Soviet and Japanese Aerospace Literature

Throughout 1989 the *AIAA Journal* will carry selected abstracts on leading research topics from the Soviet aerospace literature and, as space permits, from similar Japanese literature. The topics will be chosen and the abstracts reviewed for pertinency by *AIAA Journal* editors. This month features Satellite Scientific Instruments and Equipment Technology from the USSR and Spacecraft/Satellite Equipment and Instruments from Japan.

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Soviet Aerospace Literature
This month: *Satellite Scientific Instruments and Equipment Technology*

A89-37303 The proton spectrum in the energy range above 1 TeV measured with the satellite-borne Sokol instrument (Izmerenie na ISZ priborom 'Sokol' spektra protonov v oblasti energii vyshe 1 TeV). N. L. GRIGOROV, *Pis'ma v Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki* (ISSN 0370-274X), Vol. 49, Jan. 25, 1989, pp. 71-74. 5 Refs.

Satellite measurements of the energy spectra and other high-energy cosmic-ray particles are examined. The spectra were measured by an instrument designed in such a manner that the reverse particle current in the charge detector does not affect the extraction of protons and helium nuclei. The spectra obtained agree well with Proton-satellite measurements.

A89-32182 Gyroscopic systems (2nd revised and enlarged edition) (Russian book) (Giroskopicheskie sistemy /2nd revised and enlarged edition/). DMITRII S. PEL'POR, ED. Moscow, Izdatel'stvo Vysshaia Shkola, 1988, 424 pp. No individual items are abstracted in this volume.

The book is concerned with the theory and analysis of primary gyroscopic transducers, physical pendulums and accelerometers, gyroscopic instruments, and high-precision orientation systems. In particular, attention is given to the determination of the equilibrium position of a physical pendulum, motion of a gyroscopic pendulum in flight, angle and angular velocity transducers, optical gyroscopes, three-degrees-of-freedom gyroscopes, and course-setting gyroscopic instruments. The discussion also covers three-dimensional gyroscopic orientation systems based on dynamically tunable gyroscopes, strapped-down orientation systems, initial orientation of gyroscopic systems, and gyroscopic orientation and stabilization systems for spacecraft.

A89-32126 The Gagarin Scientific Lectures on Astronautics and Aviation 1987 (Russian book) (Gagarinskie nauchnye chteniia po kosmonavtike i aviatsii 1987 g.). A. IU. ISHLINSKII, ED. Moscow, Izdatel'stvo Nauka, 1988, 168 pp. No individual items are abstracted in this volume.

Reports given at the 17th Gagarin Lectures (1987) and the 16th Lectures (1986) are presented. Works are presented on problems in flight mechanics, gas dynamics, and modern techniques for the automated design of flight vehicles. Attention is also given to space power systems, flight-vehicle structural strength, and flight-vehicle control systems.

A89-27301 Problems and methods of space data processing (Russian book) (Zadachi i metody obrabotki kosmicheskoi informatsii). P. E. EL'IASBERG, ED. Moscow, Izdatel'stvo Nauka, 1987, 192 pp.

Papers are presented on such topics as the use of nonstationary atmospheric models to describe satellite motion, a fast algorithm for calculating satellite positions in a nearly circular orbit, and an analysis of numerical algorithms for determining cold-plasma paramerters from measurements using plane ion traps. Consideration is also given to the detection of shock waves on the basis of an analysis of form changes of energy spectra, the static and dynamic characteristics of inhomogeneous Poisson streams, and simulation of data acquisition and processing systems in connection with space experiments.

A89-26180 Maritime satellite communications (Russian book) (Sputnikovaia sviaz' na more). LEONID I. NOVIK, IGOR' D. MOROZOV, and VLADIMIR I. SOLOV'EV, Leningrad, Izdatel'stvo Sudostroenie, 1987, 220 pp. In Russian. 116 Refs.

Principles underlying the design and operation of maritime satellite communications systems are reviewed, with reference to Inmarsat and Sarsat. Particular attention is given to the design of search and rescue systems, the development of the onboard equipment, and the characteristics of coastal and shipboard earth stations. Finally, the organization of maritime satellite communications systems is discussed, and questions of system efficiency are examined.

