STATE COMMITTEE ON SCIENCE AND TECHNOLOGIES
OF THE REPUBLIC OF BELARUS

CATALOGUE

of innovation projects and products

Minsk
2011

State Committee on Science and Technology
SCST
of the Republic of Belarus

OF STATE COMMITTEE ON SCIENCE AND TECHNOLOGIES OF THE REPUBLIC OF BELARUS

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THE MAIN FUNCTIONAL TASKS:

Implementation of the government policy in the sphere of scientific, innovation, scientific and technical activity, and also in the field of intellectual property rights protection.

Organizational and economic regulation of issues related to the development of scientific, innovation, scientific and technical activity, and also in the field of intellectual property rights protection.

Scheduling the training of scientific personnel of the highest qualification at the national level and by field of science; organization of the research results implementation.

Analyzing the level of research and development under performance; development of proposals for their economic efficiency.

Coordination activities of the republican bodies of state administration and organizations in the field of scientific, innovation, scientific and technical, and activity, as well as in the field of intellectual property rights protection.

Improving the structure of scientific and technical capacity in the republic and increasing the effectiveness of its use.

Integrated government policy in the field of international scientific and technical cooperation of the country.

Development of innovation infrastructure, creating mechanisms for the support of innovation activity subjects, creation and development of productions based on the new and high technologies.

Attraction and use in the national economy of advanced highly efficient foreign technologies.

Stimulating and support to the development in the republic of entrepreneurship connected with commercialization and implementation in production of scientific and technical achievements.

Informing of the public on the issues of science development, its achievements, activities of the SCST, republican bodies of state administration in the sphere of science, and scientific organizations.

State scientific and technical expertise and maintaining the registers of high-technology productions and enterprises.

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The Catalogue based on materials presented by organizations that have taken part in State scientific technical programs and innovations projects, realized in 2010.

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Dear friends!

State Committee on Science and Technologies of the Republic of Belarus represents the issue of innovation projects and products catalogue done within the frames of state scientific and technical programs of Republic of Belarus development for 2007–2010.

The Catalogue to a greater degree reflects scientific, scientific and technical, innovation activity in the branches of industry favoring to modernization of the economy. This is primarily nanomaterials and nanotechnologies, information technologies, radio-engineering and microelectronics, laser technologies, new materials and protective coating.

Adequate consideration is also given to innovation projects in conventional for the republic branches such as: automobile manufacturing, tractor industry, agriculture machinery and others.

The presented projects make a good showing of technical and technological novelty, competitive ability on domestic and foreign markets, have a considerable export-and import substitution potential.

The experts are ready to render assistance in implementation of proposed projects.

Welcome to mutually advantageous cooperation!

Chairman of the State Committee on Science and Technologies of the Republic of Belarus

Ihar V. Voitau

Novelty: the products having no analogues or rank over foreign and domestic analogues

Project having patent protection

Export-oriented products, technologies

Import-substituting products, technologies

Resource-saving, energy-saving technologies

Secondary resources use and wastes utilization

Ecological safety

I. Nanotechnologies and Nanomaterials

I-1. The automated complex for the study of friction, wear, and physical and mechanical properties of modified surfaces and thin coatings (AKIPT)

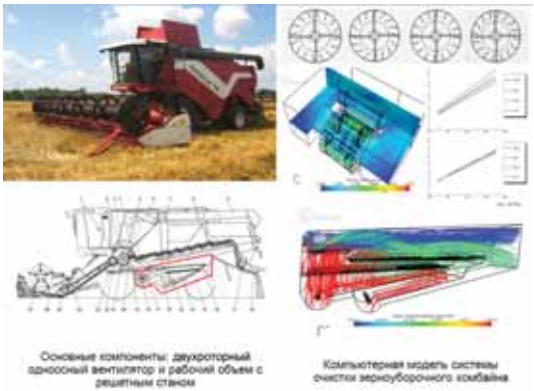
Application field	The complex is used in the following spheres — tribology, physics of thin films, material science. There is the possibility to investigate patterns of small linear dimensions; investigate the tribological properties of the layers in the thickness range from tens of nanometers to microns, and the modified surfaces, changing the track length of wear from 5 up to 20 mm.
Description of products	Features: identification of friction in the load range from 0.01 up to 0.5 h, the adhesion strength of thin coatings with a maximum load of up to 2 h, the depth of wear track with a resolution of 0.2 microns, the penetration depth of the indenter in the measurement of microhardness of 200 nm, the indenter load of up to 2 h, the range of variation of wear track length — 5–20 mm, an automated control of the instrument with the output of measured data to a computer, a convenient variation of the load on the indenter without the use of precision loading mechanism, causing the high cost of such equipment.
Competitiveness	The complex by the study of friction, wear and physical-mechanical characteristics of the modified layers and coatings is up to the highest world standards. In Belarus and the CIS countries, instruments of this class are not made, there are only laboratory experimental plants.
Expected outcome	The developed system is intended for studies of micro-mechanical properties of thin coatings and modified layers used in various fields of mechanical engineering.
Offers on sale	Agreement on cooperation.
Level of readiness	Experimental model.
The transfer of rights object	Effective model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Welding and Protective Coatings Institute" SSFU***

II. Information Technologies

II-1. Computer system "EXTRA" for task solution support in the sphere of diagnosis with attachment in sporting traumatology and recreation therapy

Application field	The computer system is used for diagnosis and treatment of diseases in the spheres of sporting traumatology and recreation therapy, as well as in educational process while teaching developers of computer systems, doctors, and students of medical higher educational establishments.
Description of products	Technology and formal mathematic models have been developed for task solution of image recognition with insufficient information, as well as computer system "EXTRA" for task solution in the sphere of diagnosis with attachment in sporting traumatology and recreation therapy.
Competitiveness	There are no direct analogues. Computer system "EXTRA" is in compliance with the best models of software products of the CIS countries.
Expected outcome	Increase of effectiveness and treatment-diagnosis process. Economic, social and other effects after implementation of developed technologies conditioned by enhancement of engineering and operation of the systems for task solution of image recognition and artificial intellect while training developers of computer systems in higher educational establishments.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; delivery of the finished product; agreement on cooperation.
Level of readiness	Experimental model.
The transfer of rights object	Software; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Belarusian State University***

II-2. Electronic models and technique of computer modeling and analyzing the continuum streams for perfection of grain clearing processes in a combine harvester



Основные компоненты: двухроторный одноосный вентилятор и рабочий объем с решетным станом

Компьютерная модель системы очистки зерноуборочного комбайна

Application field
Agricultural mechanical engineering.

Description of products
Electronic models of basic elements (the fan and the working chamber of the clearing system) of a combine harvester in the form of volume final-element computational grids, and also a technique of computer modeling and analyzing the continuum streams in the clearing system of a combine harvester on the basis of the finite volume method and the equations of mathematical physics.

Competitiveness	Scientific and technical level of the project "Electronic models of clearing system elements of combine harvester KZS-1218 and a technique of computer modeling and analyzing the continuum streams inside the clearing system" corresponds to the best CIS samples.
Expected outcome	The use of agricultural machines in the course of development (first of all machines for harvesting and grain clearing) and research of their operating modes, a choice of an optimum operating mode; designing and research of the operation of designs having rotor parts (fans, turbines, turbo compressors, etc.).
Offers on sale	Transfer of engineering specifications and specialist advice on development; introduction of technology; agreement on cooperation.
Level of readiness	Idea, concept; design and budget documentation.
The transfer of rights object	Effective model; software; others.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

II-3. Image analysis program of computed tomography of retroperitoneal organs "RAMONAK"

Application field	Program "RAMONAK" can be used for complex processing of digital images in computed tomography. Program "RAMONAK" can be incorporated as an element in any software and hardware complex that works with 3D medical images.
Description of products	"RAMONAK" is meant for analyzing and monitoring of set of images obtained through medical research methods. The program is designed to automate the monitoring of diseases with ray-path testing methods. The program has an open architecture for data processing and analysis of ray-path methods of medical images. The program includes functions for image processing, interactive features of highlighting and calculating of the bulk characteristics of selected objects.
Competitiveness	Program "RAMONAK" does not have any domestic counterparts, but the scientific and technical level of basic technical and operational characteristics is not inferior to foreign analogues. The market value of program "RAMONAK" is significantly below their foreign counterparts in the global market.
Expected outcome	Implementation of image analysis program of computed tomography of retroperitoneal "RAMONAK" will significantly improve the monitoring of the disease; reduce the cost of medicines and the number of days of hospitalization.
Offers on sale	Delivery by individual orders; manufacturing and supply; delivery of the finished product.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

II-4. Information-analytical system of person-hour fixing for the pipelines welding

Application field	Businesses and organizations of Belarus and the CIS countries, which are engaged in building and repairing pipelines.
Description of products	The system provides a calculation of time standards to perform the operations of manual arc welding, gas welding and cutting, autowelding in carbon dioxide, autowelding under the flux and heat treatment of weld pipe junctions. Data and knowledge base systems are made by the means of database InterBase, program-methodical complex is made in a visual programming environment Delphi 7.0. The system works interactively. The work results are displayed on a computer screen or printed by means of Microsoft Office Excel. The user interface provides a visual and symbolic control of correct program work, has suitable control means.
Competitiveness	Is higher than similar domestic development of research and development enterprise (RDE) "INTERMEH" if we mean the time acceleration of person-hours calculating for piping welds compared to manual methods (1.2–1.5, in the new — 7.5–8.5 times), can reduce the timetable shortening of welding works in construction and repair of pipelines through the technically based time norms by 10–15 % and improves the level of similar foreign product JSC "ASCON" (Russia) if we mean the person-hours time calculations for piping welds compared to manual methods (1.2–1.5, in the new — 7.5–8.5 times).
Expected outcome	The acceleration of normative labor content calculation due dates is 7.5-8.5 times more than manual methods, the reduction of labor costs to perform the operations of welding in the construction and repair of pipelines through the technically based time norms calculation by 10–15 %.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development; cooperation with the customer on application.
Level of readiness	Experimental model.
The transfer of rights object	Software.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works
Organization-developer	***"Welding and Protective Coatings Institute" SSFU***

II-5. Program complex "Estimation and visualization of forest fire dynamics"

Application field	The program complex allows to estimate forest fire characteristics on the basis of the developed technique, the created databases of initial parameters and the prepared typical scenarios of the development of forest fires, to model dynamics of fire development, to visualize the results of estimation on an electronic card and export the results to geoinformation systems (GIS).
Description of products	The program complex allows to estimate the dynamics of forest fire spread, and also carry out the construction of burnt zone borders and a burning area of wood combustible materials, to put contours of these zones on digital cards with possibility of transmitting graphic pictures to operating GIS. The program complex of modeling and a computer model of forest fire spread allow to register the properties of wood combustible materials in concrete territory, physical and chemical characteristics of burning processes, a direction and speed of wind in a large forest. The carried calculation by the computer model yields the results including spatial distributions of mathematical solutions of fire spread for the successive occasions. The program complex provides: – input, updating of databases for the mathematical model; – estimation of fire characteristics and dynamics of its development (speed and direction of front spread, fire area, front perimeter, etc.); – formation and correction of the knowledge base of a computer model; – information search in databases and the knowledge base; – visualization of the estimation results on an electronic card; – export/import of cartographical layers into GIS.
Expected outcome	The program complex allows to carry out forecasting of forest fires development and their consequences.
Offers on sale	Delivery by individual orders.
The transfer of rights object	Software.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Organization-developer	***Belarusian State University***

II-6. Software of computer-aided design system of cross-wedge rolling instrument

Application field
The system is meant for engineering process automation of the instrument that should be used in to the hot flat cross-wedge rolling of divergent wedge of solid ferrous and nonferrous metals.

Description of products	The method of designing an instrument for cross-wedge rolling was developed and based on the allocation of individual elements (groups of elements) included in a roll part, the design of wedges for selected items with the subsequent solution of the synthesis (assembly) of the wedge-type instrument. The developed method, formal models and algorithms are implemented in the software-aided design tool for cross-wedge rolling.
Competitiveness	For the first time there was developed a method of a tool designing based on formal models of the elements of the instrument. The models allow a unified library of parameterized 3D models of wedge-type tools and formalized procedures of the synthesis of assembly modeling tool.
Expected outcome	Tests of the method in the test sample showed a significant reduction (by at least 50 %) in labor costs compared to traditional methods of design, and as a consequence, a significant reduction in terms of design. Promising market are the companies from Russia, Ukraine and Korea, which operate flat cross-wedge rolling mills.
Offers on sale	Sale of a license.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

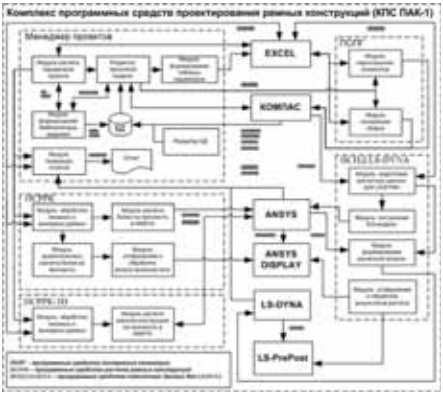
II-7. Program Informative Complex (PIC) "Cadastre-ERS" of integrated tools for co-processing of earth remote sensing data and updated or created digital maps

Application field	PIC "Cadastre-ERS" may be used for complex processing of digital aerospace pictures (DAP) of both domestic and foreign earth remote sensing aircraft (ERS) for being used in technologies of renovation/creation of digital terrain maps (CCM), modeling, and operational space analysis of the area conditions for the multiple tasks of decision making in operational and emergency situations on the basis of remote sensing data and digital maps, etc.
Description of products	PIC "Cadastre-ERS" is based on the use of GIS techniques, digital image processing, collaborative processing raster and vector models DN and DCW. PIC "Cadastre-ERS" has an ergonomically convenient user interface and includes a full-function complete set of integrated into a package of tools for co-processing of remote sensing data of ERS with DCW and implements various methods of improving the quality of the DN, the binding and orthotransformation of DN to DCW, thematic deciphering and formation of graphic and digital accounting documents and forms on the results of thematic deciphering of DN and others. The developed complex is designed primarily for ERS processing, which must come from the Belarusian spacecraft "Belka" realizing panchromatic imagery with a resolution of 2.5meters and multispectral imagery (4 channels: 0.54–0.6; 0.63–0.69, 0.69–0.72, 0.75–0.86) with a resolution of 10 m.
Competitiveness	PIC "Cadastre-ERS" does not have domestic counterparts; a scientific and technical level of basic technical and operational characteristics is not inferior to the best foreign analogues. The market value of PIC "Cadastre-ERS" is significantly below their foreign counterparts in the world market.
Expected outcome	PIC "Cadastre-ERS" is in demand for the national economy of Belarus and will import substitute in the domestic market, as well as competitive in the world, primarily on the CIS market.
Offers on sale	Delivery by individual orders; manufacturing and supply; delivery of the finished product.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

II-8. Standard software and hardware ESP IS server

Application field	At present, based on RFID technologies are widely used in world practice in various automation systems: identification and control of movements of returnable container, control system sales in retail outlets, supply chain of goods and services, monitoring of the cargo traffic movement on transport corridors, and control system of technological processes on factories.
Description of products	Logistics enterprise server EPC IS is a new modern means of fixing the events that occur in chains of work with objects that are marked by the means of automatic identification. Logistic Spy 2.0 provides the following functions: description of the configuration, used RFID equipment, management, setting and monitoring of RFID equipment, data gathering of RFID tags in the automatic mode, processing and filtering of information about RFID tags, the generation of relevant events, fixation of events in a database and its mailing, provides to an application software the access service to the event database.
Competitiveness	Domestic analogues do not exist.
Expected outcome	The designed logistics information enterprise server is a standardized program-technical complex. Logistics enterprise server Logistic Spy 2.0 is designed to reduce time, cost of developing new, and refining existing information systems in terms of RFID technology.
Offers on sale	Sale of a license.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	License agreement.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Intersectoral Theoretical and Practical Centre for Identification Systems and Electronic Transaction***

II-9. System of software tools support of software tools of the design and engineering analysis of structural elements combined tillage aggregates (PCC PAC-1)



Application field	CAD system is created to automate the design and engineering analysis of combined tillage aggregates frame structures (CPA).
Description of products	The methodology and the automation software complex for design and modeling of uniform (basic) structural elements of the CPA were created in conditions close to real operation. SPC PAC-1 provides a continuous loop of automation design process and modeling of uniform (basic) CPA structural elements.
Competitiveness	A specialized method for engineering analysis of the structural elements of the CPA was developed. A single integrated design envelope, modeling and engineering design analysis of CPA was created.
Expected outcome	Tests of the method consisting of the engineering sample showed a significant reduction (at least 50 %) in labor costs in comparison with traditional methods for design and reducing the time of design and prototyping.
Offers on sale	Sale of a license.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

