ABSTRACTS

**ВОПРОСЫ РАДИОЭЛЕКТРОНИКИ**

### серия

**ТЕХНИКА ТЕЛЕВИДЕНИЯ**

**2019 вып. 2**

*Umbitaliev A. A*., *Vargin P. S*., *Chernogubov A. A.* **Determination of the spatial form of artificial space objects by the method of television laser location. Рр. 3–9.** Methods for remotely determining the surface shape of artificial space objects using a television laser locator (TVLL) are considered. The method of television laser location is described. The proposed three-circuit guidance system and the formation of a beam illumination TVLL. The description of various modes of TVLL operation is given: single- and multi-zone, single- and multi-pulse. The depth resolution of TVLL is estimated. **Keywords:** three-dimensional image, definition of the surface topography, the form of artificial space objects, optical sounding of satellites

*Pyatkov V. V*., *Meleshko А. V*., *Galich R.G.***Algorithm for guiding aircraft on evaluating of an instant flight with the requirements of mutual orientation of speed vectors. Рр. 10–23.** An algorithm for long-range guiding of an aircraft on evaluating of an instant flight is proposed, which ensures acceptable conditions for capturing by television homing head of an object of the dock by fulfillment conditions of the vector complanarity of both aircrafts at the end of long-range guidance. **Keywords:** aircraft, instantaneous span vector, velocity vector, guidance

*Vasiliev P. V.* **Assessment of the probability of observations of small near-earth object side optical-electronic coordinator in the absence of illumination by the Sun.** **Рр. 24–28.** A refined approach to determining the probability of observation of a small space object when approaching a controlled object equipped with an onboard optoelectronic coordinator in the absence of illumination by the Sun, taking into account the latitude of the meeting point, is presented. **Keywords**: small space-earth object side optical-electronic coordinator, the high speed convergence, the illumination of the Sun, the probability of observation.

*Kleymenov V. V*., *Khankov S. I*., *Mosin D. A*., *Severenko A. V.* **About the possibility of detection on the surface and near the earth of the small-sized high-temperature object the board of low-orbital space apparatus.** **Рр. 30–33.** The limiting values of the observation time of a small-sized high-temperature object from a low-orbit spacecraft are investigated depending on the height of its orbit and taking into account the instantaneous field of view of the telescope of the observing optical-electronic device. It is shown that the detection of a small object on the Earth`s surface is difficult due to time constraints on the accumulation of the received signal power. The presented analytical formulas make it possible to assess the influence on the possibility of finding the source of all the determining parameters. Keywords: telescopes for remote sensing of the Earth, object detection from space, small-sized temperature object, entrance pupil, telescope field of view, solar radiation, thermal radiation of the Earth.

*Sagdullaev V. Yu*., *Sagdullaev Yu. S.* **Formation of signals of multi-spectral images inside wide spectral sections. Рр. 40–47.** The features and method of generating signals of multi-spectral television images of narrow registration zones of a radiant flux based on information are widely spectral sections**. Keywords:**multispectral television, integral registration method, generation of multi-spectral image signals

*Tolochkov D. V*., *Salata D. V.* **Application of the vector control method for engine for stabilization of images in airborne overview systems. Рр. 48–52.** The application of vector motor control in the control system of a gyro-stabilized platform is considered and the accuracy of the platform stabilization is assessed. **Keywords:** gyro-stabilized platform, vector control, image stabilization

*Sergeyev V. V*., *Karpov V. N*., *Pribylov Y. S*., *Sokolov V. A.* **The active system of underwater vision for autonomous uninhabited underwater vehicle. Рр. 53–61.** The article consider the features of building an active underwater vision system for autonomous unmanned underwater vehicles, provides recommendations on choosing a light-signal converter and backlight systems, on spatial separation of a light source and a TV camera to reduce the influence of backscattering interference and increase the visibility range under water. The block diagram and the main technical characteristics of AUVS for AUUV are given. **Keywords:** autonomous and remote controlled unmanned underwater vehicles, underwater television, solid-state imaging devices, underwater visibility, LED backlight system