A89-26075 Effect of circumsolar plasma on the operation of a long-baseline interferometer (O vliianii okolosolnechnoi plazmy na rabotu interferometra s bol'shoi bazoi). A. I. EFIMOV, O. M. KORSAK, O. I. IAKOVLEV, V. P. IAKUBOV, and I. D. TSERENIN, *Radiotekhnika i Elektronika* (ISSN 0033-8494), Vol. 33, Dec. 1988, pp. 2640-2643. 8 Refs.

The paper examines the effect of the circumsolar plasma on the interference frequency in long-baseline interferometer experiments carried out with the Venera 15 and 16 probes. Attention is given to methods for reducing the error of difference-frequency determination connected with the plasma effect. It is shown that the variance of the interference-frequency fluctuations is associated with the error of determining the angular velocity of a probe with respect to the interferometer baseline.

A89-30179 Investigation of high-energy particles of primary cosmic rays with the Sokol satellite-borne instrumentation (Izuchenie chastits vysokikh energii pervichnogo kosmicheskogo izlucheniia na ISZ apparaturoi 'Sokol'). N. L. GRIGOROV, I. P. IVANENKO, I. D. RAPOPORT, V. IA. SHESTOPEROV, IU. V. BASINA et al., *Moskovskii Universitet, Vestnik, Seriia 3 - Fizika, Astronomiia* (ISSN 0579-9392), Vol. 29, Sept.-Oct. 1988, pp. 44-50. 5 Refs.

The Cosmos-satellite Sokol instrumentation consists of two sectioned Cerenkov charge detectors and a sectioned ionization calorimeter for the investigation of high-energy particles of primary cosmic rays. Particle charge spectra were obtained with satisfactory resolution at energies above 1 TeV using Sokol. Data were obtained concerning the influence of the reverse current of secondary particles from the calorimeter on the charge measurements.

A89-28289 Satellite-borne spectrometry technique for determining moisture in the stratosphere using the Doppler effect (Sputnikovyi spektrometricheskii metod opredeleniia vlazhnosti v stratosfere, ispol'zuiushchii effekt Dopplera). ZHIUL'VERN B. KHACHATRIAN, *Zeitschrift fuer Meteorologie* (ISSN 0084-5361), Vol. 38, no. 4, 1988, pp. 206-211. 10 Refs.

The paper examines the feasibility of determining moisture in the stratosphere using a stable transmitter operating near the center of the water-vapor absorption line and installed on a satellite in circular orbit. It is shown that the use of the two-frequency technique leads to a significant increase in accuracy due to a substantial reduction of the influence of the lower atmospheric layers on the moisture measurements. To implement the proposed technique using a nondirectional antenna on a satellite in an orbit 1300 km high, it is necessary to use transmitters with a radiating power less than 10 mW.

A89-27310 Analysis of numerical algorithms for the determination of cold-plasma parameters on the basis of measurements using plane ion traps (earth and interplanetary environments sounding by Cosmos 900) (Analiz chislennykh algoritmov opredeleniia parametrov kholodnoi plazmy po izmereniiam pri pomoshchi ploskikih ionnykh lovushek). N. F. SMIRNOVA, *IN: Problems and methods of space data processing* (A89-27301 10-59). Moscow, Izdatel'stvo Nauka, 1987, pp. 126-138. 33 Refs.

The paper examines numerical algorithms for determining cold-plasma parameters (the parallel component of the ion velocity, temperature, ion concentration, and satellite potential) on the basis of measurements with plane ion traps. Lp regression estimates are presented. As a numerical example, attention is given to the determination of plasma characteristics from Cosmos-900 satellite data.

A89-37374 Investigation of the spectral characteristics of light nuclei on the Cosmos-1571 satellite (Izuchenie spektral'nykh kharakteristik legkikh iader na ISZ 'Kosmos-1571'). A. B. AKOPOVA, V. G. AMBARTSUMIAN, V. E. DUDKIN, L. V. MELKUMIAN, IU. V. POTAPOV et al., *Kosmicheskie Issledovaniia* (ISSN 0023-4206), Vol. 27, Mar.-Apr. 1989, pp. 313-316. 9 Refs.