II-10. The software package "The calculation of the number and mode of cross-border transmission of petroleum products on water courses in emergency situations"

Application field	The software package is meant for calculating the parameters and characteristics of the transport and distribution of petroleum products across watercourses during related to the accidental flows emergency situations.
Description of products	The software package provides the calculations and construction of a dynamic model of the oil slick motion on the watercourse on the electronic map. The software tool is built in a modular approach and consists of the compatible modules MapInfo GIS. The model calculates the motion of the spot the following features and characteristics: – the zone of pollution time approach; – a maximum magnitude of petroleum pollution concentration in the area of the watercourse; – the length of the passage of high petroleum products concentrations in a given alignment of the watercourse; – the speed of the spot motion; – required time to reach the spot until the reference point; – maps of contamination at a certain time after the accident. The software module visualization of the dynamic model of the spot on the watercourse in GIS environment provides the formation of maps with the environment application in the area of emergency. The system includes electronic databases on the characteristics of streams, petroleum and petroleum products, oil and product pipelines.
Expected outcome	The software package allows to predict the effects of oil spills and petroleum.
Offers on sale	Delivery by individual orders.
The transfer of rights object	Software.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Organization-developer	***Institute for Command Engineers of the Ministry of Emergencies of the Republic of Belarus***

II-11. The software system for design of production lines of modular machine for batch processing

Application field	Automation of the preparation of technical and commercial proposal for the production line for batch processing of parts on special modular cutting machine and machine pilot projecting.
Description of products	The software system is meant to develop the technical and commercial proposals for production lines of special machines for the aggregate group processing a given range of components. It provides computer-aided design of group processes for the line, the formation of aggregate configurations of machines, implementing designed group technical process, with the selection of their major standardized units and the definition of the machine size and cost.
Competitiveness	The software system exceeds the best domestic and foreign counterparts in terms of design processes automation by 10–50 %, to reduce the period of design — by 15–30 % in terms of standardization of design solutions — up to 2 times, and in contrast, has means of optimizing the design decisions.
Expected outcome	Application of the software system will reduce complexity, reduce time and improve the quality of technical preparation of production in comparison with traditional methods.
Offers on sale	Transfer of engineering specifications and specialist advice on development; partnerships or other arrangements; cooperation with the customer on application; agreement on cooperation.
Level of readiness	Experimental model.
The transfer of rights object	Software; experimental model.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***United Institute of Informatics Problems of the National Academy of Sciences of Belarus***

II-12. The system of calculation and optimization of the quality level of welding production in the industrial pipelines construction

Application field	Technological processes and the quality of blank and assembly- welding production in the industrial pipelines construction.
Description of products	Statistical analysis of the quality of welded joints according to basic groups, imperfection and the reasons of its generation. The formation of the output calculating-analityc documentation about the quality condition that dominates in the formation of defects in production of factors (reasons) for the organization, objects, and executors. The software is built on a modular approach with the use of visual programming Delphi 7.0 and DBMS InterBase.
Competitiveness	The developed system does not have any foreign and domestic counterparts.
Expected outcome	Reducing of the total cost of welding and assembly work during the construction of the industrial pipelines by 5–7 %. Shortening of the object delivery terms of the welding in the exploitation by 3–5 % due to the process of optimization. Savings of welding materials and energy resources is by 10–15 %.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development; cooperation with the customer on application.
Level of readiness	Experimental model.
The transfer of rights object	Software.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Welding and Protective Coatings Institute" SSFU***

III. Electronics and Radio Engineering

III-1. Comparison microscope "Peleng MC-04"

Application field
Used in expert divisions of power structures.

Description of products
Comparison microscope "Peleng MC-4" for the expert (including identification) research of micro-and macrotracks withdrawn from the scene of the ballistic trace evidence, handwriting expert studies and research documents, counterfeit drugs, forensic and forensic medical examinations. The increase in visual observation of 5, 10, 20, 40 and 80 times. The study of objects: in ultraviolet radiation, in the visible spectrum of radiation, in infrared radiation, in visible in polarized radiation. Overlay image or link in the field of view. Smooth movement across the field image lines of connected images partition. Surveillance Images in binoculars, on a computer monitor. Joined images of the objects from a digital camera "Olympus" (matrix 12 mega pixels). Registration of images of the test objects with the help of the digital camera "Olympus" (matrix 12 mega pixels).

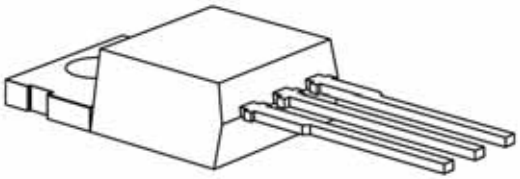
Competitiveness	Created comparison microscope "Peleng MC-4" is of the new generation with higher competitive performance. Comparison microscope "Peleng MC-4" with a new generation of visual resolution of 45 mm^{-1}, equipped with a digital camcorder, digital camera, coaxial illuminator, which will allow recording images in digital form with the ability to output it to the monitor, freeing the operator from the routine processing films, more quality shots. The developed software provides the investigation of volume scanning of objects (bullets, shells) in trace evidence and ballistic research, archiving of sweep surfaces, and a quick comparison with the available in memory ones.
Expected outcome	The main consumer of comparison microscopes "Peleng MC-4" of a new generation — the forensic division of near and distant foreign countries (Russia, Belarus, Uzbekistan, Kazakhstan, Ukraine, etc.).
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply; agreement on cooperation.
Level of readiness	Limited production.
The transfer of rights object	Invention; effective model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Joint production.
Organization-developer	***"Peleng" JSC***

III-2. High-resolution lenses for special technological and check-out equipment of new generation



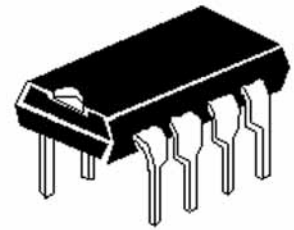
Application field	High-resolution lenses assigned for work in special equipment for the production of photomasks with the level of detection capability 65 and 150 nm.
Description of products	Lenses "VOK-65", "VOK-150" and "VOLG-200" — are diffraction limited lenses, working in UV- and DUV-light bands. Lenses "VOK-65" and "VOK-150" provide the ability to work effectively the devices of automatic control topology photomasks with the level of detection capability 65 and 150 nm; usage of lens "VOLG-200" in a multichannel laser image generator enables the production of intermediate photomasks VLSI of technological level from 0.18 μm.
Competitiveness	The cost of technological level lenses is 65 and 150 nm. In the international market reaches 900–1,000 ths US dollars. The average estimated cost of lenses is 367 ths US dollars.
Expected outcome	Expansion of the export's potential of the company. Preservation of intellectual work. Cost cutting in developing and manufacturing of equipment.
Offers on sale	Introduction of technology.
Level of readiness	Limited production.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Organization-developer	***"KBTEM-OMO" RUE***

III-3. ILP223 IMS for AC/DC converter with integrated power transistor



Application field	ILP223 is meant to use in power modules of TV receivers, monitors, audio-amplifiers.
Description of products	Characteristics: – a small number of external converter binding components; – low AC/DC losses — up to 90 % efficiency; – built-in auto-restart and output current limiting; – thermal protection function; – provides the construction of forward, fly back, up and down converters; – works with conventional and optical feedback; – a stable operation in interruptible and continuous currents mode; – the output "SOURCE" is connected to the body radiator to reduce radio interference.
Competitiveness	Connects directly to a high line voltage, has small-size integration (driver + MOSFET) and a simple pipe hookup (achieved by using BCDMOS-technologies and original circuit decision).
Expected outcome	Reduction of weight and size and energy characteristics of electronic equipment, reduction of waste and inefficiencies of electricity, reducing of the imports volume of components, increase of exports, refinement of manufactured products and the microcircuits output expansion of high reliability and functional complexity.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Topology of an integrated microcircuit.
Offers for cooperation	Joint production.
Organization-developer	***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

III-4. ILX3085EN interface integrated transceiver chip RS-485 with low power consumption and the level of resistance to static electricity up to 15 kV



Application field

ILX3085EN is intended for use in telecommunication systems, sub-standard RS-485, RS-422 with low power dissipation, level compilers, transceiver devices sensitive to electromagnetic radiation, control systems, industrial facilities.

Description of products

Features of the development:

- contains a transmitter and a receiver serial data RS-485 standard;
- implemented auto-off function (Auto Shutdown), which provides low power consumption;
- supply voltage Uss = 5.0 V ± 5 %;
- temperature range — from –40 up to +85 °C;
- resistance to ESD on the receiver input and the output of the transmitter (RS-485 levels) — 15,000;
- value of the current "lock" — no less than 300 mA during normal weather conditions.

Competitiveness The level of resistance to static electricity is up to 15 kV, the ability to operate over a wide supply voltage range, high noise immunity and reliable transmission of signals, the ability to control trunk bus with expanded number of subscribers up to 256.

Expected outcome Mass production of these chips will expand the market and satisfy the requirements of the Belarusian enterprises of of electronic equipment.

Offers on sale Manufacturing and supply.

Level of readiness Serial production.

The transfer of rights object Topology of an integrated microcircuit.

Offers for cooperation Joint production.

Organization-developer ***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

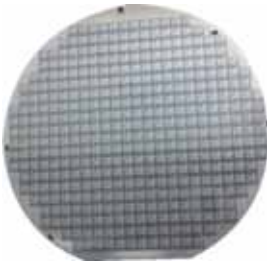
III-5. ILX3221EN interface integrated transceiver chip RS-232 with low power consumption and the level of resistance to static electricity up to 15 kV

Application field	ILX3221EN is intended for use in modern high-performance computing systems with a wide range of supply voltage, in high-speed electronic devices with high reliability in the exchange of information between remote objects.
Description of products	Characteristics of the development: – contains a transmitter and a receiver of serial RS-232 standard data; – implemented auto-off function (reduced consumption); – supply voltage Ucc = (3,0–5,5) V; – temperature range — from –40 up to +85 °C; – resistance to ESD at the receiver input and the output of the transmitter (RS-232 levels) — 1 kV; – value of the current lock — not less than 100 mA during normal weather conditions.
Competitiveness	Reduced power consumption; the level of resistance to static electricity — up to 15 kV, the ability to operate over a wide supply voltage range, high noise immunity, reliable transmission of signals.
Expected outcome	Mass production of these chips will expand the market and also satisfy the requirements of the Belarusian enterprises of electronic equipment.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Topology of an integrated microcircuit.
Offers for cooperation	Joint production.
Organization-developer	***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

III-6. ILX3232EN interface integrated transceiver chip RS-232 with low power consumption and the level of resistance to static electricity up to 15 kV

Application field	ILX3232EN is intended for use in modern high-performance computing systems with a wide range of supply voltage, high-speed electronic devices with high reliability in the exchange of information between remote objects.
Description of products	Characteristics of the development: – 2 transmitters and 2 RS-232 standard receivers; – auto-off function (reduced consumption); – supply voltage Ucc = (3.0–5.5) V; – temperature — –40up to +85 °C; – resistance to ESD at the receiver input and the output of the transmitter (RS-232 levels) — 15 kV; – the current lock — no less than 100 mA.
Competitiveness	Reduced power consumption; the level of resistance to static electricity is up to 15 kV, the ability to operate over a wide supply voltage range, high noise immunity, reliable transmission of signals.
Expected outcome	Mass production of these chips will expand the market and satisfy the requirements of the Belarusian enterprises of electronic equipment.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Topology of an integrated microcircuit.
Offers for cooperation	Joint production.
Organization-developer	***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

III-7. IZY266 interface integrated circuit for AC/DC converter with an integrated power transistor



Application field

IZY266 is meant for using in cell phone chargers, backup power of personal computers and television receivers, AC-adapter, electrical equipment control means, digital network of bundled services (ISDN) or the network completion of a digital subscriber line (DSL).

Description of products

Characteristics:

- automatic reset circuit for protection against short circuit and bond feedback cutting;
- input voltage control;
- operating frequency modulation reduces electromagnetic radiation (~ for 10 dB);
- work on a frequency of 132 kHz allows you to reduce the size of the transformer;
- ability of no-load operation;
- simple on/off control of output transistor without the necessity for feedback compensation;
- no-load consumption not more than 50 mW;
- temperature protection circuit.

Competitiveness It connects directly to a high line voltage, has small-size integration (driver + MOSFET) and a simple pipe hookup (achieved by using technology and BiKDMOP and original circuit decision).

Expected outcome Reduced weight and size and energy characteristics of electronic equipment, reducing waste and inefficiencies of electricity, volume reducing of accessory imports, exports increase, quality improvement of manufactured products and the increase in chip manufacturing of high reliability and functional complexity.

Offers on sale Manufacturing and supply.

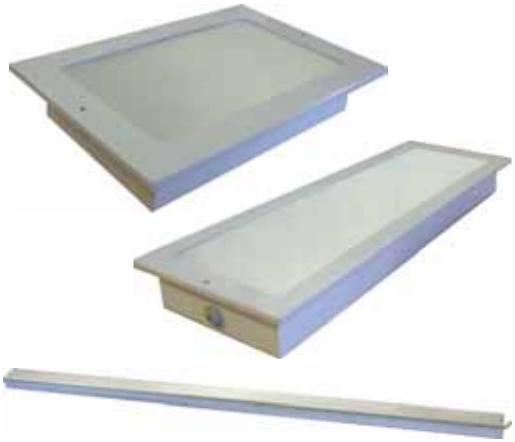
Level of readiness Serial production.

The transfer of rights object Topology of an integrated microcircuit.

Offers for cooperation Joint production.

Organization-developer ***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

III-8. LED lamps for railway cars



Application field	Overall, duty and emergency lighting in railway cars.
Description of products	Overall, the duty and emergency lighting of corridor, passengers' compartment, conductor's compartment, service offices, lobbies, toilets in passenger cars, trolley car driver's cab. The main parameters: range of operating voltages — from 87 up to 145 V; power consumption — no more than 25 W; illumination at a distance of 2.1 m — at least 50 lux; weight — no more than 2 kg.
Competitiveness	There are no domestic and foreign counterparts.
Expected outcome	Reduction of energy consumption, long life, resistance to mechanical stresses and low temperatures, safety for a human and the environment.
Offers on sale	Delivery by individual orders.
Level of readiness	Experimental model; pilot lot.
The transfer of rights object	Experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Investments.
Organization-developer	***Institute of Digital Television "Horizont" RUE***

III-9. LED street lamp "Phoenix"

Application field

Lighting of highways, roads, railway platforms, adjacent areas and passages, streets, squares, bridges, parks and recreation areas, outdoor lighting industrial facilities, security lighting, lighting, parking, etc.

Description of products

The optical system provides the required luminary intensity curve for street lighting, and the hull shape lamp — self-cleaning polycarbonate safety glass. The sources of light are white glow emitting diodes. High efficiency lamp is not less than 65 lm/W, power consumption, depending on version — 90–180 W, light output — 5,900–12,000 lumens, operating temperature range — from –35 up to +45 °C. Luminary cast has a durable coating with hydrophilic properties. Specialized sources of secondary power supply ensure reliable service of the LED-lighting module and connection to a standard power supply of 220 V.

Competitiveness	Technical and operational characteristics of the LED-lamp are at the level parameters of the best foreign analogues at lower cost.
Expected outcome	Replacing the traditional street lamps designed for LED-lighting will reduce overall costs by reducing lighting energy consumption and reduce operating costs for repairs and maintenance of lamps. Mercury compounds absence in the LED-lamps can provide environmental lightning.
Offers on sale	Sale of products on a contractual basis; joint enterprise; manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Effective model; undisclosed information (know-how); scientific and technical information.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works; joint production; joint enterprise.
Organization-developer	***Center of LED and Optoelectronic Technologies of National Academy of Sciences of Belarus***

III-10. Power factor corrector chip IL6562

Application field	Power factor corrector chip specifically is meant for use as a primary converter in electronic ballast and in the schemes of autonomous power converters. The chip can be used in AC/DC-adapter, battery chargers, etc.
Description of products	Characteristics of power factor corrector chip: – power factor correction in switching mode; – precise adjustable overvoltage protection chip in output; – a low drive current; – current consumption in idle mode — no more than 70 mA; – current consumption in operation — less than 5 mA; – extended supply voltage range — up to 22 V; – lock function; – an accurate internal source reference voltage; – double transistorized output stage valve control with blocking low voltage and voltage stabilizer.
Competitiveness	New circuit requirements solutions in conjunction with BiKDMOP-technology.
Expected outcome	The usage of this product would allow to reduce in weight and size and energy characteristics of electronic equipment, reduce waste and inefficiencies of electricity, reduce the volume of imports of components, increase exports, improve the quality of manufactured products and the increase in chip manufacturing reliability and functional complexity.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Topology of an integrated microcircuit.
Offers for cooperation	Joint production.
Organization-developer	***Belmicrosystems Research & Design Center "Semiconductor device factory" UE***

III-11. Radio station complex "Sirius" APCO25 standard of digital trunking radio, than includes a base-, stationary, mobile-, transportable, manpacked and hidden portable radios

Application field
Organization of secure systems of professional digital radio, also for the government.

