SUMMARY

The objective of the work was to perform a comprehensive analysis of the dynamics of the bomb-fluger system motion. The primary research problem was to assess the influence of various geometrical parameters of the system on the stabilization of the fluger's movement, which includes the target detection system. These tasks were carried out by performing a number of sub-tasks. As part of them, the existing design solutions of air bombs were analyzed. They were divided taking into account the scope, purpose and ability to forced flight path changes as well as design solutions used to enforce this change. The general structure of the guiding head with the reflected, scattered laser radiation detection unit, built in a fluger mounting is described. The general principles of using unguided and corrected bombs equipped with a semi-active laser correction system are discussed. The paper presents a mathematical model of the discussed structural system bomb-fluger. The assumptions for the model were presented, and the structure of the bomb-fluger system was discussed. The forces and moments acting on the system were determined. The equations of motion for each of the elements and the entire dynamical system were presented. The work contains the results of simulation and experimental tests. The simulation tests were carried out using the PRODAS program and a dedicated program developed at ITWL, while the experiments were carried out in a wind tunnel. Thanks to them, the aerodynamic coefficients of the tested system were obtained. In addition, a bomb model and the results of simulation tests of bomb drops for various design variants of the tested system and for various initial conditions are presented. Conclusions were formulated that served as guidelines for the design of the bomb in the system discussed in the paper.