The energy distributions of singly and doubly charged particles with energies up to 50 MeV/nucleon were measured on the Cosmos-1571 satellite in order to investigate the radiation environment in near-earth orbit. It is shown that the differential energy spectra of singly and doubly charged particles are similar, while the fluxes differ by almost an order of magnitude, amounting to 2.2 x 10 to the 5th particles/sq cm for the singly charged particles and 3.0 x 10 to the 4th particles/sq cm for the doubly charged particles.

A89-37359 The planning of spacecraft launches and the servicing of regions of the earth, taking into account the degree of their illumination and the operational limitations of the onboard optoelectronic device (Planirovanie zapuskov KA i obsluzhivaniia raionov zemli s uchetom ikh osveshchennosti i ogranichenii funktsionirovaniia bortovykh optiko-elektronnykh priborov). I. D. IBRAGIMOV and B. S. SKREBUSHEVSKII, *Kosmicheskie Issledovaniia* (ISSN 0023-4206), Vol. 27, Mar.-Apr. 1989, pp. 214-220.

The paper examines the problem of determining the launch dates and times of spacecraft with onboard optoelectronic devices and angular attitude sensors intended to serve specified regions of the earth. A graph-analytical method is presented which makes it possible to determine launch dates with an accuracy up to a few days, and the launch time with an accuracy up to a few minutes.

A89-37324 Methodological aspects of the automation of the calibration and processing of satellite microwave-radiometer data (Metodicheskie voprosy avtomatizatsii kalibrovki i obrabotki sputnikovykh SVCh-radiometricheskikh dannykh). A. B. AKVILONOVA, M. S. KRYLOVA, B. G. KUTUZA, B. Z. PETRENKO, V. P. SAVORSKII et al., *Issledovanie Zemli iz Kosmosa* (ISSN 0205-9614), Jan.-Feb. 1989, pp. 103-114. 22 Refs.

A procedure for the computer-aided processing of satellite microwave-radiometer ground-track data is presented. Typical features of radiometer calibration with reference to two ground points are discussed, and a method for evaluating the influence of calibration errors on the accuracy of ocean-atmosphere brightness-temperature measurements is presented. Also considered is a procedure for the computer-aided identification of sites in the experimental data which correspond to the ground control points.

A89-22209 Key aspects of earth radiation budget studies (Kliuchevye aspekty issledovanii radiatsionnogo balansa zemli). G. I. MARCHUK, K. IA. KONDRAT'EV, and V. V. KOZODEROV, *Issledovanie Zemli iz Kosmosa* (ISSN 0205-9614), Sept.-Oct. 1988, pp. 3-10. 26 Refs.

This paper discusses the significance of satellite data on earth radiation balance (ERB) and its components for understanding basic climatic features and their use for assessing the albedo and cloudiness-radiation feedback. The ERB data acquired to date are described, and the requirements for the collection and processing of ERB data are examined, including the apparatus, calibration and processing methods, data transformation, and climatological interpretation.

A89-18715 Determination of accuracy requirements in the measurements of certain parameters of the atmosphere and the earth surface for ground-truth calibration of visible-range spaceborne instruments (Opredelenie trebovanii k tochnosti izmerenii nekotorykh parametrov atmosfery i zemnoi poverkhnosti dlia kalibrovki po nazemnym testovym uchastkam sputnikovykh sredstv vidimogo diapazona). V. V. GOGOKHIIA, *Issledovanie Zemli iz Kosmosa* (ISSN 0205-9614), July-Aug. 1988, pp. 98-110. 31 Refs.

A matrix method which can be used to calculate the radiation field needed for checking and calibration purposes is presented together with a relevant computer program. Errors in the solution of the radiation transfer equation are analyzed as functions of the number of atmospheric layers, the type of the aerosol scatterer, the solar zenith angle, and the reflective characteristics of the surface, and their optimal values are derived.

A89-14741 Design methods for degenerate parametric amplifiers for onboard millimeter-wave detection systems (Metody proektirovaniia vyrozhdennykh parametricheskikh usilitelei dlia bortovykh priemnykh sistem millimetrovogo diapazona dlin voln). V. V. KOROGOD, A. S. BERLIN, and I. A. STRUKOV, *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 114-121. 8 Refs.

A degenerate GaAs-diode parametric amplifier is described which was used in the satellite-borne radiometer system in the Relikt experiment to map the cosmic background radiation. Factors hindering the achievement of the limiting noise temperature of the amplifier are examined, and the requirements on the tuning of the sum-frequency circuit are addressed along with the operation of the amplifier in the radiometer.

