

The increasing use of drones is noticeable in both military activities and various everyday tasks in modern societies. However, the difficulty in detecting these devices due to their low Radar Cross Section (RCS) and low electromagnetic emissions has become a concern when it comes to protecting sensitive area against unknown drone flights, which can gather location information or even cause physical damage. In addition to these detection challenges, the fact that drones can fly at the night adds an additional layer of obstacle to the surveillance and the safeguarding location information. This paper explores the use of CO₂ laser beam as a directed illuminator for a drone flying in a controlled environment, with the aim of capturing images in the long-wave infrared (LWIR) spectrum. The obtained images were used to train a Convolutional Neural Network (CNN) using the widely recognized YOLO architecture in the literature. As a result of this training, it was possible to validate the neural network and demonstrate the potential for utilizing this approach in drone detection when illuminated by a power source, thus enhancing detection in nighttime environment.