Description of products
The complex of base radio stations, subscriber (Stationary, portable, man packed and hidden portable) terminals, and network equipment is the basis for building digital trunking radio systems of open international standard ARSO25 in the VHF- and UHF-radio-frequency bandwidth. At the same time used radio access technology ensures the efficient use of radio frequency resources. It is advisable to use for government and emergency services.

Competitiveness	Domestic counterparts are absent. Products are competitive in price indices in the markets of Russia and other CIS countries, states of Eastern Europe, Africa, the Middle East, Southeast Asia and South America.
Expected outcome	For the domestic market — import substitution when creating digital professional radio networks. Production of export is oriented and competitive in price indices in foreign radio markets.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development; joint production; service maintenance.
Level of readiness	Serial production.
The transfer of rights object	Software; experimental model.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Investments; joint production.
Organization-developer	***"Tekhnika svyazi" PC***

III-12. The transmitter of a digital television broadcasting of DVB-T standard 1000-W

Application field
Digital television broadcast networking.

Description of products
The transmitter is intended for creation and transmission of a television signal with the output power of 2 kW in digital mode. Working frequency range — 470–862 MHz. Power consumption — up to 8,000 Wt. Operation at temperature from 0 up to +45 °C. Built on solid-state components with the use of innovative technologies that considerably have improved the reliability and efficiency of its exploitation. There were used systems of remote monitoring and management, automatic backing driver, and stabilization of the output power.

Competitiveness	Corresponds to the analogues. The products are competitive on price indices in the markets of Russia and other CIS countries.
Expected outcome	For the domestic market — import substitution while creating digital television networks. Organization of production involves export orientation and competitiveness of price indices in the CIS markets.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development; joint production; service maintenance.
Level of readiness	Serial production.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Joint production.
Organization-developer	***"Tekhnika svyazi" PC***

III-13. Tuner of digital terrestrial television

Application field	Receiving and processing the signals of digital terrestrial television broadcasting standard DVB-T with compression of the MPEG-2 and MPEG-4/AVC, and supply the decoded video and audio signals at low frequency TV inputs.
Description of products	Automatic, manual and network channels search. Conventional access system Conax CAS7. Multilingual user interface. Software update over the air (OTA). USB. HDMI digital interface for connection of the display (TV, monitor) in high definition. Analog interface SCART. Digital audio interface S/PDIF. Support services, DVB. Media Player: File System FAT32; recording capacity to 4GB via USB; support AVI, MKV; MPEG2, H.264/AVC (SD), DIVX, XVID, MP3; decoding images BMP, GIF, JPEG, PNG; supply voltage in the network ranging from 150 up to 250 V.
Competitiveness	In the aggregate performance tuner corresponds to the modern world technical standards and market requirements. There are no domestic analogs.
Expected outcome	Market devices saturation for receiving digital television, including the reception of high definition television.
Offers on sale	Serial production.
Level of readiness	Experimental model.
The transfer o rights object	Experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Investments.
Organization-developer	***Institute of Digital Television "Horizont" RUE***

III-14. Vandal-proof LED light for housing and utilities infrastructure

Application field
Lighting of entrances, stairwells, corridors, common areas and housing and utilities infrastructure utility rooms and public buildings.

Description of products	Direct replacement traditional lighting fixtures with incandescent lamp 40-60 W. Polycarbonate spreader and a special configuration molded case of anodized aluminum for high vandal proof and lighting optimal thermal regime. Mounting fixture is performed by special barb bolts to prevent unauthorized removal. Power consumption — up to 10 W. The luminous flux lamp — no less than 550 lm. Specialized sources of secondary power supply ensure reliable service of the LED lighting module and connection to a standard power supply of 220 V.
Competitiveness	Technical and operational characteristics of the LED lamp are at the level of parameters of the best foreign analogues at lower cost.
Expected outcome	The light application allows increasing the lamp vandal proof lighting in housing and utilities infrastructure, to significantly reduce the cost of lighting by reducing power consumption and operating costs. Mercury compounds absence in the LED lamps provides environmental lighting.
Offers on sale	Sale of products on a contractual basis; joint enterprise; manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Production prototype; undisclosed information (know-how); scientific and technical information.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works; joint production; joint enterprise.
Organization-developer	***Center of LED and Optoelectronic Technologies of the National Academy of Sciences of Belarus***

IV. Energy

IV-1. Information-measuring device of distributed control of substation and station electric universal power supply UPS-01

Application field
Power plants, substations and power system enterprises.

Description of products	UPS-01 performs the function of substation equipment distributed control and station electric part, measuring, registration and visualization of parameters, electrical equipment operating regime, power quality rating. In one device measuring instrument, power quality control device, fault location device, disturbance recorder, master controller, signals concentrator from microprocessor protection, WKS are concentrated.
Competitiveness	Domestic analogues do not exist.
Expected outcome	UPS-01 has a broader set of features compared to currently used similar devices.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; cooperation with the customer on application; delivery of the finished product.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***A. V. Lykov Heat and Mass Transfer Institute of the National Academy of Sciences of Belarus***

IV-2. Installation for heating water by utilizing radioactive heat losses of high-temperature furnaces of bulk solids

Application field	The heating-utilizing unit is intended for heating of water, which can be used in DHW and for enterprise heating or for technological purposes.
Description of products	The heating-utilizing unit for water heating consists of two symmetrical parts, shielding the upper cylindrical surface of kiln, which includes heating take-up panel of metal pipes, a reflector of radiation flux, heat insulation of radiation flow reflector, protection of heating-utilizing unit from precipitations. The average plant capacity — 200 kW. The heating-utilizing unit can be equipped with a pump swapping of the heat-carrying agent and with a control system of controlling the temperature of surface elements, heat-carrying agent temperature, coolant flow, water level in the tank accumulator of hot water-supply of the company.
Competitiveness	In conducting patent searches, analogs were not found.
Expected outcome	The unit is repaid in 1.5 years on average.
Offers on sale	Delivery by individual orders; transfer of engineering specifications and specialist advice on development; cooperation with the customer on application.
Level of readiness	Experimental model.
The transfer of rights object	Undisclosed information (know-how).
The transfer of rights form	Agreement on the creation and use of intellectual property.
Organization-developer	***"Institute NIPTIS named after S. Ataev" RUE***

IV-3. The technology and set of equipment for production of fuel pellets (pellets) of waste from the processing of grain and other crops

Application field	The production of clean fuels in the form of pellets by processing of unproductive waste, generated during processing and cleaning of cereals and cereal crops on cereal products' plants, formula-feed plants, as well as through the use of straw crops (canola), and flaxboons.
Description of products	The pellets are cylinders with a diameter of 6–10 and 30–50 mm in length with a calorific value 14–18 MJ/kg. The developed technology and production line of fuel pellet PLFL-2 provides processing of non-productive waste of grain, straw cereals crops (rape) by removal of impurities, drying, grinding, pelleting and getting out of this raw material pellet fuel (annual production is not less than 2,000 t, the performance line — 1.8–2 t/h, the installed capacity — 210 kW, the consumption of liquid or gaseous fuels is excluded). The manufacturer of wood pellets — Sole Proprietorship "Salvy".
Competitiveness	Corresponds to the technical level of development of the CIS countries. Compared with the traditional technology of fuel pellets from waste wood can expand the range of raw materials, non-productive use of waste from grain processing while reducing material consumption by 10–12 % and energy-intensive process — by 8–10 %.
Expected outcome	The technological process and equipment provides the reduction of energy consumption by 27,000 kW·h/year, with annual production of 2,000 t of annual production, reduces the specific energy process by 8–10 % compared to the production of fuel pellets from wood, improves environmental conditions through the utilization of unproductive cereals waste.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development.
Level of readiness	Experimental model.
The transfer of rights object	Effective model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Theoretical and Practical Center of the National Academy of Sciences of Belarus on Agriculture Mechanization***

V. Laser Technologies

V-1. Laser-pulse active vision system



Application field	Road, rail and sea transport, aircraft, security systems, emergency services. Is meant for driving for various purposes, monitoring of protected sites condition, long maritime observations.
Description of products	The vision system is used to obtain a clear image of the environment at night or in low visibility conditions (fog, dust, gas contamination, rain, snow, etc.). Images can be displayed on the screen, the windshield of the vehicle, monocular or binocular observation system.
Competitiveness	The cost of the system is much smaller than that of thermal imager. High image quality (is better than its analogs), high geometric resolving ability — more than 60 lines/mm, high-contrast image, the resolution of objects at a depth of 1–2 m, the possibility of distant measurement of an object with accurate within 5 m, regardless the distance to it.
Expected outcome	It is assumed to release at least 100 copies of the device for "BelAZ" needs.
Offers on sale	Delivery by individual orders; transfer of engineering specifications and specialist advice on development; organization of serial manufacture; sale of a license.
Level of readiness	Limited production.
The transfer of rights object	Effective model; undisclosed information (know-how).
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works; Joint production.
Organization-developer	***B. I. Stepanov Institute of Physics of the National Academy of Sciences of Belarus***

V-2. Meter cloud SD-02-2006

Application field
Hydrometeorology, civil airports, airfields of the Ministry of Defence and the Ministry of Emergency Situations, helipads civil of aviation.

Description of products	Meter cloud SD-02-2006 consists of lasing emitter, lens, receiver and control circuit based on a microcontroller. Leveling of cloud base is achieved by measuring the transit time of the light pulse from the emitter to the cloudiness bottom and back, with subsequent conversion of the obtained time interval in a proportional value of the height of clouds.
Competitiveness	According to its performance characteristics meter cloud SD-02-2006 is at the level of mass-produced foreign models.
Expected outcome	The main consumers of cloud meter SD-02-2006: SA "National Hydrometeorological center", Aviation Committee of the CIS countries.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply; agreement on cooperation.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Joint production.
Organization-developer	***"Peleng" JSC***

V-3. The device for express optical diagnostics of cancer

Application field

Biology, medicine. Basic and applied researches on the diagnosis of cancer and other tumors, including those on early stages of their formation.

Description of products

The device is produced for non-contact and express optical diagnostics of cancer; its action is based on simultaneous recording of UV-induced autofluorescence of tissues and recording of the spectra of diffusely scattered light. It has the possibility of express recording of fluorescence kinetics, wide spectral range of measurements, high sensitivity and the possibility of processing the measurement results by using modern statistical methods.

Competitiveness	High speed and accuracy of obtaining experimental data. Compactness and mobility of the device. The use of safe sources of light makes it possible to use this device on living tissues. Ability to arrange researches in various types of tissues, including those with a high content of blood vessels.
Expected outcome	The project implementation will significantly reduce time and economic costs for pathological diagnosis of cancer. The developed devices can also be used for the diagnosis and localization of cancer directly during surgery, which would allow, in certain cases, to refuse from re-intervention and increase the probability of positive dynamics of the treatment process.
Offers on sale	Delivery by individual orders; transfer of engineering specifications and specialist advice on development; joint production.
Level of readiness	Experimental (model) sample.
The transfer of rights object	Undisclosed information (know-how).
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***B. I. Stepanov Institute of Physics of the National Academy of Sciences of Belarus***

VI. New Materials and Protective Coatings

VI-1. Composite magnetic material on the base of ferrite iron powder

Application field	Mechanical engineering. New composite magnetic materials on the base of ferrite iron powder can replace laminated electromagnetic steel for many high-frequency applications in such products as transformers, throttles, modern valve high-speed electric motors and generators.
Description of products	The composite magnetic material on the base of ferrite iron powder has the following characteristics: – frequency — to 100 kHz; – induction — to 2 T; – power loss — to 2 %; – permeability — to 700 units.
Competitiveness	It is competitive. It has no analogues in the territory of the CIS countries. In technical parameters it corresponds to the best world samples made by companies "Hoganes" (Sweden) and "Micrometals" (USA). The cost price of manufacture of the material is 2 times lower.
Expected outcome	Expected economic benefit will make 30,000 US dollars a year at the expense of labor productivity increase by 12 %, power consumption decrease by 10 %.
Offers on sale	Sale of products; delivery by individual orders; serial production; agreement on cooperation.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; joint production; joint enterprise.
Organization-developer	***Theoretical and Practical Centre on Material Science of the National Academy of Sciences of Belarus***

VI-2. Development of composite material based on polyolefins and production technology of protective details of automotive and agricultural equipment units with increased resistance to alternating shock loads

Application field

The developed composite material based on polyolefins and some protective details of automotive and agricultural equipment units with increased resistance to alternating shock loads produced by the developed technology will be produced at JSC "Belvtorpolimer". Shock struck guards, manufactured from composite materials by the developed technology will be produced at JSC "Belcard". The developed technology will be implemented at JSC "Belvtorpolimer" obtained composite material by the developed technology will be used for various types of packaging, bags, packaging. In the future, to expand the market of the manufactured composite material by the CIS and near-broad countries it is planned to expand the range of products from reclamated and composite materials for the production of molded structural units, large diameter pipes and elements of small architectural forms. It is planned to supply details of the protective units of automotive and agricultural equipment to service points for servicing of the equipment for replacement of the out-of service protective elements. Field of development application — chemical industry, automobile industry, agro-industrial complex.

Description of products

The scientific novelty of the project is to use low-dimensional modifiers in the products form of mechanical and thermal dispersion technology geosilikates and industrial rejects for the intermolecular interaction melt stabilization of the based on polypropylene composite material. This provides the possibility of moldings obtaining with high strain-strength characteristics of the composite material by extrusion. The originality of the recycling technology of thermoplastic rejects with a high content of inorganic contaminants includes continuous mechanical and thermal effects on the half-finished product at various stages of closed process, which will reduce the level of decomposition and oxidative phenomena. The novelty of the proposed technical solutions was implemented in an application materials complex for invention patents.

Competitiveness

In relation to the best domestic designs the developed material has a tensile strength of 2 MPa Ball, indentation hardness of 4 MPa higher, frost resistance at 10 °C lower than that produced by JSC "Polymir".
In relation to the world's best developed material it has higher service performance.
The developed material and the manufacturing of products from it are environmentally friendly.

Expected outcome	The designed composite material will be used for various types of packing, bags, and packaging. In the future, to expand the market of composite materials developed by the CIS and near-broad countries it is planned to expand the range of products: the molded building blocks, large diameter pipes and elements of small architectural forms. The pilot batches of thermoplastic composite material based on polypropylene and cardan transmissions protective cover for automotive vehicles out of it were produced, preliminary and acceptance tests were held, composite material installation series and its qualification test was made, specifications for the based on polypropylene. Composite materials were developed. The enterprises involved in the implementation of this project have the necessary infrastructure and production capacity.
Offers on sale	Sale of products; manufacturing and supply; organization of serial manufacture; agreement on cooperation.
Level of readiness	Serial production.
The transfer of rights object	Invention; effective model.
The transfer of rights form	Agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works; joint production; joint enterprise.
Organization-developer	***Grodno State Agrarian University***

VI-3. Fire retardant lacquer for wood and wood materials of high resistance to aging and high decorative properties

Application field	Lacquer is meant for fire protection, protective and decorative coatings for wood and materials based on its base in order to achieve flammability of G1 and G2 and protective and decorative properties.
Description of products	Transparent, colorless to yellow liquid with density of 1,200–1,300 kg/m^3. Drying time — no more than 12 h. Flameproof efficiency of lacquer at rate of not more than 300 g/m^3 corresponds to Group I according to SS (ГОСТ) 16363. Retains its flameproof rating for at least 10 years of service when used in places that do not experience the impact of climatic factors and chemically aggressive environments. Under the influence of climatic factors and chemically aggressive media keeps flame retardant properties for at least 2 years.
Competitiveness	Fire retardant lacquer has high resistance to aging, excellent decorative properties and low cost in comparison with analogues.
Expected outcome	The development of production would eliminate the import of purchases of similar purpose, will reduce costs during construction; will provide access to export to neighboring countries and the currency resources inflow.
Offers on sale	Organization of serial manufacture; license agreement, contract.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Invention.
The transfer of rights form	License agreement.
Organization-developer	***Research Institute of Fire Safety and Emergencies of the Ministry for Emergency Situations of the Republic of Belarus***

VI-4. Heat pipes with powder capillary structures of inhomogeneous steam distribution with a high heat transfer capability

Application field	Creation of high heat transfer equipment to dissipate high heat fluxes of modern electronics, electrical engineering, and aerospace engineering. The perspective markets: Russia, India and Ukraine.
Description of products	The resource-saving technology of heat pipes with powder capillary structure of inhomogeneous steam distribution was developed. The usage of heterogeneous powder capillary structure, which has distributed over the volume small and large sizes pores in the range of 10–100 microns, can enhance heat transfer capacity of heat pipes in comparison with foreign analogues by 100 %, and increase efficiency and reduce material consumption of cooling systems correspondingly.
Competitiveness	The use of more efficient powder capillary structures provides more (no less than 100 %), heat transfer capacity of heat pipes without increasing their weight. It corresponds to the best domestic and foreign analogs.
Expected outcome	Application of the designed heat pipes in the cooling systems can significantly improve their heat transfer efficiency; reduce costs, save material, energy and human resources.
Offers on sale	Sale of products; sale of products on a contractual basis; delivery by individual orders; organization of serial manufacture.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Effective model; scientific and technical information; experimental model; others.
The transfer of rights form	Agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works; joint production; joint enterprise.
Organization-developer	***Powder Metallurgy Institute***

VI-5. High-heat material in the form of tablets based on cubic boron nitride

Application field

For creating an integrated circuit (IC) memory devices, microprocessors and microcontrollers, peripheral ICs, ICs for television and audio equipment, ICs for telecommunications, power electronics, standard analog ICs, standard logic ICs, ICs are resistant to external destabilizing factors are required for use material of high thermal conductivity, radiation, thermal, and chemical resistance.

