Method and algorithm for the aiming point data derivation in the task of high-precision landing of a manned reentry vehicle at the earth orbit letdown

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The paper centers on the aiming task that ensures the landing of a sliding reentry vehicle (RV) with a rocket-assisted parachute non-destructive landing system. The vehicle is part of an advanced manned orbiting spacecraft on small-sized launch sites on the territory of Russia. Within the research we analyzed the factors that require the corrective action concerning the aiming end point of the controlled letdown path with respect to the aiming point of the RV landing. Findings of the research show that conventional aiming, which uses the rated performance of the RV and atmosphere, does not provide the conditions for the guaranteed high-precision RV casting because of the possible reduction of its real maneuvering potential. As a result, the study introduces a method and an algorithm of the aiming point bias of the non-destructive landing system start with the a priori statistical estimation of the possible RV side-step manoeuvre incompetence. Finally, the study gives the results of numerical simulations confirming the effectiveness of the proposed method and algorithm.

Keywords: *manned reentry vehicle, high-precision letdown control, aiming task, actual side-step manoeuvre incompetence, aiming point bias*

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