A89-14740 Two-frequency Gunn oscillators - A new class of microwave semiconductor devices (Dvukhchastotnye generatory Ganna - Novyi klass poluprovodnikovykh ustroistv SVCh-diapazona). A. S. KOSOV, I. A. STRUKOV, and G. S. GONIAEV, *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 105-113. 22 Refs.

The paper describes theoretical calculations and design aspects of two-frequency Gunn oscillators, which, generating at the fundamental frequency and the second harmonic, extend the operating frequency range of Gunn devices. These devices can be used in microwave detection systems with a degenerate parametric amplifier and a frequency converter at the input. A device of this type was used in the radiometer system of the Prognoz-9 Relikt (relic radiation) experiment.

A89-14738 Onboard millimeter-wave radiometers for investigating the relic-radiation anisotropy (Bortovye radiometry millimetrovogo diapazona dlin voln dlia issledovaniia anizotropii reliktovogo izlucheniia). I. A. STRUKOV, D. P. SKULACHEV, V. M. BALEBANOV, V. E. BEKER, A. S. KOSOV et al., *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 87-93. 5 Refs.

A brief description is given of the Relikt-1 experiment performed on the Prognoz-9 satelite during 1983-1984 and designed to measure the anisotropy of the relic radiation. Requirements on the measurement instrumentation are considered. A high-sensitivity 8-mm-band radiometer is described; ways to assure the reliability of the microwave components of the radiometer are discussed.

A89-14736 Prognoz-9 instrumentation for cold-plasma studies (Apparatura dlia issledovaniia kholodnoi plazmy na sputnike 'Prognoz-9'). IU. D. KRISILOV, V. V. AFONIN, N. A. BARABANOV, V. V. BEZRUKIKH, S. L. EMEL'IANOV et al., *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 71-77. 6 Refs.

The paper describes the D-211M instrumentation on the Prognoz-9 satellite for measuring the physical parameters of the ion component of the cold plasma in the 0-25-eV energy range. The approach used involves the measurement and subsequent mathematical processing of the ion-deceleration curves obtained using a retarding-potential analyzer.

A89-14734 Guaranteed signal-measurement accuracy of probe sensors (Garantirovannaia tochnost' izmereniia signala zondovykh datchikov). IU. E. SOBCHENKO, *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 65-68. 6 Refs.

The paper examines the problem of estimating the signal parameters of plasma-probe sensors in the case of spatial-temporal variations of the estimated parameter. Results are presented which make it possible to determine the guaranteed estimation error and the optimal measurement time. This approach is used to analyze data from the Prognoz-5 D211 plasma spectrometer.

A89-14729 Main principles underlying the design of onboard instrumentation for the radio sounding of the plasma shells of planets (Osnovnye printsipy postroeniia bortovoi apparatury radiozondirovaniia plazmennykh obolochek planet). T. K. BREUS, D. IA. SHTERN, and M. L. EL'KIN, *IN: Scientific instrumentation for space studies* (A89-14726 03-19). Moscow, Izdatel'stvo Nauka, 1987, pp. 27-34. 11 Refs.

The paper examines the design of satellite-borne instrumentation intended for the radio sounding of the Martian plasmasphere and the earth's topside ionosphere. It is shown that the use of resonance matching and complex sounding signals allows a large gain in energy potential and makes it possible to achieve the necessary range of action. It is concluded that the proposed approach will allow the design of instrumentation for the radio sounding of planetary plasma shells from orbits up to 20,000 km.

A89-13771 The Radioastron project. N. S. KARDASHEV and V. I. SLYSH, *IN: The impact of VLBI on astrophysics and geophysics; Proceedings of the 129th IAU Symposium,* Cambridge, MA, May 10-15, 1987 (A89-13726 03-90). Dordrecht, Kluwer Academic Publishers, 1988, pp. 433-440.