Description of products	High-heat material in the form of tablets based on cubic boron nitride. Features: – thermal conductivity — 150 W/m·K; – hardness (Hv) — 30–45 GPa; – elastic modulus — 700 GPa; – crack resistance — 9–10 MPa·$m^{½}$. The use of such material as cubic boron nitride adds to the described features high strength characteristics.
Competitiveness	Hardness is 10 % higher, elastic modulus is 15 % higher than that of the known analogues. At the cost up to 50 % lowers than those of the known analogues.
Expected outcome	Updatable — 25.5 %, import substitution — 75 %. Energy intensity was reduced by 15 % by reducing the synthesis temperature. Material reduced by 35 % by reducing the consumption of hard metal. Cost of reduced by 15 % by increasing the service life of equipment serviceable product.
Offers on sale	Sale of products; organization of serial manufacture; sale of technology; agreement on cooperation.
Level of readiness	Pilot lot.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Theoretical and Practical Centre on Material Science of the National Academy of Sciences of Belarus***

VI-6. Hydrophobic plasticizing additive for concrete-cement mixtures "Giplanan" and the technology of its production

Application field	Hydrophobic plasticizing additive for concrete-cement mixtures "Giplanan" raises and keeps up to 2.5 hours of its mobility reduces 2–4 times water absorption of concrete and increases its frost resistance, which increases the service life of concrete and reinforced concrete structures, that are operates in conditions of high moisture content.
Description of products	The additive for concrete "Giplanan" based on domestic raw materials of organic and mineral origin, is characterized by plasticizing and waterproofing effect during the introduction in concrete and mortar Portlar mixtures, and technology of its production. The use of hydrophobic plasticizer additive will allow to accomplish the deposing of concrete technology without energy consuming and labour intensive processes of concrete mixtures vibration.
Competitiveness	Improves the workability of concrete mix from P1 to P4, provides mobility conservation for 2.5 h, reduces water demand by 20 %, water absorption — 3-times, increases the frost resistance of concrete to 2 marks. When introducing additives branding durability of concrete is not only not reduced (in accordance with the STB (СТБ) 1112-98 is allowed to decrease to 5%), but on the contrary, it is increased by an average of 5–7 %, compared with control structures. According to its characteristics it is not inferior to foreign analogues, such as the addition of "Asolin DM" (Germany).
Expected outcome	The additive "Giplanan" is 2–3 times cheaper than its foreign counterparts. Especially effective is its use with the introduction of concrete used in the works of a zero circle, in road building and bridge construction, and construction of hydraulic structures.
Offers on sale	Manufacturing and supply.
Level of readiness	Pilot lot.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Institute of General and Inorganic Chemistry of the National Academy of Sciences of Belarus***

VI-7. Integrated water treatment complexes, aimed at work in service water systems and in household water supply of oil and chemical enterprises

Application field

Developed new water purification systems are designed to work in technical, household water supply, as in the oil and chemical industries, as well as in other industries.

Description of products

Water purification systems, which have no analogues in the national practice, are made on the basis of the sorption-catalytic composites and ceramic-polymer filter tracks. Manufactured modular unit of integrated water treatment, which benefits are determined by high performance, versatility and by operating characteristics complex, reduces the level of pollution by 95 %. Developed by plants design, depending on the source of water supply, operating conditions, the quality requirements for treatment include the possibility of equipping the modules with developed filter elements based on silica-alumina or ceramic-polymer compositions. Made modifications of plants require less than 1 % of water total consumption for regeneration. Construction of filter elements designed with a modular scheme of cleaning can create modified plants with capacity ranging from 10 up to 500 m^3/h. Increase of productivity is achieved by raising the number of modules. The modular cleaning circuit, implemented in modifications, allows to conduct routine maintenance without stopping the entire water supply system.

Competitiveness	Service life of the plant before the replacement of filter material is more than 100,000 m^3 or an average more than 2 years of operation, which is 50–60 % higher than the existing counterparts. In comparison with foreign analogues, the designed plant consumes two or more times less water to regeneration. The cost of plants manufacturing is up to 500 euro per 1 m^3/h capacity, which is 50–70 % below the market value of their foreign counterparts.
Expected outcome	The expected economic effect from the use of the developed treatment system within three years of development in comparison with foreign analogues "Flow-Atlantean" (Russia) — 525 million rubles, foreign counterparts "HONEYWELL" or "YAMIT.ELI" (Germany) — 617 million rubles.
Offers on sale	Manufacturing and supply.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization developer	***Institute of General and Inorganic Chemistry of the National Academy of Sciences of Belarus***

VI-8. The structure and technology for getting anticorrosive bifunctional composition "Antibes" with a combined function of products protection, designs and constructions of metal, concrete, reinforced concrete from static electricity, chemical, microbiological, particularly hydrogen sulfide, corrosion

Application field

Antibacterial, antifungal and antistatic protection of structures, products and storage equipment in the petroleum, oil-refining, chemical, gas and construction industries, underground tunnels, subway, underground main overpasses, the development of potassium and other natural deposits, municipal engineering: collecting system, treatment facilities.

Description of products	Bifunctional composition "Antibes" and coverage based on it have the high performance and flexibility by combining in one material anti-static properties that provide intrinsic safety covers, weather resistance and protective properties of the complex of many affecting factors: micaleal fungi, different strains of bacteria, corrosive acid, alkali and saline environments, produced water, stock oil and petroleum products, lignosulfonate, sodium thiocyanate, carbamide , ammonium sulfate, foamy emulsion for firefighting.
Competitiveness	In Belarus there is no production of anti-corrosive composition, which combines the function of protecting metal products and structures from static electricity and microbiological corrosion. In relation to foreign counterparts, in particular, "INERTA 50", "INERTA 60" ("TEKNOS"), the composition "Antibes" has a high antimicrobial activity of sulfate-reducing bacteria, which are the initiators of the most dangerous types of localized corrosion (pitting, rill, pit) in the oil, oil-processing and gas industries.
Expected outcome	The increase of the service life of products and constructions, saving metal by preventing its destruction due to biocorrosion, reliability and fire-explosion of oil and chemical industries.
Offers on sale	Delivery by individual orders; joint enterprise; cooperation with the customer on application; license agreement, contract.
Level of readiness	Idea, concept; pilot lot.
The transfer of rights object	Undisclosed information (know-how); scientific and technical information.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Joint production; joint enterprise.
Organization-developer	***Institute of General and Inorganic Chemistry of the National Academy of Sciences of Belarus***

VI-9. The technological process of high-efficiency application of a functional coating on high-wear details for mechanical engineering and aviation engineering with reception of complex strengthening effect. A strengthening coating on high-wear surfaces of details for mechanical engineering and aviation engineering

Application field	Details for mechanical engineering and aviation engineering, working in the conditions of abrasive-mechanical wear and hostile environment.
Description of products	This technology is intended for formation of wear resistant coatings by the method of microplasmous influence with complex strengthening effect on the base of hard alloys on working surfaces of metal objects of arbitrary dimension types, configurations and function with creation of the functionally adapted coatings of the increased thicknesses (from 1 up to 500 microns).
Competitiveness	The hardness of coatings makes about 72–74 HRC, that it is more in comparison with the used laser processing. The roughness of a surface after strengthening is lower in comparison with the laser processing and at the level of the laser and ultrasonic strengthening. The coating cost is 4–6 times lower in comparison with the laser processing.
Expected outcome	As a result there is developed and implemented the technology of formation of protective coatings on a surface of details for mechanical engineering and the aviation engineering in OHP ISZP. Details for mechanical engineering with coatings will be implemented the "Metavtoservis" company and in the "Adipol" company.
Offers on sale	Transfer of engineering specifications and specialist advice on development; cooperation with the customer on application; introduction of technology; agreement on cooperation.
Level of readiness	Serial production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***"Welding and Protective Coatings Institute" SSFU***

VI-10. Wear-resistant composite material based on fluoropolymer binders for brake pads of cable cars

Application field	Industrial enterprises of metallurgical profile, as well as plants producing synthetic, glass fibers, the textile industry.
Description of products	Formulations have been developed on the basis of wear-resistant composite fluoropolymer binders with high deformation resistance. Constructive design of a process of obtaining brake pads was proposed. A set of documents of typical production of the process of manufacturing wear-resistant composite material is based on fluoropolymer binder and the brake pads out of it was developed.
Competitiveness	Brake pads from the developed materials have a higher wear resistance, high deformation resistance; service life of brake pads is 1.5 times higher in comparison with similar products imported.
Expected outcome	The full import substitution by absolute replacement of imported parts for domestically produced parts.
Offers on sale	Sale of products; sale of products on a contractual basis.
Level of readiness	Serial production.
The transfer of rights object	Invention.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***V. A. Belyi Metal-Polymer Research Institute of the National Academy of Sciences of Belarus***

VII. Mechanical Engineering and Metal Working

VII-1. Air purification filter

Application field	Air filter is designed to clean non-corrosive, non-explosive and not inclined to sticking and condensation of gaseous mixtures of fine dust at temperatures up to 100 °C.
Description of products	Performance of purified gas — no more than 8,000 m^3/h, filtration area — 120 m^2, allowable pressure (vacuum) inside the filter — 5 kPa, mass concentration of dust at the inlet — no more than 50 g/m^3, installed capacity — no more than 2 kW, degree of purification — no less than 99.5 %, hydraulic friction — 2.90 kPa overall dimensions: length — 4,550 mm, width — 2,450 mm, height — 6,200 mm, weight — no more than 4,400 kg.
Competitiveness	Competitive with the installation of the filter regeneration system of filter elements as with compressed air, so using the atmospheric pressure.
Expected outcome	Application the designed filter allows companies to use affordable high quality filtration equipment.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply.
Level of readiness	Experimental model; serial production; limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***Scientific Production Association "Center" RUE***

VII-2. Antifriction powder material, modified with nanostructured particles in the form of oxide components, technology and equipment for the manufacturing of a two-layer anti-friction products with high wear resistance of the centrifugal method of inductive welding

Application field

Two-layer anti-friction products, manufactured with the use of developed antifriction material, modified by nanostructured particles in the form of oxide components, technologies and equipment are used in friction tribotechnical purpose machines and mechanisms operating in the regime of intense abrasive wear.

Areas of application development — enterprises of railway, engineering, road construction, petrochemical, agricultural, and other profile of Belarus and other countries.

An indicative list of products, manufactured by two-layer anti-friction: the details of the track machines for alignment, padding, finishing and cleaning gravel path (bushing tamping units and lifting electromagnets nut machines such as the CDF and HBO), running coupling nodes pickup dragline mining shovels, driving pair of road-building machinery, bearings, cartridge bushings, inserts, worm wheels, nuts, valves, rings, synchronizer, load and driving screws of machine equipment, boxes, hubs, gears, etc.

Description of products

Antifriction-layer products contain the powder consisting of copper-based alloy with nanomodifiers in the form of oxide components and the steel framework that enables high hardness and wear resistance of clad layers running mate parts of various machines and mechanisms operating under conditions of intense abrasive wear. Technology and equipment for manufacturing two-layer anti-friction products include inductive method in the field of centrifugal forces.

Main technical characteristics of the material, product and process of manufacture by centrifugal induction welding:

- dimensions of produced two-layer anti-friction components: the length of 40–400 mm, outside diameter — 20–400 mm, wall thickness — 5–80 mm;
- melting temperature of the material — 930–940 °C;
- layer thickness — 0.5–80 mm;

– hardness of the coating — 175–185 HB;
– porosity of the deposited layer — 1.5–1.7;
– the relative wear resistance in comparison with analogues — in 2–3 times;
– saving of non-ferrous alloys — 75–85 %.

Scientific novelty of the design is to establish the characteristics of melting of the powder layer with nanostructured modifiers for induction surfacing. At the same time there was studied the kinetics of moving front of phase transition properties of modifiers and sedimentation of nanostructured phases, as well as the influence of thermal regime on the structure, mechanical and performance properties of the resulting layers. Technical novelty is confirmed by four patents of the Republic of Belarus.

Competitiveness In comparison with the known analogues of the CIS countries (e. g., products of Tambov factory "Bearing", Kostroma plant of Track Machines (Russia) and abroad (e. g., products of firms "Plasser and Toyer" (Austria) the development has the following advantages:

– increasing the service life of parts;
– manufacturing of parts of different sizes of repair;
– it can provide details of the specified physical and mechanical properties and performance;
– the lack of preliminary and final heat treatment;
– the availability of equipment development and implementation of technology;
– high return on investment and low cost of production;
– significant savings of non-ferrous alloys.

Expected outcome The developed material, technology and equipment for manufacturing two-layer anti-friction products with high wear resistance as compared with domestic and foreign counterparts can improve the hardness of clad layers running mate details of machines operating under conditions of intense abrasive wear by 1.3–1.4 times and the relative durability — by 2–3 times with an increase in productivity of the manufacturing process by 30–35 %.

Offers on sale Delivery by individual orders; transfer of engineering specifications and specialist advice on development; introduction of technology; license agreement, contract.

Level of readiness Experimental model; pilot lot; serial production.

The transfer of rights object Effective model; scientific and technical information; experimental model; others.

The transfer of rights form License agreement; purchase and sale contract.

Offers for cooperation Investments; cooperated research and experimental designing (technical) works; joint production.

Organization-developer ***Joint Institute of Mechanical Engineering of the National Academy of Sciences of Belarus***

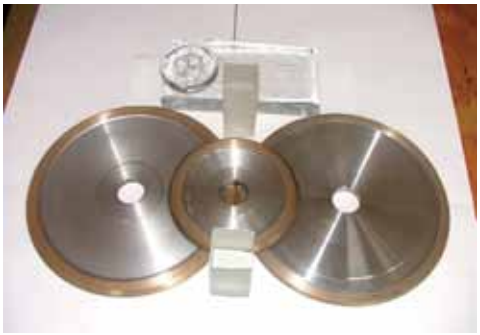
VII-3. Creating of a family of high-tech four-cylinder diesel engines with power of 122 h. p. (90 kW) under the guidelines of international standards of environmental safety for Stage 3B of wheeled tractors with innovations that enhance consumers' quality of development

Application field
The engine is designed for mounting on tractors of class 1.4.

Description of products
The 4-cylinder diesel engine with the crank — con-rod mechanism of normal type, with the full-supporting cranked shaft, with the mechanism of gas distribution of valved type, adjustable by a system of gas-turbine inflate with boost air cooling of type "air — air", with fuel-supplying equipment of accumulator type with electronic control, providing the ecological characteristics complying with norms of ECE UN Stage 3A.

Competitiveness	The engine corresponds to the best world samples. Competitive.
Expected outcome	The engine will be used by RUE "MTW" on domestic tractor power units. Increase of environmental safety of the automotive engineering.
Offers on sale	Sale of products; serial production.
Level of readiness	Serial production.
The transfer of rights object	Production prototype; experimental model.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Investments; joint production.
Organization-developer	***"Minsk Motor Plant" OJSC***

VII-4. Development of composite diamond containing materials, tools and technologies of their manufacturing, technological process of processing of glass and other fragile materials



Application field	Building industry, glass processing, and mechanical engineering.
Description of products	The formulations of a mixture of connectives of composite materials are developed, there are optimized modes of their manufacturing; there are developed the technological process of mixture manufacture, the tool adapted of processing of crystal (glass), and also the technological process of processing of crystal.
Competitiveness	As for productivity they surpass analogues of the Russian Federation.
Expected outcome	Implementation of the results of performance of the task will allow to increase export potential of the "Cristal" company and to decrease import of circles for glass processing by enterprises of the Republic of Belarus.
Offers on sale	Manufacturing and supply; introduction of technology.
Level of readiness	Serial production.
The transfer of rights object	Effective model; experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Joint production.
Organization-developer	***"Physicotechnical Institute of the National Academy of Sciences of Belarus" SSI***

VII-5. Magnetic pulse (MPP) and electro-hydro-impulsive (EHIP) press for low-cost and accelerated preparation of stamping and assembling

Application field

Developed presses are assigned for accomplishment of stamping and assembling operations and can be used on plants of automobile, aircraft, instrument making industry, in mechanical engineering and in powder metallurgy. Press EHIP can also be used in pile foundations' construction and anchors in building, in cleaning of pipeline systems from scales.