*Dvornikov S. V*., *Sevidov V. V*., *Bolenko E. G*., *Krasyukov A. V.* **Implemen­tation of the finite difference energy method for determining the location of space objects. Рр. 62–69.** A method of positioning spacecraft on the principles of different-energy measurements in space is developed. Analytical descriptions of its stages are presented. Its advantages in relation to two-dimensional realizations are shown. The simulation results are presented. The prospects of its application are defined. **Keywords:** difference-energy method, method of positioning of space objects, circle and sphere of Apollonia

*Dvornikov S. V*., *Semisoshenko M. A*., *Okov I. N*., *Pogorelov A. A.*, *Litkevich G. U.*, *Chudakov A. M*., *Gordeychuk A. U*., *Borisov V.V*., *Dvornikov S. S.* **Proposals for the selection of frequency resource for radio engineering systems of the decameter range. Рр. 70–75.** The article discusses approaches to reduce the loss of bandwidth and time required for the transmission of graphical information via MRTS. The results of the study of the dependence of the reduction in the decameter range of transmission speed and throughput of multichannel radio engineering systems for transmitting graphic information from the number of unsuitable channels are shown. An analytical model of information transfer in a multi-channel mode with retransmission of packets received with an error is presented. According to the obtained results, suggestions for their practical application were formulated. **Keywords:** multichannel radio systems, decameter range of radio waves, bandwidth estimation, packet retransmission

*Dvornikov S. V*., *Bachеvsky S. V*., *Rusin A. A*., *Dvornikov S. S.*, *Tarasov M. V.* **Evaluation of the efficiency of the frequency resource selection mode for multi-channel radio systems decameter range. Рр. 76–82.** The article presents the results of the study of the dependence of the reduction in the decameter range of transmission speed and bandwidth of multi-channel radio systems of graphic information transmission on the number of unusable channels. An analytical model of information transmission in multichannel mode with retransmission of received error packets is presented. The data of mathematical modeling are analyzed and proposals on practical application of the obtained results are formulated. **Keywords:** multichannel radio system. decameter range of radio waves. Bandwidth estimation. Retransmission of packets

*Kornyshev N. P*., *Lukin D. G*., *Senin A. S.* **Method of compensation of fixed pattern noise of the matrix sensor taking into account the exposure time. Рр. 83–88.** The method of compensation of the fi**x**ed pattern noise (FPN) in matri**x** sensors of IR-range invariant to change of time of e**x**posure on the set interval is considered. The comparative images and waveforms of the signals after compensating FPN with and without taking into account the exposure time are resulted. **Keywords**: IR matrix sensor. Fixed pattern noise.

*Mitiani G. Sh.* **Thermal modeling of nitrogen-cooled cryostat for CCD-systems.** **Рр. 89–101.** We develop the first finite element thermal model of optical nitrogen cryostat for astronomy. The model allows to research design of optical cryostats before the stage of experimental design and experimental tests. Thermal modeling is carried out by the FEM in Ansys WB using algorithms on APDL. The model takes into account all types of thermal loads and contact resistances. We control the solution accuracy of differential equations related to topology of the finite element mesh and variable properties of materials. **Keywords:** thermal modeling, CCD, nitrogen-cooled cryostat, FEA, Ansys

*Rasumov A. V.*, *Onufrey A. U*., *Orlov A. A.* **Modeling of electromagnetic environment in the area of location of technical equipment of radar systems. Рр. 102–107.** The article presents a methodology for modeling the electromagnetic environment, considering the location of the screens and structural elements of the radio-electronic system. A method for determining the effectiveness of shielding means of protection from powerful electromagnetic radiation is proposed. **Keywords:** simulation, electromagnetic environment, shielding, electronic systems