The Radioastron mission (Andreyanov et al. 1986) is designed to achieve angular resolutions as fine as 6 microarcsec and will be used to study radio sources with very high brightness temperature. It will form an orbiting radio interferometer between a satellite radio telescope 10 m in diameter and several large ground-based radio telescopes. The orbit of the satellite makes it possible to have baselines from several thousands to 80,000 km. The satellite will be equipped with four dual polarization receivers at 327, 1665, 4830, and 22235 MHz, with local oscillators phase-locked to a ground-based hydrogen maser frequency standard via an S-band microwave link. The IF signals from the receivers will be transmitted to the ground by an X-band high data rate link and recorded on magnetic tape in the VLBA format. Participation of large radio telescopes from many countries is envisaged and encouraged.

A89-10732 Transionospheric radio sounding as a technique for monitoring the state of the ionosphere (Transionosfernoe radiozondirovanie kak sredstvo kontrolia sostoianiia ionosfery). N. P. DANILKIN, *IN: The ionospheric service: Current status, problems, and prospects* (A89-10729 01-46). Leningrad, Gidrometeoizdat, 1988, pp. 79-110. 7 Refs.

The history of transionospheric sounding is presented, and a general description of this technique is given. The equipment and data-processing methodology are examined; and results obtained with Intercosmos-19 are examined. Some new results are examined, including the determination of N(h) profiles from transionograms, MUF determination for radio communications, and cutoff-frequency estimation for space/ground radio communications.

A89-10716 Physical/technical principles behind the development and application of spacecraft (Russian book) (Fiziko/tekhnicheskie osnovy sozdaniia i primeneniia kosmicheskikh apparatov). GENNADII PETROVICH DEMENT'EV, ALEKSANDR GRIGOR'EVICH ZAKHAROV, and IURII KONSTANTINOVICH KAZAROV, Moscow, Izdatel'stvo Mashinostroenie, 1987, 264 pp. 217 Refs.

Various aspects of spacecraft design, development, and application are discussed, with some projections made concerning space programs up to the year 2000. Particular consideration is given to the functional design of spacecraft, the structural design and application of orbital complexes, the development of spacecraft with two-mode liquid rocket engines and low-thrust engines, the features of onboard computers, and advanced spacecraft construction materials.

A88-55418 General design concepts used in advanced TDMA satellite communication systems. G. PANKOV, M. SIMONOV, and V. TSIRLIN, IAF Paper 88-429 presented at the IAF 39th International Astronautical Congress, Bangalore, India, Oct. 8-15, 1988. 3 pp.

Aspects of TDMA satellite communication systems are briefly considered. Advanced TDMA satellite communications systems characterized by their ability to operate via a multibeam satellite are examined along with related problems. The use of forward error correction techniques to optimize the utilization of the assigned frequency band and the on-board transponder power is discussed.

A88-51606 Transionospheric sounding as a final link in the information system for ionospheric radio sounding. S. I. AVDIUSHIN, N. P. DANILKIN, I. I. IVANOV, IU. V. KUSHNEREVSKII, and V. V. MIGULIN, *Advances in Space Research* (ISSN 0273-1177), Vol. 8, no. 4, 1988, pp. 29-38.

The transionospheric sounding (TIS) method is considered as the final link in the ionospheric radio sounding system, and it is pointed out that the method should be capable of simultaneous operation in all the four types of radio sounding (vertical ground-based, oblique incidence, topside from the satellite, and TIS). By combining the methods of N(h)-profile calculation in the ionosphere, the spatial distribution of the ionospheric state characteristics can be determined. Successful TIS experiments from IC-19 have permitted calculation of real N(h)-profiles from the transionograms.

A88-50769 High-temperature solar energy systems for spacecraft power and propulsion units (Russian book) (Solnechnye vysokotemperaturnye kosmicheskie energodvigatel'nye ustanovki). OLEG IVANOVICH KUDRIN, Moscow, Izdatel'stvo Mashinostroenie, 1987, 248 pp. 22 Refs.

The work covers such topics as solar-energy concentrators, concentrator-receiver systems in solar-energy propulsion units, selective absorption as a way to enhance the efficiency of solar energy conversion and the Stirling engine as a solar enery converter. The development of high-temperature solar energy systems for spacecraft power and propulsion units is investigated in detail, with particular attention given to results of ground-based testing.

A88-50106 The search for gamma radiation from supernova 1987A in an experiment aboard the Salut-7/Cosmos-1686 complex (Poisk gamma-izlucheniia ot sverkhnovoi 1987A v eksperimente na orbital'nom komplekse 'Saliut-7'/'Kosmos-1686'). R. N. BASILOVA, G. M. BLOKH, V. M. PANKOV, V. L. PROKHIN, A. I. RUTKOVSKII et al., *Pis'ma v Astronomicheskii Zhurnal* (ISSN 0320-0108), Vol. 14, July 1988, pp. 594-598. 8 Refs.

