ABSTRACT

RESEARCH OF LENSES FOR THERMAL CAMERAS

Scope of work – 108 pages; Number of illustrations – 56; Number of tables – 30; Number of applications – 2; Number of sources according to the list of references – 23

Topicality. The efficiency of the use of thermal imaging devices in the longwavelength spectrum (LWIR, 8 to 14 microns) is also determined by the fact that the maximum thermal radiation of the human body as an object of observation falls within this range. The main modules are: lens, microbolometric matrix radiation receiver, image processing module, control module, micro display, eyepiece, interface connector for transmission of information, power source, some modules can be removed, combined or supplemented depending on from the specific model of the device. The most important element of a thermal imaging device is a high-quality optical lens system that forms images in the plane of the photodetector. Therefore, a rather urgent problem is research and improvement of the generalized physics and mathematics model of lenses for thermal imaging cameras.

The purpose and objectives of the study – the purpose of the research of this master's thesis is to consider the methods of calculating the main characteristics of lenses for HDPE, the analysis of radiation receivers and materials for lenses, capable of operating in the spectral range of 8-14 microns, the choice of optimal lens parameters and photodetector to obtain high image quality specific patented lenses. And also improvement and research of the generalized physico-mathematical model of lenses for thermal imaging cameras.

Objectives of the study: the influence of lens characteristics for thermal imaging cameras on image quality and detection range.

Subject of study: lens for thermal imaging device.

Publications:

1. A.A. Knir. Research of lenses for thermal imaging cameras // XV International scientific-practical conference of students, aspirants, and young scientists "EFFICIENCY OF ENGINEERING SOLUTIONS IN APPLIANCE", Kyiv, PBF, NTUU "KPI". - 2019

2. A.A. Knir. Calculation of optical parameters of lenses for thermal imaging systems // IV INTERNATIONAL SCIENTIFIC-PRACTICAL CONFERENCE "The Potential of Modern Science", Kyiv, 2019

Keywords: *lens, thermal imaging camera, minimum separation temperature difference, detection range.*