STUDY OF THE IMPACT OF CHANGES IN IMAGE INFORMATIVE FEATURES IN NAVIGATION CONTROL SYSTEMS ON THE OPERATION OF UNMANNED AERIAL VEHICLES

Abstract. The objective of this article is to determine the permissible changes in the informative characteristics of navigation control systems under the influence of destructive effects used to describe objects on the observation surface (OS), while maintaining a given level of unmanned aerial vehicles (UAV) efficiency. This objective is achieved by establishing an analytical relationship between the UAV efficiency indicator and the probability of localizing a reference object in the image; by studying the dependence of this probability on the characteristics of the decision-making function (DMF) it generates, with subsequent determination of its relationship with the permissible changes in the informative characteristics (IC). The solution to the first problem is based on a probabilistic approach to assessing the effectiveness of UAVs under destructive effects on objects on the observation surface (OS). The solution to the second problem is based on establishing a mathematical relationship between the probability of localizing a reference object and the characteristics of the decision-making function (DMF) it generates. The solution to the third problem consists in assessing the permissible changes in stable informative features of an image (IF), at which the computer vision system (CVS) remains operational. The study was conducted in the MATLAB software environment using images obtained from Google Earth. It has been shown that the permissible changes caused by destructive impacts, in terms of the change in the area of the reference object, are within the range of (10–15)% of their total area, regardless of the type of observation surface (OS).

Keywords: unmanned aerial vehicle, computer vision system, reference object, informative features, destructive impact.