

**Shubarev V. A., Metkin N. P., Vesnicheva M. V.** *Scientific and Technical Program of the Union State of Russia and Belarus "Microsystem Technique" — the Basis of a New Generation of Microsystem Technique and Unified Integrated Dual-Use Systems on its Base* . . . . . 2

We represent scientific and technical Program of the Union State of Russia and Belarus "Microsystem technique", its actuality, objectives and targets. In this work we examine scientific, technological, political, socio-economic and business aspects of the Program.

**Keywords:** scientific and technical Program of the Union State of Russia and Belarus, "Microsystem technique", microsystem technique device, special processing and calibration equipment, radio electronics component base

**Avakaw S. M., Aheichanka A. S., Zouev V. P., Karneliuk A. I., Matsiushkou U. E., Samokhvalov V. K., Tachitski J. I., Trapashka H. A., Baryshnikov D. P., Rusetsky V. A.** *Special Opto-Mechanical, Inspection and Measurement Equipment for Industrial Production of Microsystem Engineering Products* . . . . . 7

The paper presents preliminary results of the implementation of the scientific and technical program of the Union State "Development and manufacture of a new generation of microengineering systems, as well as consistent integrated systems of dual-purpose based on them" in order to create the special opto-mechanical, inspection and measurement equipment for conducting photolithographic and inspection processes in the manufacture of the microsystem engineering products.

**Keywords:** microsystem engineering, patterning, pattern generator, stepper, alignment of patterns, critical dimension, inspection of flatness

**Barbarchuk D. V., Klim O. V., Mazovka T. E., Kovalchuk G. F., Kavenski A. E., Tsaruk A. V., Tsirkun D. P., Shkolyk S. B., Baryshnikov D. P., Shubarev V. A.** *Equipment for Assembly of Microsystem Engineering Devices* . . . . . 15

The paper considers design principles of systems for grinding and honing thinning, double-threaded separation, laser processing, diffusion wafer welding and "flip-chip" die bonding in assembly of micro-system engineering devices. The results of research and development are shown.

**Keywords:** micro-system engineering, abrasive tools, semiconductor wafer grinding, wafer split-up in the crystals, laser hole formation, diffusion welding, die bonding, "flip-chip"

**Michailov A. N., Berlik S. A., Michailov E. A.** *The Methodology of Automated Control of Parameters of Microsystems Sensors* . . . . . 22

The article is about questions of automation of development of test programs and their application for control of parameters of sensors of microsystem engineering on the basis of behavioral models, the components which are a part of sensors are considered. Behavioral models a components represent the texts of program modules written in higher-level language of the description of equipment (Hardware Description Language — HDL). In article it is supposed to use as descriptions a compinents — the Verilog HDL language.

**Keywords:** control of parameters, sensor, behavioral models, test program

**Galisultanov A. T., Dzyubanenko S. V., Ignatuev V. S., Silakov D. M., Kalinin V. A.** *Acoustoelectronic Force Sensor in Security Systems for Hydroelectric Generator in Hydroelectricity* . . . . . 24

Acoustoelectronic force sensor for force control on the anchor piles and stud fastening covers of hydroelectric turbines is developed. The use of piezoelectric sensors can improve the accuracy and performance. The SKDS-SISH monitoring system built on these sensors allows continuous monitoring of load, which increases the safety of complex technical objects.

**Keywords:** acoustoelectronics, SAW resonator, force sensors, hydroelectricity

**Taratyn I. A., Serdyuk I. V., Smirnov M. S., Grinchuk A. P.** *Fire Alarm Detectors on the Base of Low Energy-Consuming Gas Sensors for Early Prevention of Inflammability* . . . . . 28

The article describes fire alarm detector on the base of gas sensor, manufactured by batch microelectronic technology. The working principle of semiconductor sensor is described. Test results of the detectors in the gas analytic system at "Avangard".

**Keywords:** gas sensing module, aluminum oxide, gas mixing station, gas analytic system, explosion-proof

**Timoshenkov S. P., Kalugin V. V., Kochurina E. S., Anchutin S. A., Kalinin V. A., Stroganov K. A.** *Various Ranges of Linear Accelerations Microaccelerometers for Using in the Inertial Navigation Systems* . . . . . 32  
Micromechanical accelerometers have a wide range of application. Development of a capacitive-type accelerometer is described. High sensitivity, simple design and manufacturing technology are the major advantages of these devices.

**Keywords:** microaccelerometer, MEMS, capacitive accelerometer sensor

**Pinaev V. V., Sukhanov V. S., Pankov V. V., Mikhailov Yu. A., Danilova N. L., Bylinkin S. F., Gavrilov A. A., Shipunov A. N.** *Integral MemS-Transducers with High Stability of Output Parameters* . . . . . 36  
There are some production procedures securing the increase of timing stability of pressure transducers and accelerometers parameters. Results of high-speed reliability tests of samples are presented. Reliability parameters of the transducers are determined by an experiment-calculated method.

**Keywords:** pressure transducer, accelerometer, sensor, timing stability of parameters, reliability tests

**Gonchar I. I., Kisilev L. N., Michailov A.N., Pevgov V. G., Semenov A. V., Shubarev V. A.** *Thermoresistive Cryogenic Medium Level Measurement Sensors* . . . . . 41  
Presented research results of thermoresistive cryogenic medium level measurement sensors, which are made on thin heat-insulating substrates using microelectronic technology.

**Keywords:** thermistor, sensor, level sensor, level gauge, delay time, sensitivity

**Bubnov Yu. Z., Vishnevnik L. N., Serdyuk I. V., Smirnov M. S.** *Semiconductor Gas Sensors with Membrane Structure for Fire Alarm Detector*. . . . . 45

The demand within the market of modern combined fire alarm detectors, which includes gas sensor module is defined. For this module is proposed semiconductor sensor, which includes membrane structure.

The test results of semiconductor sensor with membrane structure are presented.

**Keywords:** fire detector, fire alarm detectors, semiconductor sensor

**Michaylov A. N., Kosinskiy V. N.** *Building and Facility Strain Gages and Construction Safety Monitoring System* . . . . . 50

Wireless monitoring systems application reasonability in the area of building and facilities construction safety support is shown. Engineered by the public corporation "Avangard" specialists wireless deformation monitoring system presented in this article. Shown the technology which provides rise of building and facilities complex safety through increasing self-descriptiveness and reliability of deformation monitoring system as one of the elements of complex safety. The structure of the new inductive sensing device for the deformation sensor of wireless deformation monitoring system, which is developing in the network of Union state program "Microsystemtechnics", observed in this article.

**Keywords:** construction monitoring system, sensors, inductive sensing device, software

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