Description of products

MPP and EHIP include high-voltage generator of pulse currents (GPC), that consists of capacitive storage, high-voltage charger, high-current commutator (discharger), control unit and technological unit, equipped with inductor and form tool for MPP and with hydro camera with discharge electrodes for EHIP, where buttons and form tool can be installed.

While processing liquid concrete mix, a two-electrode emitter is a movable operating element that is installed in a hole to fill a bored pile. When the voltage failure of the inter electrode emitter gap takes place, shock wave generates in liquid, which causes plastic metal deformation or local broadening of pile diameter, filled with liquid concrete.

Competitiveness	Is provided with the use of the newest development of high voltage equipment and heavy currents: low-inductance pulse capacitors LIPC, thyratrons with arc-discharge form TADF1-150k/25 and vacuum controlled gap, which allow to raise impulse frequency characteristics and lower up to 5 times weight and size characteristics if compared with best foreign analogs.
Expected outcome	Cost reduction on die tooling in 5–10 times, reduction of energy consumption in 1.5–2 times, preparation terms' reduction of new production in 5–10 times, lower operating costs, reducing the cost of building materials up to 3 times.
Offers on sale	Sale of products; delivery by individual orders; manufacturing and supply; organization of serial manufacture.
Level of readiness	Experimental model; pilot lot; limited production.
The transfer of rights object	Invention; effective model; experimental model.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works; joint production.
Organization-developer	***"Physicotechnical Institute of the National Academy of Sciences of Belarus" SSI***

VII-6. Manufacturing technology and heat treatment of small dimension types crosspieces, and bearing housings made from steel 60PP of low hardenability by the surface volumetric quenching

Application field	Production of components for automotive vehicles.
Description of products	There was realized a process and developed the technology of manufacturing and heat treatment of small dimension types crosspieces and bearing housings made from steel 60PP of low hardenability by the surface volumetric quenching. According to the materials used in the project development, there were put in three tenders for the supposed inventions. Characteristics : – the number of manufacturing operations — 3 pieces; – coefficient of usage of equipment for heat treatment — 0.7; – coefficient of cost reduction of products — 1.3; – coefficient of reduction of installed capacity — 1.5.
Competitiveness	In the Republic of Belarus for the manufacturing crosspieces and bearing housings alloy steels such as 20HGNTR, ShKh 15 and 15G1 with the technology of heat treatment by cementation and subsequent quenching are used. The developed technologies do not have analogues and correspond to world standards.
Expected outcome	Developed technological processes, tools and equipment can make crosspieces and bearing housings with three technological operations, coefficient of equipment for heat treatment — 0.7, coefficient of reducing the cost of products — 1.3, coefficient of reduction of installed capacity — 1.5.
Offers on sale	Sale of products on a contractual basis; transfer of engineering specifications and specialist advice on development.
Level of readiness	Pilot lot; serial production.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"BELCARD" JSC***

VII-7. Multichip ruling tool: ruling diamond rolls and abrasive grinding disks, used for processing crankshafts engine and other parts

Application field	Abrasive wheels edit, producing a rough grinding and regrinding (diamond rolls) and pre-sharpening tools (roughing disks) in engineering and other enterprises.
Description of products	The composite materials based on synthetic heat-stable diamond, carbides, and adhesion-active bunch, as well as based on them manufacturing technology of multichip ruling abrasive tool, used for handling crankshafts and other components of automobile and tractor engines were developed. The technological conditions for details of the diamond and roughing roller drive. The production of parts for pilot production of the Powder Metallurgy Institute was developed.
Competitiveness	The development is competitive and corresponds to the best analogues of the CIS countries.
Expected outcome	The usage of diamond rolls and abrasive discs showed that they possess high wear resistance and effectively restore the cutting properties of grinding wheel (specific performance of the rolls of up to 32 cm^3/mg), the roughness of the machined surface (Ra = 0.8–0.63). Estimated durability (service life) of diamond rolls, based on the testimony of flow of diamonds for 1000 revisions can be up to hundreds of thousands of parts.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; joint enterprise; manufacturing and supply.
Level of readiness	Pilot lot.
The transfer of rights object	Invention.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Powder Metallurgy Institute***

VII-8. The "BelAZ-75170" mine truck, a load-carrying capacity of 154–160 t, wheel arrangement 4 × 2, with electromechanical transmission, service life is no less than 900,000 km of run

Application field
It is intended for transportation of muck and other loose cargoes at opencast minings of minerals on technological roads in various climatic conditions.

Description of products	The mine truck with load-carrying capacity of 154–160 t is equipped with the diesel engine "CUMMINS QSK45-C" of power of 1492 kW with an electronic control system. A frame from alloyed steel with use of cast elements in places of the greatest stresses, pneumohydraulic suspension with the new guiding device. The improved dynamic and propulsion parameters.
Competitiveness	In comparison with the best foreign analogues ("Terex MT3600B", "Komatsu 630E", "Caterpillar Cat-789B") the "BelAZ-75170" mine truck surpasses them in such parameters as a specific power (higher), laden mass and total mass (lighter by 0.7–2.3 t), overall dimensions (smaller height, length, loading height), and better parameters of smoothness of motion.
Expected outcome	Application of the new mine truck will increase an average operational speed of movement by 3–5 %, will decrease fuel consumption by 5–9 %, will decrease labour input of maintenance by 8–12 %, will increase useful life by 12–15 %, will decrease cost price of transportation of a tonne-kilometre of cargo by 15–18 %.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; organization of serial manufacture; serial production.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"BELAZ" OJSC***

VII-9. The "BelAZ-75310" mine truck, a load-carrying capacity of 240 t, with an electromechanical transmission of "alternating — alternating current", life no less than 900,000 km of run

Application field	It is intended for transportation of muck and other loose cargoes on opencast minings of minerals on technological roads in various climatic conditions.
Description of products	The mine truck with a load-carrying capacity of 240 t is equipped with the diesel engine "CUMMINS QSK60-S" of a power of 1864 kW, with an electronic control system. A frame from alloyed steels with use of cast elements in places of the greatest stresses, pneumohydraulic suspension with the new guiding device. The improved dynamic and propulsion parameters.
Competitiveness	In comparison with the best foreign analogues ("Terex MT4400B", "Euclid Hitachi EH4000", "Caterpillar Cat-793C"), the "BelAZ-75310" mine truck surpasses them in a load-carrying capacity (higher by 4–12 t), has the better parameters of smoothness of motion and propulsion-dynamic characteristics.
Expected outcome	The use of a new mine truck will increase an average operational speed of movement by 6–8 %, will decrease fuel consumption by 7–10 %, will decrease labor input of maintenance by 6–10 %, will increase exploitation resources by 9–11 %, will decrease the cost price of transportation of atonne-kilometre of cargo by 10–13 %.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; organization of serial manufacture; serial production.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"BELAZ" OJSC***

VII-10. The "BelAZ-75450" mine truck, a load-carrying capacity of 45 t, with hydromechanical transmission, wheel arrangement 4 × 2, axle suspension on trailing arms with central hinges and unilocular pneumohydraulic cylinders, useful life no less than 600,000 km of run

Application field
It is intended for transportation of muck and other loose cargoes at opencast minings of minerals on technological roads in various climatic conditions.

Description of products
The mine truck with a load-carrying capacity of 45 t is equipped with the diesel engine "CUMMINS QSX15-C" of power of 448 kW, meets safety requirements for emission of exhaust gases EPA of class Tier III, with an electronic control system. A frame from alloyed steel with use of cast elements in places of greatest stresses, pneumohydraulic suspension with the new guiding device, multi-disk oil-cooled brakes. The improved dynamic and propulsion parameters.

Competitiveness	In comparison with the best domestic ("BelAZ-7547") and foreign ("Terex TR45", "Hitachi R50", "Caterpillar 773E") analogues the "BelAZ-75450" mine truck surpasses them in such parameters as a laden mass and total mass (lighter by 1.3–3.9 t), overall dimensions (smaller length, width, base), maneuverability (smaller radius of turn), and better parameters of smoothness of motion.
Expected outcome	Application of the new mine truck will increase an average operational speed of movement by 10–12 %, will increase the total coefficient of efficiency of transmission by 7–10 %, will decrease fuel consumption by 7–8 %, will decrease labour input of maintenance by 18–20 %, will increase useful life by 45–50 %, will decrease cost price of transportation of a tonne-kilometre of cargo by 11–12 %.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; serial production.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"BELAZ" OJSC***

VII-11. The design and manufacturing technology of glasses lenses for work with a computer

Application field	Designed lenses are meant for use as glasses lenses for work with a computer.
Description of products	The developed lens is meant for matching the spectral characteristics of eyes' photoreceptors and computer monitors. The performed work includes the following milestones. 1. Research and development of spectral characteristics of the lenses for work with a computer. 2. Development of the construction and coating technology with given spectral characteristics. 3. Conversion of serial production of eyeglass lenses to work with a computer.
Competitiveness	In the Republic of Belarus lenses for work with computer have not been manufactured, they comply with international standards. The lenses will not only protect your eyes from harmful monitor radiation, but also provide the conformation of spectral characteristics of retinal photoreceptors and the luminophors of the screen that reduces stress on the visual analyzer of the brain.
Expected outcome	Application of glasses with developed lenses will allow to reduce fatigue while working with a computer.
Offers on sale	Manufacturing and supply; organization of serial manufacture; serial production.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"Plant "Optic" JSC***

VII-12. The development of obtaining modes of a permeable composite material and manufacturing technologies of its clean filters of non-corrosive gases and air. The development of filter constructions and recommendations for their recovery

Application field	The technology of production of permeable composite material and production process of clean filters of non-corrosive gases and air. The design of filters and their production.
Description of products	There were developed technological regimes of obtaining a permeable composite material and filter element constructions. Pressing modes and sintering of titanium powder filter elements were perfected in order to obtain the desired properties: filtration efficiency, porosity and mechanical strength. The following characteristics of the filter element were obtained: porosity — 35–42 %, average pore size — 52–62 microns, filtration efficiency for particles of 50 microns — no less than 98 %.
Competitiveness	In comparison with foreign analogues ("Poral", France) with the equivalent porosity filtration efficiency above 10 %, the cost is 40 % less.
Expected outcome	The reduction of consumption of powdered material, reducing the sintering temperature and time of products. Saving resources and energy by 10–15%. The possibility of repeated regeneration in field conditions.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; cooperation with the customer on application.
Level of readiness	Limited production.
The transfer of rights object	Invention.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Powder Metallurgy Institute***

VII-13. The garbage truck with loading device and system of compaction of wastes by the method of "VARIOPRESS" MKB-12

Application field	Objects of sanitary cleaning and improvement of cities and town settlements.
Description of products	In the garbage truck there is used an effective system with a double cycle of compaction (pressing) of firm municipal wastes. The type of the base chassis is MAZ 555, a body volume — 12 m^3, load-carrying capacity of the loading device — 600 kg, capacity of applied containers — 0.12, 0.24, 0.75 m^3, compaction factor — 4.5–5.0.
Competitiveness	The garbage truck will provide the result due to the raised degree of compaction of wastes in comparison with ordinary garbage trucks with one cycle of compaction.
Expected outcome	Replacement of parks of refuse collectors of the enterprises of sanitary cleaning by more economical machines.
Offers on sale	Sale of products on a contractual basis; partnerships or other arrangements.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
Offers for cooperation	Investments.
Organization-developer	***"Zhilcommuntechnika" RUE***

VII-14. The gear shaving semiautomatic device with CNC for toothed gears processing with diameter up to 320 mm with a CNC level control system and the development of pattern making BCH-732 CNC23

Application field
Machine tool industry, automotive industry, agricultural engineering, electrical and war industry.

Description of products	Gear shaving semiautomatic device with CNC of CNC level is meant for cylindrical gears handling with diameter up to 320 mm in a serial, high-volume and mass production. It has an electronic mechanism of "barrel distortion", allowing to obtain different versions of tooth shape during processing.
Competitiveness	As a result of the realization of this project the competitiveness of tools has increased, the possibility of their delivery for export in countries near and far abroad is increasing, working staff conditions improved, production costs reduced.
Expected outcome	The labor content and energy intensity was reduced during the production, the processing productivity increased, the diagnostics improved, there appeared a possibility to get any modification during the tooth processing, reliability and durability increased.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders.
Level of readiness	Limited production.
Organization-developer	***Vitebsk Machine Tool Plant "VISTAN"***

VII-15. The hi-tech 4-cylinder diesel engine with power to 140 kW (190 h. p.), meeting norms of environmental safety of Euro-4 and in the long term — Euro-5 for cars and buses

Application field
The engine is intended basically for being installed on trucks and buses developed by "MAZ" JSC. As the power unit for middle tonnage trucks and buses with the total mass to 13 t, for articulated trucks on their base with the total mass to 21 t, and for single cars with the total mass to 20.5 t.

Description of products	The 4-cylinder diesel engine with the crank –conrod mechanism of normal type, with the full-supporting cranked shaft, with the mechanism of gas distribution of valved type with top arrangement of valves in the 16-valve head of cylinders, with the 2-stage system of gas-turbine of supercharge with cooling of supercharge of "air — air" type, with the fuel-feeding equipment of accumulator type with the electronic control (Common Rail), providing the ecological characteristics complying with norms of Rules EEK OON of Euro-4.
Competitiveness	The engine corresponds to the best world samples. Competitive.
Expected outcome	Engine application will allow to replace import engines with the automotive engineering produced in the Republic of Belarus by domestic power units. Increase of environmental safety of automotive engineering.
Offers on sale	Sale of products; organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement; purchase and sale contract.
Offers for cooperation	Investments; joint production.
Organization-developer	***"Minsk Motor Plant" OJSC***

VII-16. The horizontal machining center with CNC and the automatic pallet changer of GDM630 model

Application field
The horizontal machining center with CNC and the automatic pallet changer of GDM630 model can be used in various branches of mechanical engineering with individual, small-scale and serial method of manufacture.

Description of products	The horizontal machining center with CNC and the automatic pallet changer of GDM630 model is intended for serial processing of details by a horizontal spindle by means of drilling, boring of holes under coordinates, milling on a contour with linear and circular interpolation, tapping.
Competitiveness	In relation to the best domestic samples: in functional characteristics and quality it surpasses the level of domestic analogue of model of GDF630-01 of "StankoGomel" (Gomel, Belarus). In relation to the best foreign samples: in functional characteristics and quality it corresponds to the level of the best analogues — models of CWK630 of the "Starragheckert" company (Germany).
Expected outcome	The horizontal machining center with CNC and the automatic pallet changer of GDM630 model does not exert negative influence on environment ecology.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders.
Level of readiness	Limited production.
The transfer of rights object	Invention.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Organization-developer	***"StankoGomel" JSC***

VII-17. The horizontal machining center with CNC MS1761F3

Application field
The horizontal machining center can be applied in small-scale production, series production at the machine-building enterprises The horizontal machining centers are intended for performance of turning works, drilling, tapping and millings.

Description of products	The MS1761F3 horizontal machining center is a base for a wide range of machine tools. A customer has a possibility to choose the model of the machining center optimal for manufacture with one or two supports and a counterspindle, chip conveyors.
Competitiveness	The MS1761F3 horizontal machining center corresponds to the world level in machine-tool construction. The main competitive advantage of the center is its price.
Expected outcome	The manufacture of the horizontal machining centers with CNC, produced by a block-modular method, will allow to satisfy a demand of the domestic enterprises in machine tools of such type.
Offers on sale	Delivery by individual orders.
Level of readiness	Pilot lot.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"P. M. Masherov Minsk Automatic Lines Plant" RUE***

VII-18. The vertical machining center with CNC for five-sided machining of model of BYVER630

Application field
Various branches of mechanical engineering with individual, small-scale and series production.

