AN ANALYSIS OF THE EFFICIENCY OF SOME LASER SYSTEMS USED IN DIFFICULT AMBIENT CONDITIONS

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Abstract : *The paper presents the assessment of how the main hostile ambient conditions (atmospheric turbulence and diffusion) influence the efficiency of reception of LASER radiation by the warning systems type LWS (LASER Warning System) used for the detection of intruders from the ground or from air. We analyzed several specific types of installation of LWS systems on platforms having different precisions of stabilization to vibrations.*

Keywords: LASER Warning System, Atmospheric turbulence, Atmospheric diffusion, Vibrations, Signal-to-noise ratio (SNR), the Probability of detection / False alarm

1. Introduction

LASER Warning System (LWS) systems are tools to alert the intruders (terrestrial or aerial) in real time to their surveillance area, intruders using LASER (continuous or pulsed) light sources for detecting objects (or objectives) of interest. After the rapid detection of intruder LASER irradiation, the LWS system issues commands to take protection counters (eg, by targeting interest objects with smoke curtains or by moving the object of interest to the initial position). In this way, the intensity of the LASER signal on the object to be highlighted by illumination decreases significantly and the intruder detection optoelectronic system will become inefficient [1-3]. The paper presents the assessment of how the main hostile ambient conditions (atmospheric turbulence and diffusion) influence the efficiency of reception of LASER radiation by the warning systems type LWS used for the detection of intruders from the ground or from air. We analyzed several specific types of installation of LWS systems on platforms having different precisions of stabilization to vibrations.

2. Basic aspects

General configuration of using LWS systems on fixed (left) or mobile (right) platform [4-7, 17] is given in figure 1 and the variation of the LASER signal relative to the relative displacement speed between the intruder's LASER emitter and the object of interest is prezented in figure 2 [8-10].

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