low-orbit GNSS SC and low-orbit SC is a promising method to improve the accuracy of motion parameters determination and allows increasing the accuracy of ephemeris-time information of low-orbit GNSS SC by 30–50% for a dense network of ground receivers (100 and more ground stations) and by 5–6 times when using a regional network of ground stations.
Keywords: spacecraft, motion parameters, navigation technologies, high-precision ballistics
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