Description of products	The vertical machining center with CNC for five-sided machining of model of BYVER630 is intended for serial machining of details for one process installation by a vertical spindle by means of drilling, core-drilling, boring of holes by co-ordinates, contour milling with linear and circular interpolation, tapping.
Competitiveness	In relation to the best domestic samples: there are no analogues. In relation to the best foreign samples: as of functional characteristics and quality it corresponds to the best analogues — to model of 500V/5 produced by "Sterlitamak Nachine-Tool Factory" (Russia) and to model C30 produced by "Hermle" (Germany).
Expected outcome	The vertical machining center with CNC for five-sided machining of model of BYVER630 does not influence negatively on environment ecology.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders.
Level of readiness	Limited production.
Organization-developer	***"StankoGomel" JSC***

VII-19. The MP3-180 garbage truck

Application field	Objects of sanitary cleaning and improvement of cities and town settlements.
Description of product	The garbage truck consists of the unified loading device (handler) with capture of a container in any point of its position in radius ± 90° from a longitudinal axis of the garbage truck, the reception chamber, located in the butt part of the equipment, in which loaded firm wastes preliminarily are compacted and moved into the body where by means of the pressing plate the second stage of compaction is carried out. Unloading of wastes from the garbage truck is carried out with the lifted back cover at the expense of movement of the pushing out plate.
Competitiveness	In technical and operational characteristics it surpasses domestic garbage trucks with back loading at the expense of highly effective system of collection and compaction of wastes. It corresponds to the level of the foreign analogue produced by "FAUN" (Germany).
Expected outcome	Replacement of parks of refuse collectors of the enterprises of sanitary cleaning by more economical machines.
Offers on sale	Sale of products on a contractual basis; partnerships or other arrangements.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
Offers for cooperation	Investments.
Organization-developer	***"Zhilcommuntechnika" RUE***

VIII. Automotive and Tractor Production

VIII-1. The "Belarus 3522" wheel tractor of general purpose of drawbar class 6 for performance of power-intensive works in agriculture, industry, building and other branches

Application field

The tractor is intended for performance of power-intensive agricultural works in tractive and tractive-driving modes in composition of wide-cut and combined units; for the basic and preplant processing of soil, sowing of crops and other cultures, laying-in of fodder, harvesting of root crops, grain and technical crops; for transport, cargo handling and stationary works, works in building and industry.

Description of products

The wheel tractor of general purpose of drawbar class 6, is equipped with the diesel engine with a turbo-supercharging of power of 261 kW, dry double-disk clutch, hydromechanical step-by-step gearbox, independent front and rear driving axle, hydrovolumetric steering, universal hydro-suspended system with a pump of variable productivity, distributor with a electrohydraulic control, with a power, positional and mixed methods of regulation of depth of soil processing.

Competitiveness	As the tests of the "Belarus 3522" tractor have shown, its application in agricultural production will allow to solve a number of problems of labor productivity increase with the least operational-technological expenses per a unit of the made product and will create preconditions to steady dominating positions in domestic tractor construction.
Expected outcome	As a result of product realization it is supposed to carry out updating of park of tractors in the RB, to increase export of tractors to the CIS countries and other countries (Poland, Lithuania, Latvia, Bulgaria, etc.). Improvement of ecological compatibility of the tractor (reduction of harmful influence on soil and decrease of emission of harmful substances) will promote environment preservation, increase of productivity and decrease of the cost price of agricultural crops.
Offers on sale	Sale of products; sale of products on a contractual basis; joint production; license agreement, contract.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***"Minsk Tractor Works" RUE***

VIII-2. The "BelAZ-75810" underground dump truck, a load-carrying capacity of 50 t, wheel arrangement 4 × 4, with hydromechanical transmission, diesel engine with a little toxicity for work in straitened conditions of underground mine openings (mines, tunnels)

Application field	The underground dump truck is intended for transportation of muck and minerals on routes of underground mine openings with a length to 8 km and average slopes to 12 %. The maximum level of mine water on separate parts of a route may be to 1 m.
Description of products	The "BelAZ-75810" underground dump truck with load-carrying capacity of 50 t, wheel arrangement 4 × 4 is equipped with the diesel engine with a little toxicity and power of 535 kW, two-stage system of purification of exhaust gases, multi-disk brakes of driving axles with forced cooling of disks, comfortable single-seat closed cab with a modern design, which meets safety requirements of ROBS/FOPS.
Competitiveness	The technical characteristics correspond to the level of the best foreign analogues: "Atlas Copco MT5020 (USA)", "Sandvik Toro 50" (Finland), "DUX TD45" (Canada).
Expected outcome	The high technical-operational characteristics with the reasonable price will make the product attractive for buyers at home and abroad. The underground dump truck with a high technological level and price 1.5–2 times lower than foreign analogues will be quite competitive in the world market.
Offers on sale	Sale of products; manufacturing and supply; organization of serial manufacture.
Level of readiness	Limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"BELAZ" OJSC***

VIII-3. The "MoAZ-4055" load-haul-dump unit, load-carrying capacity of 9 t, wheel arrangement 4 × 4, for work in straitened conditions of underground mine openings (mines, tunnels)

Application field	The development is intended for transportation of muck and minerals in underground mine openings and to load the underground dump trucks with a load-carrying capacity to 50 t in constrained conditions of mines and tunnels.
Description of products	The "MoAZ-4055" load-haul-dump unit, load-carrying capacity of 9 t, wheel arrangement 4 × 4, is equipped with the diesel engine with a little toxicity and power of 179 kW with two-stage system of purification of exhaust gases, multi-disk brakes of driving axles with cooling in an oil bath, comfortable single-seat open cab with a modern design, which meets safety requirements of FOPS.
Competitiveness	The technical characteristics correspond to the level of the best foreign analogues: "Atlas Copco ST-1020" (Canada), "Sandvik Toro 400" (Finland), "Bumar LK-4" (Poland), "H.Paus PEL 50" (Germany).
Expected outcome	The "MoAZ-4055" load-haul-dump unit with a load-carrying capacity of 9 t will successfully compete in the world market with the load-haul-dump units of the same load-carrying capacity that is the problem decision of import substitution for the domestic mining industry.
Offers on sale	Sale of products; manufacturing and supply; service maintenance.
Level of readiness	Serial production.
The transfer of rights object	Invention.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"BELAZ" OJSC***

VIII-4. The articulated chip truck in composition of the triaxial automobile of 6 × 4 type and the biaxial trailer with the total volume of the fixed bodies of 60–80 bulked cubic meters

Application field
Transportation of wood loose materials (chips) and other various materials with a density from 0.3 to 0.35 t/m^3 on public roads, timber-carrying roads and departmental roads with the load-carrying ability corresponding to technical characteristics of the automobile (articulated truck).

Description of products	The "MAZ-6501A5 + MAZ-857102" articulated chip truck is equipped with the engine YaMZ-6582.10 with power of 240,6 kW, corresponding to requirements of ecological norms of Euro-3, and the 8-step transmission box YaMZ-2381-07 with power takeoff from the end face of the transmission box. The frame with longerons of a constant profile on the length, the strengthened base (4400 + 1400 mm). The cabin 6501 is short with the low roof, with the spring suspension. The automobile and trailer bodies are all-metal with lateral unloading. The total volume of the bodies is 72.5 m^3.
Competitiveness	Creation in a new generation of automobiles of the articulated chip trucks will allow to provide the market of the Russian Federation, the Republic of Belarus, the CIS countries with a high-efficiency vehicle of the big tonnage for transportation of chips in the forest industry.
Expected outcome	The specific productivity of the developed articulated trucks is higher than for the base (serial) variant by 65 %. Increase of life by 30 %. Expenses for maintenance and operating repair are less than for the base variant at the average by 25 %. More comfortable working conditions for a driver. Increase of protection of environment.
Offers on sale	Organization of serial manufacture.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

VIII-5. The articulated trucks of a new generation with an increased truckload for the international and long-distance transportations, corresponding to international norms for ecology of Euro-4: the side tractor of 4 × 2 type with the triaxial trailer with the total volume of the bodies of 110–112 m^3 and the side tractor of 6 × 2 type with the biaxial trailer with the central axes with the total volume of the bodies of 115–117 m^3

Application field	International and long-distance transportations.
Description of products	The "MAZ-631019 + 837310" articulated truck: the engine — Daimler OM501 LA, V6 (Euro-4), a power of the engine — 320 kW (435 h. p.), the transmission — ZF16S221. The"MAZ-534019 + 870102"articulated truck: the engine — OM501 LA, V6 (Euro-4), a power of the engine — 320 kW (435 h. p.), the transmission — ZF16S221.
Competitiveness	Due to application of up-to-date engines of the increased power with the optimized reduction ratio of transmission, tubeless tires with the reduced rolling resistance, the improved aerodynamics, the articulated truck possesses, the high propulsion, and speed characteristics, and fuel efficiency.
Expected outcome	The specific productivity of the developed saddle articulated trucks is higher than for the base (serial) variant by 20–25 %. Increase of life by 20 %. Expenses for maintenance and operating repair are less than for the base variant at the average by 15–25 %. Increase of protection of environment.
Offers on sale	Cooperation with the customer on application.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

VIII-6. The city bus with a low floor of the second generation corresponding to international norms for ecology of Euro-4 and Euro-5

Application field

It is used for transportation of passengers on city and suburban routes.

Description of products

The city bus of the second generation has a completely low construction: the height of the saloon floor makes only 330 mm from a roadbed, that in combination with the system of kneeling provides the maximum convenience of an entrance and an exit from the saloon that is especially important for people with limited mobility; the power system of the framework based on bulkhead principle, provides the maximum durability and passive safety of the bus; the pneumatic suspension with electronic control gives additional stability to the bus, allows to carry out dynamic change of a road clearance, and also to carry out lowering of the body of the bus on stops; the additional multilayer noise isolation of the motor compartment with application of composite materials reduces to the minimum the noise level in saloon from the working motor; application on all wheels of disk brakes essentially increases efficiency of braking, and also increases life of the brake system. Application of the 6-step automatic transmission allows to optimize regimes of movement both in a city cycle and for trips for a long distance; the optimum microclimate in the saloon is provided by the conditioner.

Competitiveness	The modern design, rational lay-out of the saloon in combination with the big platform, semisoft seats and convenient hand-rails do a trip in the bus more comfortable; traditionally, much attention is given to the workplace of the driver: an ergonomic seat on the pneumatic suspension, a new dashboard, an individual heater and other elements improving working conditions of the driver are applied.
Expected outcome	Lineup expansion in the segment of middle city buses. Strengthening of positions in the traditional market of the CIS countries. Entry to the foreign markets, to the market of the European union.
Offers on sale	Serial production.
Level of readiness	Serial production.
The transfer of rights object	Invention; effective model; production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

VIII-7. The container chip truck for transportation of containers with a capacity of 35-40 bulked cubic meters is equipped with the mechanism for replacement of containers of "multilift" type

Application field

Transportation of chips and wood waste for timber industry and at woodworking enterprises on the roads allowing a load of 20,000 kg on dual axles and on the public roads with fulfillment of requirements of technical standards (TNPA).

Description of products

The "MAZ-6501AZ-9330" is equipped with the engine YaMZ-6562.10 with a power of 184 kW, corresponding to requirements of ecological norms of Euro-3, and with the 8-step transmission box YaMZ-2381-07 with power takeoff from the end face of the transmission box. On the automobile there is installed the MPR-3 handling mechanism cargo handling produced by "Velmash-Servis" company (Velikie Luki, the Russian Federation). The maximum load-carrying capacity of the mechanism (weight of the body with a cargo) makes 20,000 kg.

Competitiveness	Technical advantages of the "multilift" system consist in reduction of time for cargo handling operations in 2–3 times in comparison with the trucks with the fixed bodies. The technological level of the container chip truck corresponds to the best foreign analogues: Iveco 260E27KE, MAN 2628УDFK, Mercedes 2643.
Expected outcome	The specific productivity of the chip truck in comparison with the serial saddle articulated chip truck is higher 1.95 times. Increase of resource by 30 %. Expenses for maintenance and operating repair are less than for the base variant by 25 %. Increase of protection of environment.
Offers on sale	Organization of serial manufacture.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

VIII-8. The low floor city bus of the second generation of average passenger capacity

Application field
Passenger transportation on city routes of average congestion.

Description of products
The city bus of the second generation of average passenger capacity with low level of a floor in a forward part of the saloon, with the big platform, small radius of turn, with the increased dimension on width and of apertures of the doors, corresponding to the last requirements of EEK OON (Rules No. 107), with necessary changes of the design, providing using by people with limited possibilities with a passenger capacity of 60–70 persons at a length of 8.5–8.8 m. The construction also includes modern decisions for brakes: installation of disk brakes on all wheels, and for a steering: installation of a steering of integrated type is provided. Implementation of such constructive differences allows to provide not only fulfillment of modern requirements for certification, but also gives a possibility to improve operational characteristics of the bus: to increase passenger capacity and speed of passenger exchange. Presence of disk brakes and a steering of integrated type do the bus more maneuverable and raise active safety.

Competitiveness	The modern design, rational lay-out of the saloon in a combination with the big platform, semisoft seats and convenient hand-rails do a trip in the bus more comfortable; traditionally much attention is given to the workplace of the driver: an ergonomic seat on pneumatic suspension, a new dashboard, an individual heater and other elements improving working conditions of the driver are applied.
Expected outcome	Lineup expansion in a segment of middle city buses. Strengthening of positions in the traditional market of the CIS countries. Entry in the foreign markets, the market of the European Union.
Offers on sale	Serial production.
Level of readiness	Serial production.
The transfer of rights object	Invention; effective model; production prototype.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

VIII-9. The saddle average tonnage articulated trucks of a load-carrying capacity of 12.5 t for the suburban, regional and long-distance transportations, corresponding to ecology norms of Euro-3, Euro-4, Euro-5

Application field

Transportation of various cargoes (a foodstuff, clothes, footwear, fancy goods, home appliances, furniture, etc.) on public roads.

Description of products

The "MAZ-447131 + 931020" articulated truck: a load-carrying capacity of 12.5 t, engine Deutz BF 4M1013 FC Code 140G/2 of a power of 140 kW (ecological class 3), transmission ZF 6S800TO.

The "MAZ-447137 + 931020" articulated truck: a load-carrying capacity of 12.5 t, engine Deutz TCD 2013 L04 4V Code C4SF140 (ecological class 4) of a power of 140 kW, transmission ZF 6S800TO and MAZ-4471V2 + 931020 articulated truck, a load-carrying capacity of 12,5 t, engine MAN D0834LFL64 of a power of 132 kW (ecological class 5), transmission ZF 6S800TO.

Competitiveness	Due to application of up-to-date engines of the increased power with the optimized reduction ratio of transmission, tubeless tires with the reduced rolling resistance, the improved aerodynamics, the articulated truck possesses the high propulsion and speed characteristics and fuel efficiency.
Expected outcome	The specific productivity of the developed saddle articulated trucks is higher than for the base (serial) variant by 20–25 %. Increase of resource by 20 %. Expenses for maintenance and operating repair are less than for the base variant at the average by 15–25 %. Increase of protection of environment.
Offers on sale	Organization of serial manufacture.
Level of readiness	Limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***"Minsk Automobile Plant" JSC***

IX. Agricultural Equipment

IX-1. The base model of harvesting complexes with the engine of a power of 600 h. p.

Application field	The complex is intended for harvesting of corn in any phase of ripeness of corn, sunflower and other cultures, selection of natural grasses from rollers with simultaneous crushing and loading in vehicles.
Description of products	The complex is equipped by a six-rolling feeding device, a hydraulic drive of the feeding device and adapters, a stone-metal detector, a crushing device, a post of control, an onboard information-control system on the base of a computer, a final crushing device, a system of unloading of a crushed mass. The complex is equipped with a harvester for caulescent cultures with the width of capture of 6m; pickup with a width of capture of 3 m; harvester for harvesting of grasses with a width of capture of 6 m.
Competitiveness	Productivity increases at the expense of increase of engine power, of presence of the basic and additional fuel tanks, application of wide-cut replaceable adapters, improvement of passability at the expense of application of wide-profile wheels, increase of transport speed to 40 km/h.
Expected outcome	The smaller cost price of harvesting of forages. Conformity to modern ecological requirements is provided.
Offers on sale	Sale of products; organization of serial manufacture; serial production.
Level of readiness	Limited production.
The transfer of rights object	Invention; production prototype.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***GSKB for Grain and Forage Machinery***

IX-2. The beet-harvesting self-propelled combine on the base of the unit for harvesting of sugar beet

Application field	The combine is intended for single-phase harvesting of root crops of sugar beet, carries out cropping of beet tops with their scattering across the field, cropping of heads, excavation of root crops, separation and clearing of a pile from the soil and plant residues, loading of root crops in a bunker and unloading in a vehicle or a field pile.
Description of products	The combine design consists of a beet tops harvesting module, a root harvesting module, the receiving conveyor, a block of feeding rotors, a bunker with the system of conveyors (loading, bottom, unloading) and a screw distributing conveyer, a cabin with a platform of control and a workplace of the operator, a frame of the combine, a power unit, chassis with axels of the driving and driven wheels, electric equipment, a hydraulic system and mechanical transmissions.
Competitiveness	Rigging of the combine by the onboard computer, a mechanism of automatic driving on seedbeds, a system of automatic control of depth of digging, a bridge for swinging axis with the system of increasing stability, a system of video monitoring, cruise-control for determination and maintenance of speed of movement.
Expected outcome	The solution of the problem of effective harvesting of sugar beet due to reduction of expenditure of currency funds for purchase of combines abroad and due to reduction of cost price of harvesting.
Offers on sale	Sale of products; organization of serial manufacture; serial production
Level of readiness	Limited production.
The transfer of rights object	Invention; production prototype.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***GSKB for Grain and Forage Machinery***

IX-3. The machine for high-precision applying of simple and mixed mineral fertilizers

Application field	Agricultural production enterprises.
Description of products	The rod machine for applying mineral fertilizers is intended for transportation and high-precision superficial application of simple and mixed mineral fertilizers. Machine coverage is 18 m. The range of doses for applying mineral fertilizers is 80–700 kg/ha. Productivity per 1 h of the basic time (at the application dose of 400 kg/ha and packed density of fertilizers not less than 1.1 t/m^3) is 18 ha. The capacity of the bulk body is 9 m^3.
Competitiveness	Non-uniformity of distributing fertilizers by coverage (between single sowing devices) of the machine for high-precision application of simple and mixed solid mineral fertilizers does not exceed 15 %, non-uniformity of applying fertilizers on the course of machine movement — no more than 10 %.
Expected outcome	Economic efficiency: expected annual economic benefit — not less than 36,943.2 ths rub., degree of reduction of the cost price of the mechanised works for the new machinery, taking into account a crop increase (due to decrease of non-uniformity of application) — by 1.53 centners/ha, percent — 62.38 %, degree of labour input decrease— 37.5 %.
Offers on sale	Transfer of engineering specifications and specialist advice on development; license agreement, contract.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***Theoretical and Practical Center of the National Academy of Sciences of Belarus on Agriculture Mechanization***

IX-4. Developing and introducing in manufacture a complex of machines for stone removal

Application field
Agriculture of the Republic of Belarus and the countries with similar soil-climatic conditioned, cultivation.

