ABSTRACTS

### ВОПРОСЫ РАДИОЭЛЕКТРОНИКИ

### серия

### ТЕХНИКА ТЕЛЕВИДЕНИЯ

### 2020 вып. 3

*Umbitaliev A. A., Kuzichkin A. V., Tsarelungo A. B., Garan P. S., Drinevsky G. P., Dyakov S. V.* **Ground-based tv reception complex for the «Vostochny» cosmodrome. PP. 3–8**. The principles of construction and main characteristics of the ground-based receiving television complex for the «Vostochny» cosmodrome are considered. The complex is designed to receive radio signals containing television information in digital or analog formats from the international space station, as well as from manned and transport spacecraft. **Keywords:** ground-based receiving television complex, «Vostochny» cosmodrome, digital complex of switching and distribution of television information

*Kamenev A. A., Soluyanov A. A.* **Simulation of high-orbit space object IR signatures for evaluation of their technical condition. PP. 9–16**. Connection of IR signature (indicatrix and spectral density of radiation power) of typical high-orbit space objects was revealed on the basis of IR signature simulation. Results obtained of space object radiation power in different IR spectral regions may be used for development of algorithms of high-orbit space object condition and high-orbit space object discrimination. **Keywords:** space object, radiation power indicatrix, infrared range, technical condition.

*Kamenev A. A., Lapovok Y. V.* **Methodic of selecting spectral channels of the infrared radiometer for estimating the surface temperature. PP. 17–23**. A technique is proposed for selecting the parameters of spectral channels (boundary wavelengths and band spacing) of a multispectral infrared radiometer, which makes it possible to increase the reliability of estimating the temperature of the outer surface of a high-orbit space object with high emissivity. **Keywords:** infrared range, spectral observation channel, space object, multispectral radiometer, thermodynamic surface temperature.

*Ivanov V. G., Kamenev A. A.* **Methodology for justification of requirements for the parameters of on-board thermal imager for detecting extended ground stationary objects on the background of spatially inhomogeneous laying surfaces**. **PP.** **24–31**. A method is considered for substantiating the choice of parameters of on-board thermal imaging cameras that ensure the detection of ground stationary objects using the temperature difference between the object and the surrounding background and taking into account the potential threshold contrasts detected by camera in the ranges of relative atmospheric transparency. **Keywords:** on-board thermal imager, detecting ground objects, threshold contrasts and signal to noise ratio

*Maltsev G.N., Nazarov A.V., Korobchenko I.P.* **Analysis of limitations of space objects observation by ground-based optical-electronic systems under conditions of solar illumination. PP. 32–44**. The conditions of observation of low-orbit space objects by ground-based optical-electronic systems in the passive mode of operation in solar illumination are analyzed. The limitations of the controlled sections of the trajectory of observed space objects due to their location in the viewing area of the optical-electronic system, outside the earth's shadow zone and night time are considered. It is shown that in most cases the considered limitations lead to the possibility of observing low-orbit space objects for a limited time interval at dusk. **Keywords**: observation of space objects, optical-electronic system, viewing area, solar illumination.

*Sagdullaev T. Yu., Sagdullaev Yu. S.* **On the issue of evaluation potential capabilities of spectrozonal television systems***.* **PP. 45–52**.The technique of assessing the potential capabilities of spectrozonal television systems for solving the problems of spectral selection of objects is considered. **Keywords**: spectrozonal television, radiant flux registration methods, assessment of the potential capabilities of systems, selection of objects

*Tsytsulin A. K., Pavlov V. A.,* *Bobrovskiy A. I., Morozov A. V., Rogachev V. A.* **Objects classification by the speed-smearing feature noise resistance.
PP. 53–67**.Using the example of spacecraft detection against a starry background, the problem of classifying small-sized objects based on high-speed blur is considered. Methods for the formation of decisive statistics and an algorithm for object classification are proposed. Potential noise immunity and approximation to it using neural network algorithms are estimated. **Keywords:** classification, smear, variance with respect to axes passing through the object center, approximation

*Dvornikov S. V.*, *Dvornikov A. S.*, *Sergeev I. A*, *Kotyashichev I. A.* **Proposals for the organization of distance transmissions at the matching frequencies. PP. 68–73**. The article presents proposals for organizing the operation of digital video broadcasting systems in the common frequency band with LTE networks. An approach to providing in-phase reception based on antenna diversity is considered. The topology of the placement of antenna devices is justified. The simulation results of the analyzed situation are presented. **Keywords:** diversity reception, digital video broadcasting systems, matching work.

*Dvornikov S. V., Dvornikov A. S., Dvornikov S. S., Orlov A. E., Morozov E. V.* **Detection of signals with FHSS in incorrect receiving mode. PP. 74–80**. The article presents theoretical studies on the detection of signals with frequency hopping at the stage of entering into communication. The calculated expressions for incoherent reception conditions and probabilistic estimates are obtained. The results of modeling the analyzed situation with respect to radio stations of eXRS technology are presented. **Keywords**: detection of signals with frequency hopping, detection probability with incoherent reception, probabilistic assessment

*Dvornikov S. V., Sivers M. A., Dvornikov A. S., Dvornikov S. S.* **Signal recognition based on the probabilistic evaluation of the dispersion of their sign vectors. PP. 81–90**. The article has developed proposals for assessing the probability of recognition of signals from the standpoint of measuring the variance of the vectors of their signs. The analytical apparatus is presented. Recommendations on its use are formulated. The simulation results are given. **Keywords**: signal recognition, formation of recognition signs, recognition probability.

*Kozinov I. A., Levoshko A. A., Garagulya A. S.* **Reliability of operational transmission of compressed video data of space video information systems on radio channels with limited capacity**. **PP. 91–100**. The noise immunity of the transmission of compressed video data of space video information systems over radio channels with limited bandwidth is considered. An approach to increasing the reliability of the transmission of compressed video data based on the results of the joint work of compression algorithms and the formation of signal-code structures is proposed. **Keywords:** video data, bandwidth, reliability, signal code constructions, compression.

*Neelov V. V.***Model of sequential selection of space objects of a broadband polarimetric radar system under time constraints. PP. 101–107**.The article describes a model of a radar broadband polarization channel, procedures for quantitative evaluation of broadband selection features and sequential selection of a target with an adaptive number of measurements. It is shown that it is possible to reduce the observation time without reducing the quality of selection by using sequential decision making algorithms. **Keywords:** spacecraft, broadband polarimeter, remote monitoring, radar station

*Neelov V. V.* **Algorithm for evaluating quantitative values of features for recognizing the geometric shape and orientation of a radar target**. **PP. 108–116**. The article describes an algorithm that allows estimating the geometric shape and orientation of a radar target relative to the radar base based on the results of measuring the polarization scattering matrix. The results of a full-scale experiment are presented. Keywords: polarizing matrix, geometric shape recognition, radar sensing

*Ermoshin K. D.* **Server software for transmission and reception of multimedia data. PP. 117–121**. The article describes the implementation of server software for the transmission and reception of multimedia data and issues of its modularity, platform independence, reentrance and thread safety. **Keywords:** object-oriented programming, server, modularity, multimedia data.