Gamma-quanta flux measurements were carried out during February-October 1987 in a search for radiation from SN 1987A. The time dependence of the mean monthly gamma-quanta flux measured with the Nega telescope at an altitude of 500 km in the equatorial region is analyzed. The upper limit of the gamma-quanta flux is determined to be 1.5 x 10 to the -6th/sq cm s keV on the 3-sigma level for the 1.5-4.4 MeV energy interval.

A88-50105 The increase in the hard X-ray flux from SN 1987A detected with the Hexe and Pulsar X-1 telescopes aboard the Kvant module's Roentgen observatory (Uvelichenie potoka zhestkogo rentgenovskogo izlucheniia ot sverkhnovoi 1987A po dannym priborov 'Gekse' i 'Pul'sar X-1' observatorii 'Rentgen' na module 'Kvant'). R. A. SIUNIAEV, V. V. EFREMOV, A. S. KANIOVSKII, D. K. STEPANOV, S. N. IUNIN *et al., Pis'ma v Astronomicheskii Zhurnal* (ISSN 0320-0108), Vol. 14, July 1988, pp. 579-590. 12 Refs.

Observations of SN 1987A carried out during August 1987-February 1988 using the Hexe and Pulsar X-1 telescopes aboard the Mir station's Kvant module revealed a significant increase in the hard X-ray flux from the supernova in the 20-400 keV range. The radiation spectrum and its rate of increase can only be explained by models associated with gamma-line Comptonization, which arises during radioactive Co-57 decay. The early appearance of Co-57 line emission and the relatively slow increase in intensity suggests either substantial Co mixing over a significant part of the ejected envelope, or significant nonspherical geometry of the supernova envelope.

A88-49432 Methods for eliminating conflicts between operation modes of an earth-resource satellite in mission planning (Metody ustraneniia konfliktov mezhdu rezhimami funktsionirovaniia KA IPRZ pri sostavlenii programm raboty). G. P. ANSHAKOV, A. V. SOLLOGUB, and D. G. BUNDOV, *Issledovanie Zemli iz Kosmosa* (ISSN 0205-9614), May-June 1988, pp. 107-116.

This paper presents tradeoffs for achieving the maximal performance of an earth-resources satellite. Using the discrete maximum principle and a dynamic programming procedure, algorithms were developed which make it possible to assign and to schedule conflict-free operation modes (each of which is set for maximal efficiency) for information collection and transfer, thus ensuring maximal efficiency of the mission. A numerical example is included.

A88-48707 Satellite systems for maritime navigation (Russian book) (Sputnikovye sistemy morskoi navigatsii). VALERII ANATOL'EVICH BOGDANOV, VALENTIN ALEKSEEVICH SOROCHINSKII, and EVGENII VIKTOROVICH IAKSHEVICH, Moscow, Izdatel'stvo Transport, 1987, 200 pp. 42 Refs.

The principles underlying the design of Doppler satellite navigation systems are examined, and the characteristics of existing and proposed satellite systems for maritime navigation are described. Particular attention is given to the COSPAS-SARSAT system, GPS/Navstar, and the Navsat, Granas, and Geostar projects. The features of shipboard navigation instruments are examined.

A88-48077 Active components of cryoelectronic systems based on the intervalley-transfer effect (Aktivnye elementy krioelektronnykh sistem na osnove effekta mezhdolinnogo perenosa). IU. N. BROVKIN and V. V. GONCHAROV, *Kosmicheskaia Nauka i Tekhnika* (ISSN 0321-4508), no. 2, 1987, pp. 6-9. 10 Refs.

Experimental results are presented on the use of microwave devices based on the intervalley-transfer effect (ITE) in cryogenically cooled spacecraft systems. Epitaxial n-GaAs films with parameters typical for the ITE were investigated at temperatures of 4.2-300 K. It is shown that the deep cooling of ITE devices to cryogenic temperatures not only does not worsen their performance but improves many of the microwave characteristics, making these devices suitable for use in cooled onboard systems.