Description of products	As a whole the technology of stone removal includes extraction and removal of large and average stones in the size to 30 cm and removal of small stones in the size to 3–5 cm. Stone removal from a surface and the top soil layer at the field contamination less than 20 m^3/ha. There are about 1 million ha of such fields in the republic. It is technically and economically justified to spend by swathing with swath upsizing for 3–6 roller passes and removing stones out of swaths. At higher contamination with stones the removal should be carried out with a roller — stone collector.
Competitiveness	Launching the manufacture of a complex of stone removal machines reduces costs for soil processing, cultivation and harvesting at the expense of cost reduction by replacing and repairing movable operating elements of soil-cultivating and harvesting machines, increase of their productivity and decrease of combustive-lubricating materials consumption.
Expected outcome	The annual resource saving for the full volume of introduction (1,000 pieces) will make: fuel — no less than 8,000 t, labour — no less than 500,000 person-hours and metal — no less than 0.6 t. The saving of currency means at the expense of import substitution will make more than 25,000 c. u.
Offers on sale	Transfer of engineering specifications and specialist advice on development; license agreement, contract.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***Theoretical and Practical Center of the National Academy of Sciences of Belarus on Agriculture Mechanization***

IX-5. To develop and launch in production modular turnwrest ploughs: five-cased under the scheme (4 + 1) and eight-cased under the scheme (7 + 1)

Application field
Agriculture of the Republic of Belarus and the countries with similar soil-climatic conditions.

Description of products

Modular turnwrest ploughs — eight-cased under the scheme PO — (7 + 1) and five-cased under the scheme PM — (4 + 1) — are intended for a smooth ploughing to the depth up to 27 cm on various types of soil which are not obstructed with stones and other obstacles.

The ploughs are completed with roller attachments, intended for crushing clods and consolidating the topsoil under disk influence on it, and also aligning and loosening the topsoil by spring teeth.

Besides, the ploughs have a demountable module that gives the opportunity to use PO — (7 + 1) for a seven-cased variant, and PM — (4 + 1) for a four-cased variant. The plough PO — (7 + 1) is aggregated with tractors of class 5 and their foreign analogues. The plough PM — (4 + 1) is aggregated with tractors of class 3 and their foreign analogues.

The ploughs consist of the following assembly units: a frame, a traction beam, right-hand cases with right angle-removers, left-hand cases with left angle-removers, joint hinges, a turnwrest mechanism, safety locks, and a framework, a mechanism for adjusting the depth of ploughing, a wheeled mover, a hydrosystem, a turnbuckle, a wheel and electric equipment.

Productivity per 1 h of the basic time: PM — (4 + 1) — 1.4–1.8 ha; PO — (7 + 1) — 2.24–3.2 ha.

Competitiveness	The ploughs are equipped with new modern semispring cases executed like those by the Norwegian company "Kverneland", and provide qualitative ploughing of stubble grounds and a layer of long-term grasses. The smooth ploughing allows to provide of soil tilling without back ridges and open furrows, convenient for operation of seeders, combines, tractors and other machines. On a technological level it corresponds to the best foreign analogue of semihinged turnaround plough PN-100/7 and PN-100/8 by the "Kverneland" company.
Expected outcome	Annual economic benefit of: – Plough PM — (4 + 1) — 8,086.875 ths rub., payback period of capital investments — about 4 years; – Plough PO — (7 + 1) — 18,017.28 ths rub, payback period of capital investments — about 3 years.
Offers on sale	Transfer of engineering specifications and specialist advice on development; license agreement, contract.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
Organization-developer	***Theoretical and Practical Center of the National Academy of Sciences of Belarus on Agriculture Mechanization***

IX-6. To prove key parametres, to develop and launch into manufacture a trailed mower-crusher with replaceable adapters for gathering leguminous and cereal grasses

Application field	Agricultural production enterprises.
Description of products	Disk mower-crusher KDP-3.1 is intended for mowing down and additional processing of legumes, grasses and leguminous and cereal mix grass crops with packing of mowed mass in a swath or a roller. For accelerating the process of moisture-yielding ability of mowed grasses the mower has replaceable adapters: a rolling device or a conditioner. The rolling device is intended for processing leguminous grasses and leguminous and cereal mix grass crops. The conditioner is intended for processing grasses. The mower is aggregated with tractors with the engine capacity of 77-96 kW ("Belarus 1025", "Belarus 1021", "Belarus 1221", etc.). Productivity per one hour of shift-working time is 1.9–2.6 ha/h; the specific fuel consumption is 5.5–6.5 kg/ha.
Competitiveness	The use of two replaceable crusher adapters in a mower construction allows to make qualitative spreading of both leguminous and cereal grasses. The use of central rotary pole provides the possibility of mowing grasses in a shuttle way and allows to increase productivity at shift-working time. The development corresponds to the best existing foreign analogues.
Expected outcome	The use of the mower provides cost reduction of labour by 9.7 %, fuel cost — by 8.7 %, operational expenses — by 33.8 %, decrease of the resulted expenses by 37 %. Annual saving rate is 16.5 million rubles.
Offers on sale	Transfer of engineering specifications and specialist advice on development; license agreement, contract.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	License agreement; agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***Theoretical and Practical Center of the National Academy of Sciences of Belarus on Agriculture Mechanization***

X. Instrument Making

X-1. Immittance meter E7-26

Application field
It can be used for research, quality electroradioelements control, for measuring nonelectrical quantities using transducers of nonelectrical quantities into one of the measured values of the instrument.

Description of products	The designed immittance meter E6-26 is meant for measuring the capacity, inductance, resistance and reactance, active and reactive conductivity, dielectric loss tangent, Q, modulus of complex resistance, modulus of complex conductivity and the angle of the phase shift of complex impedance in the frequency from 10 Hz to 100 kHz. Working conditions for the use of immittance meter E7-26: – ambient temperature — from –20 up to +50 °C; – relative humidity at 25 °C — 90 %; – atmospheric pressure — from 84 up to 106.7 kPa (630 up to 800 mm mercury column).
Competitiveness	Strong demand for immittance meters in Belarus and other CIS countries will ensure the implementation of this device, as immittance measures of leading foreign firms have a high cost for the same or lower performance products.
Expected outcome	The immittance meter E7-26 can be a mass model of this type of meter, which will satisfy the needs of different users (mobile laboratories used in the oil and gas industries, the metrological service of the railway control services on industrial plants, etc.). This product may be of great interest for harsh environments and metrological services of the Russian defense complex, due to the lack of production of this type of meter in Russia.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-2. Limb for precision photoelectric angular-displacement sensors

Application field
Limbs for high-precision photoelectric angular-displacement sensors (PADS) are one of the most important components of angular-displacement sensors. These sensors are meant to solve one of the actual problems in the field of automation and control. They are used in measurement systems and systems of numerical program machine control for positioning blanks and tools and in printing equipment.

Description of products	PADS are meant to solve one of the most urgent tasks in the field of automation and control — the transformation of the angular displacement of the actuating devices(tool, object, etc.) into electrical signals containing information about the magnitude and direction of the displacement and suitable for further processing in measurement systems and CNC systems. PADS feature is to use as a measure of the length the radial scale on the circular limbs, which is carrier of code and regular raster and determining the accuracy of the sensors. High accuracy is ensured by an optical method for measuring the rotation angle. In the basis of the work of PADS there is a principle of photoelectric scanning barcodes rasters. As the lights, infrared LEDs are used, and as radiation detectors silicon photodiodes are served.
Competitiveness	High technical and economic characteristics of the product, low cost in comparison with foreign analogues ensure competitiveness in the markets of Russia and the CIS.
Expected outcome	Limbs for high-precision photoelectric angular-displacement sensors are one of the most important components of the angular-displacement sensors. Sensors are meant to solve one of the actual problems in the field of automation and control. They are used in measurement systems and numerical machine control systems for positioning blanks and tools and in printing equipment.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-3. Measuring antenna P6-66

Application field

The antenna together with measurement receivers and generators are used to measure flux density of electromagnetic field parameters of antenna devices, parameters, electromagnetic compatibility of radio resources, as well as excitation of an electromagnetic field with a given power density.

Description of products	P6-66 antenna is a horn-lens antenna in the form of a pyramidal horn in the H-shaped waveguide. The critical frequency of H10 and H20 of the waveguide at the beginning (neck) of the horn are determined in accordance with the operating frequency range antenna. Coaxial antenna input to the wave impedance of 50 ohms, section 2.92/1.27 mm (Type K). Working frequency range: from 12.05 to 37.5 GHz. Standing wave ratio (VSWR) antenna input — not more than 2.5. Antenna gain, at least 14 dB. Maximum permissible error of the gain — not more than ± 2.0. The antenna should have a linear polarization. The signal level of orthogonal polarization with respect to the main polarization — no more than –20 dB. The level of side-lobe — no more than –8 dB. On the stability and durability under different climatic and mechanical influences antenna complies with SS (ГОСТ) 22261-94 Group 6.
Competitiveness	The competitiveness of antenna P6-66 in the international market is provided by the modern scientific and technological level of implementation options, which are not inferior to the best foreign devices of similar purpose, and relatively low cost.
Expected outcome	Specifications and price of antennas allow exports, as in the CIS countries and in Western Europe.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-4. Measuring unit H4-129

Application field	Organization of educational processes, experiments, diagnostics of automation units, computer engineering and computing linkage.
Description of products	Measuring unit H4-129 is meant for conversion of electrical signals into a digital code, its transmission to a PC for processing and measurement of signals parameters by means of the software in time and frequency domains. The module combines a number of measuring instruments: a spectrum analyzer, a digital oscilloscope, a digital voltmeter of RMS value, a recorder. Number of Channels — 2. Operating temperature — from +5 up to +40 ° C.
Competitiveness	Measuring units H4-129 correspond to the modern scientific and technological level and needs of the market.
Expected outcome	Due to its high functionality and an affordable price the module will be competitive in the market of the CIS countries. It is supposed to activate exports, increase of the inflow of foreign currency.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-5. Microvoltmeter B2-44

Application field
Metrological maintenance of measuring equipment.

Description of products
Microvoltmeter B2-44 is meant for measuring the DC voltage of positive and negative polarity. The microvoltmeter provides mathematical and logical processing of measurement results. Microvoltmeter is meant for work in information-measuring systems with interfaces, "Joint C2", and USB. The microvoltmeter consists of an isolated body of analog and non-isolated one and digital parts. The distinctive features of the microvoltmeter design include an input amplifier unit. Structurally the microvoltmeter is made in the original rectangular plastic case of the OKW company. To display the meaning of the measured values and supporting information a four-rowed (4 × 20) full-scale LCD displays are used. The whole scheme of the microvoltmeter is performed on four printed circuit boards. All controls are placed on the front panel. The microvoltmeter satisfies the requirements of SS (ГОСТ) 22261-94, and the operating conditions refer to group 2 SS (ГОСТ) 22261-94.
The operating conditions of the microvoltmeter:
– ambient temperature — from +100 up to +350 °C;
– relative humidity at 250 ° C — up to 80 %.

Competitiveness	Owing to sufficiently high sensitivity and resolution, with high technology and acceptable to most consumers' value, the microvoltmeter will be competitive in the markets of the CIS countries.
Expected outcome	Microvoltmeter B2-44 will provide the replacement of the main park of currently used instruments for the measurement of small DC voltages. Microvoltmeter B2-44 is a modern instrument that provides solutions to key problems of measuring customers aims at a cost less than the cost of domestic or foreign counterparts, combining high enough sensitivity and resolution with high technology and an affordable price for most consumers.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

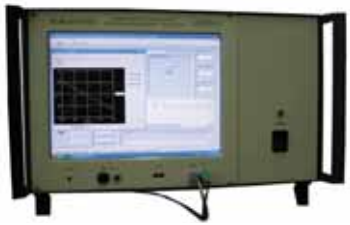
X-6. Programmable DC power supplies B5-89, B5-89/1

Application field

Organizations involved in design, manufacture and operation of optoelectronic components and devices based on them; manufacturers of LED and laser technology, which is required to supply non-standard modes of products during their manufacture, research, and testing.

Description of products	DC power supplies programmable B5-89, B5-89/1 are intended to reproduce DC voltage and DC power during the inspection and testing of optoelectronic components and devices operating independently and managed by a computer. Power supplies have a control function output voltage and output current as the front panel and an external computer through an interface USB. Power supplies are a compensation voltage regulator with series regulating element and amplified feedback voltage and current. Power supplies can operate as a voltage stabilization and current stabilization mode, which is set automatically depending on load. To measure the output voltage and current power supply are applied built-in voltage and current indicators. For safety reasons, power supplies comply with SS (ГОСТ) 12.2.091-2002, protection class 1, category 2 of installation, pollution degree 2.
Competitiveness	With more functionality and an affordable price power supply will be competitive in the markets of the CIS countries. It is supposed to activate exports, to increase the inflow of foreign currency.
Expected outcome	Designed power supplies are devices that have big functionalities, a wide measurement range, modern design, as well as affordable for a wide range of consumer value. Serial production of the power will provide the organizations with modern devices.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-7. Semiconductor parameter tester SPT-2

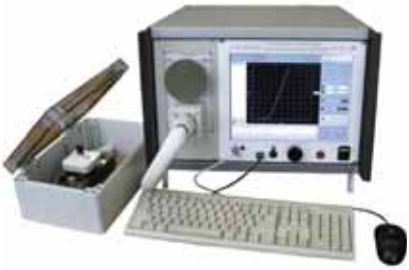


Application field

Control of characteristics of semiconductor devices of higher-power equipment in the process of production, including the analysis of defects, research of volt-ampere (VAC) and capacitor-voltage characteristics (CVC) during the development of new semiconductor devices and technologies.

Description of products	Semiconductor parameter tester SPT-3 is assigned for measuring and monitoring of VAC and CVC characteristics of semiconductor devices, automation, measurement and control of their static parameters, storage and documentation of measurement results. The device has a base model SPT-3 and modifications from SPT-2/1 to SPT-2/5, with unified design concept, and different in number and completion sources — testers (ST), the presence of capacitometer. The device has from two to four ST (determined by modification). In measurement mode, the CVC each ST of the unit provides for the formation and measurement of the jump reamer signal in current (voltage) formation modes and voltage (current) measurement. Stages size change is made according to a linear law, on a logarithmic law to base 10 or to a value list. The duration of sweep stages is set in the range from 10 ms to 60 s. In the CVC measurement the instrument provides for the formation of step sweep voltage signal according to a linear law or a value list and measures the capacity.
Competitiveness	Devices will be in demand in the CIS market as it has no analogs.
Expected outcome	The usage of the SPT-2 devices on plants of electronic and radio-electronic industry of the Republic of Belarus can automate and raise validity control in manufacture of electronic components
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-8. Semiconductor parameter tester SPT-3



Application field
Control of characteristics of semiconductor devices of higher-horsepower equipment in the process of production, including the analysis of defects, research of volt-ampere characteristic in the development of new semiconductor devices and technologies.

