

ABSTRACT

This dissertation describes the construction and testing of the guidance system used in the anti-tank guided missile (ATGM). The ATGM demonstrator was developed as a result of cooperation between the Polish companies MESKO S.A., CRW Telesystem-Mesko Sp. z o. o., and the Ukrainian company "Luch" Design Bureau. The guided missile uses Semi-Active Laser Homing (SALH), allowing it to accurately strike an armored vehicle. This dissertation presents construction and testing of the new missile autopilot, as well as presents the numerical model of the missile and describes the new algorithm for guiding the missile. The aim of developing the new guidance algorithm was (among other things) to reduce the missile flight path, and body angle in a vertical plane when hitting the target from the upper hemisphere. Hitting an armored target from the upper hemisphere increases the chance of penetrating the vehicle's armor, which is usually thinner in its upper part than in its front or side parts. The developed numerical model of the missile was a low-cost tool enabling the development of the new guidance algorithm. This is due to the simulation and laboratory testing, which required considerably less money and material than field tests. During the firing range test, only one flight of a given projectile is possible, as the projectile is destroyed after hitting the target. Therefore, proceeding to the field tests is the final phase of the verification of the correctness of the adopted assumptions, and design solutions previously verified by simulation and laboratory tests. This dissertation presents the results of simulation and laboratory tests of the new missile guidance algorithm. As well as the results of laboratory and field tests of the new autopilot, that directs the flight of a missile. The conducted tests confirmed the correctness of the adopted design assumptions of the autopilot, and the ability of a missile to hit the upper part of a vehicle at a smaller body angle. This is due to the application of the new missile guidance algorithm.

Keywords: anti-tank guided missile, missile autopilot, missile guidance algorithm, semi-active laser homing.