Description of products	Semiconductor parameter testers SPT-3 are assigned for automation of measurement and electrical parameters' control of higher-horsepower semiconductor devices, the research of its functional relations, memorizing and documentation of measured results. The device has its basic model SPT-3 and modification SPT-3/1 with integrated embodiment, built-in industrial computer, display and different ranges of output current through the collecting channel. The device provides high ranges of measuring of volt-ampere characteristic of current (from 1 nA up to 10 A for SPT-3, from 1 nA up to 20 A for SPT-3/1) and voltage (from 0 to 2,000 V). Measuring maximum permissible error: – of current — from 1 up to 9 %; – of voltage — from 1 up to 1.5 %.
Competitiveness	Devices will be in demand on the CIS market as it has no analogs.
Expected outcome	The usage of SPT-3 devices on plants of electronic and radio-electronic industry of the Republic of Belarus can automate and raise validity control in the manufacture of electronic components, including higher-horsepower components.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-9. The measuring multichannel recorder of PM-2202

Application field
The control of parameters of technological processes in various fields of power industry, oil and chemical industry, mechanical engineering, metallurgy, etc.

Description of products	The PM-2202 measuring multichannel recorder is intended for measurement of strength and voltage of a direct current, resistance to a direct current, frequency of impulses; measurements of not electric values converted into electric signals of a direct current or active resistance, and also for feed by voltage of a direct current for external sensors, registration and storage of the measured data on a hard disk and their display in real time on a built-in display. The recorder has the base of the model of PM-2202 and modifications (from PM-2202/1 to PM-2202/7), differing in quantity of measuring channels (12 or 24), and presence of a measuring instrument of frequency.
Competitiveness	The PM-2202 recorder surpasses the domestic analogue of PM-2201 and similar devices of the CIS countries in technical characteristics and functionality.
Expected outcome	The recorders allow to solve a wide range of problems for measurement, gathering and processing of information and also of continuous registration of emergency events at the enterprises of various branches. The recorders of the given class have a commodity market in the Republic of Belarus and in other CIS countries.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-10. The milliohm E6-30

Application field
The milliohm can be used in electrical instrumentation, technology, communications, metrology, control devices, electro safety control devices, technical diagnostics.

Description of products The milliohm is meant for measuring operation of the resistances from 0.0001 to 199 ohms, including checking the quality of the metallization of composite components and units of various designs. The milliohm satisfies the requirements of SS (ГОСТ) 22261-94, and the operating conditions refer to a group 3 according to SS (ГОСТ) 22261-94 with extended temperature range.
Operating conditions of use:
- ambient temperature — from –100 up to +500 °C;
- relative humidity — up to 90 % at 250 °C;
- atmospheric pressure — from 84.0 up to 106.7 kPa (630 up to 800 mm Hg. Art.)

Competitiveness The milliohm operation principle is based on measuring operation the milliohm voltage drop across the resistance measured at a given value of current flowing through its resistance. The measurements were carried out on four-wire circuit design.

Expected outcome The absence of competition from the CIS, as well as low price in comparison with foreign analogues provide The milliohm free movement as in the Belarusian market and abroad. The milliohm characteristics not inferior to foreign analogs and has no domestic ones.

Offers on sale Organization of serial manufacture.

Level of readiness Experimental model.

The transfer of rights object Scientific and technical information; experimental model.

The transfer of rights form Agreement on the creation and use of intellectual property.

Offers for cooperation Joint production.

Organization-developer ***"MNIPI" JSC***

X-11. The multifunction devices K2-91, K2-91/1

Application field

Repair, adjustment, maintenance of various electronic devices and units of instrumentation, automation, computing and communications.

Description of products

Measurement instrumentation was produced — the multifunction devices R2-91, K2-91/1. K2-91 device consists of a meter, generator, frequency meter, power supply. The device K2 91/1 additionally includes a module of oscilloscope. The devices comply with the requirements of SS (ГОСТ) 22261-94, and operating conditions are a group of 2 SS (ГОСТ) 22261-94, with extended temperature range from +50 up to +400 °C. The operating principle of the meter is based on the transformation of the measured value of the normalized dc voltage with subsequent measurement of the analog-digital integrating type converter. The generator is built in an oscillator scheme of an electronically controlled frequency analog. The work of meter is based on the pulse-counting method; consists of the counting unit that counts the number of arriving at its input pulses during a certain period of time. The structure of the power supply has four independent channels. All channels are made under the scheme of compensatory stabilizer with in-series regulating element. The principle of operation of the oscilloscope is based on digitization of analog signal and its subsequent withdrawal on the dot matrix LCD screen. Structurally, the instruments are made in the metal casing of rectangular shape. The scheme of the device R2-91 was implemented on five printed circuit boards, circuit device K2-91/1 — on five printed circuit boards in the instrument module and the four circuit boards in a module scope. The body consists of shroud, front and rear panels. The front panel has LCD, control buttons, connectors for external inputs and outputs. The rear panel has connectors for power supply, power switches.

Competitiveness	It's supposed to activate exports and to increase inflow of foreign currency.
Expected outcome	Due to a sufficiently high sensitivity and resolution, with high manufacturability and acceptability to most consumers, the cost of equipment will be competitive in the markets of the CIS countries. It is supposed to activate exports and increase inflow of foreign currency.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

X-12. The prototype of an astro-orientation sensor

Application field
Orientation of the spacecraft.

Description of products	The prototype of an astro-orientation sensor is a monoblock with the mass of 2.5 kg with a landing surface, where a fastening opening on the elements of the spacecraft construction is provided. The structure of astro-orientation sensor includes an aligner ring and an electronic module.
Competitiveness	The development has no domestic analogues, and has competitive performance: the penetrating ability — is better than 6 m, standard deviation of the direction determining on the star — is no more than 5", weight — 2.5 kg, measuring frequency — 10 Hz.
Expected outcome	The prototype of an astro-orientation sensor is the basis for the development of astro-orientation of spacecraft hardware.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply.
Level of readiness	Experimental model.
Organization-developer	***"Peleng" JSC***

X-13. The unified precision orientation device

Application field

The unified precision orientation device (UPOD) is used for measuring the orientation of antennas on the azimuth angle, elevation angle and angle of plane polarization in the laboratory, factory and field conditions. Also, this device can be used for guidance systems of satellite dishes on their coordinates for mobile objects.

Description of products

UPOD of broadband measurement antennas provides high-precision guidance of 6 types of measuring antennas in frequency ranges up to 37.5 GHz, provides an opportunity to ensure prospective measurement of antennas with narrow radiation pattern in the range up to 118 GHz; can provide job guidance system for satellite receivers, will provide job of high precision positioned for different types of monitoring communications systems, radar systems, EMC measurements, etc.

According to the stability and durability under different climatic and mechanical influences antenna complies with the norms of SS (ГОСТ) 22261-94 Group 6.

Average life of UPOD — at least 15 years.

Competitiveness	Competitiveness in foreign markets at the expense of modern scientific and technological level and relatively low cost.
Expected outcome	Radio industry, the Ministry of Communications and other departments that use the mobile tracking system satellite signals, the EMC testing of radar equipment, monitoring of the electromagnetic environment in the Republic of Belarus and the CIS countries. Assumed to export.
Offers on sale	Organization of serial manufacture.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Joint production.
Organization-developer	***"MNIPI" JSC***

XI. Tools

XI-1. Manufacturing technologies of economical composite bundles based on carbonyl iron of a cutting segment tool for cutting building materials and pavements

Application field	Construction, landscaping, road work.
Description of products	Diamond-metal compositions, based on carbonyl iron and manufacturing technology of a diamond cutting tool were developed. Technological processes for the manufacturing of the instrument were developed. The manufacture of the tool on the experimental ground of the State Scientific Institution "Metal Powder Industry Institution" (SSI "MPI") was mastered.
Competitiveness	The product is competitive and corresponds to the best analogues of the CIS countries and abroad, as confirmed by the application for the invention and participation in international conferences.
Expected outcome	The usage as a bunch basis of carbonyl iron and higher concentrations of diamond powder provides high resource values of the tool work and low cost.
Offers on sale	Delivery by individual orders; joint enterprise; manufacturing and supply.
Level of readiness	Pilot lot.
The transfer of rights object	Invention.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Powder Metallurgy Institute***

XII. Architecture and Construction

XII-1. Grinding system for regrinding and activation of cement

Application field	Used in construction for cement manufacturing for solutions and concretes with increased strength by 45 %.
Description of products	The size of the finished product (adjustable) — is up to 0.08 mm (95 %), capacity — up to 10 t/h maximum piece size — not more than 5 mm, raw material humidity — no more than 0.5 %, the installed capacity of motors of the complex — 358 > 5 kW, the capacity of bunker whirler — at least 3 m^3, the average lifetime — 7 years. Dimensions: length — 17 m, width — 7.8 m, height — 9 m, weight — up to 30 t.
Competitiveness	Competitive, and it has no analogues.
Expected outcome	The complex helps to produce activated cement. With increasing activity of cement by 5 % it is possible to obtain solutions and concretes, the strength of which increases by 45 % on the strength of the control samples.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply.
Level of readiness	Experimental model; serial production; limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***Scientific Production Association "Center" RUE***

XII-2. The device foundation technology by indentation pile static load in difficult town planning conditions and high-density site development

Application field	The construction erection of foundations in dense urban development and complex town planning conditions.
Description of products	The developed technology allows to exclude dynamic effects on the environment when constructing pile foundations, which will expand the range of their use in the construction of various (including unique) buildings in complex and high density town planning conditions.
Competitiveness	In comparison with the bored piles the developed technology allows to increase the specific bearing capacity of bases by 10–15 %, reduce material costs by 15–20 % (in case of bored piles use for the device casing — 30 %), reduce the duration of work by 10–15 %.
Expected outcome	The introduction of technology will ensure compliance with the requirements of sanitary norms due to the vibrations and dynamic effects absence on humans and the environment; will allow performing construction work in cramped urban dense environment by residential units remodeling without the relocation of tenants, will enable the rational use of urban land for development.
Offers on sale	Partnerships or other arrangements; cooperation with the customer on application; agreement on cooperation.
Level of readiness	Design and budget documentation.
The transfer of rights object	Scientific and technical information; others.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***"Institute BelNIIS" RUE***

XII-3. Unbalanced-throw screen for products classification

Application field	Designed for mechanical separation into fractions of crushed stone, gravel and sand masses, of granite, marble, dolomite, porphyrite, quartz, and other bulk materials. Screens can be used both independently and as part of production lines of grinding and classification.
Description of products	Carrying power — from 130 up to 220 t/h, the maximum size of the material — from 100 up to 150 mm, the size of the screening surface — from 3.75 up to 8.75 m^3, the number of tiers of sieves — from 2 up to 4, the angle of slope — 15°, drive power — from 11 up to 15 kW, overall dimensions: length — from 3,617 up to 5,550 mm, width — from 2,023 up to 2,518 mm, height — from 1,431 up to 2,030 mm, weight — from 3.2 up to 5.14 m.
Competitiveness	Competitive due to the wide range of crushed material.
Expected outcome	Installation of special vibration resistant bearings with double centering separators substantially improved service life and reliability of the screen.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; manufacturing and supply.
Level of readiness	Experimental model; serial production; limited production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***Scientific Production Association "Center" RUE***

XIII. Chemical Technology

XIII-1. Automatic modular membrane unit

Application field
Pre-water treatment for heat and power industry, fine water purification for housing and communal services.

Description of products	The principle of operation of a plant based on low-pressure dead-end ultrafiltration, which ensures complete removal of bacterial contamination and colloidal particles with sizes of 0.05 micron and above. When designing the installation, modular layout was used. The installation consists of the following blocks: chemical feeding unit, precleaning unit, ultrafiltration unit, regeneration backwashing unit and air scrubbing. Mode of operation: automatic.
Competitiveness	High quality water purification, reliable barrier filtration, low power-intensity, compact size equipment, ease of installation, and simplicity in treatment process control.
Expected outcome	High quality cleaning irrespective of seasonal fluctuations in the composition and temperature of purified water, reduction of need of coagulants up to 10–20 times, obtaining the necessary qualitative indicators for a single stage of water processing, opportunity to increase plant capacity due to its modular construction.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; cooperation with the customer on application; delivery of the finished product.
Level of readiness	Experimental model.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Institute of Physical Organic Chemistry of the National Academy of Sciences of Belarus***

XIII-2. Catalytic deaerating plant

Application field
Purification of water from oxygen for heat and power industry. For use at boilers, where there are no steam boilers (only water heating boilers for heating systems).

Description of products	A block-modular construction was created — Catalytic deaerating plant (CDP) — with available polymer materials. A reactor with radial input renovated water was designed and manufactured. The Palladium catalyst based on fibrous anion exchanger was developed and loaded into the reactor.
Competitiveness	The catalyst activity is superior to the best foreign analogues, ease of operation of the DCD. The work is protected by three patents of the Republic of Belarus.
Expected outcome	Practical realization of correcting motor set (CMS) for deoxygenation from feed and makeup water in boiler rooms can help to reduce capital costs and expenditure of energy compared with the processes of thermal de-aeration.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; cooperation with the customer on application; delivery of the finished product.
Level of readiness	Experimental model.
The transfer of rights object	Experimental model.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Institute of Physical Organic Chemistry of the National Academy of Sciences of Belarus***

XIII-3. Preparation for simultaneous disinfestation and disinfection "Navisan-DD"

Application field
Effective ecologically safe preparation "Navisan-DD" for simultaneous disinfection and disinfestation of veterinary facilities (cattle-breeding and poultry-farming premises, vehicles and equipment) in the presence of animals.

Description of products	The preparation has high bactericidal activity towards gram-negative and gram-positive bacteria, yeast, mold fungi, and tuberculosis mycobacteria. The scientific-technical documentation on manufacture includes a preparation specification and directions for use. Operation procedure of preparation manufacturing is introduced at LLC "SPC "Navigator" (Grodno, Belarus).
Competitiveness	Efficiency of the preparation is higher than that of the best analogue of the Republic of Belarus — "Octacin-5" and also analogue of the Russian Federation "Butox-50" (at a lower price). Based on all properties there are no analogues. The development is protected by the patent of the Republic of Belarus.
Expected outcome	Import substitution in the volume of requirement of the Republic of Belarus. Increase of efficiency of livestock farming, cost reduction in carrying out disinfection of veterinary facilities.
Offers on sale	Sale of technology; license agreement, contract.
Level of readiness	Limited production.
The transfer of rights object	Invention; undisclosed information (know-how).
The transfer of rights form	License agreement.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Research Institute for Physical Chemical Problems of the Belarusian State University***

XIII-4. Technological scheme of decontamination of equipment and processing of liquid radioactive waste in the production of isotope products

Application field	The technological scheme of equipment decontamination and spent decontamination solutions recycling and liquid radioactive waste (LRW), formed during the manufacture of radionuclide sources, can be used for equipment decontamination and cleaning of liquid radioactive waste at CJSC "Isotope Technologies", specializing company PMC "Ecores" and RAUE "Polesie", at a future nuclear power plant.
Description of products	Decontaminating compositions have low corrosion activity in relation to the construction materials; do not contain environmentally hazardous compounds, easy to use. Deactivating effect of the compositions is determined by the introduction in their proportion completing agents, surfactants and special additives KD50-200. The number of TPO is 40–100 g per 1 m^2 of treated surface while polymer coatings and decontamination pastes using. A combined method of purification of LRW with high salt content in the presence of completing agents was developed.
Competitiveness	Designed compositions have high deactivating characteristics corresponding to the best foreign analogues (e. g., "LPM" (Finland), "Alfa Laval" (International Corporation), "GI VNIPIET" (Russia) at a lower cost. There are no analogues in the Republic of Belarus.
Expected outcome	The introduction of technologies providing volume lowering of radioactive waste in the production of isotope products, will provide economic effect of about 30–40 million rub./m^3 LRW only by reducing costs for the final isolation of radioactive waste.
Offers on sale	Cooperation with the customer on application.
Level of readiness	Pilot lot.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Joint Institute for Power and Nuclear Research — Sosny***

XIII-5. The method and flowsheet of liquid radioactive wastes of unknown chemical composition treatment

Application field	The organizations working with sources of ionizing radiation, CUE "Ecores", RAUE "Polesie", nuclear power and various industries.
Description of products	The method and flowsheet of liquid radioactive wastes treatment (LRW), the flowsheet and design documentation for reprocessing liquid radioactive waste, the LRW disposal methods, the LRW technological conditioning rules, the method of producing granular sorbents and ceramic membranes were developed. The technology was worked out and tests of cleaning liquid radioactive waste were carried out in the laboratory conditions. A modular plant for processing liquid radioactive waste, on which the detention of radionuclide methods of filtration, selective adsorption and ion exchange, reverse osmosis are producing was created. The end product of processing: cemented into a metal barrel middle-active waste.
Expected outcome	The expected economic effect from implementation of this design is achieved by reducing the volume of liquid waste that have to be conditioned and delivered of long-term storage in CUE "Ecores". High cleaning efficiency and reduction in liquid radioactive waste in a hundred times will allow to get 20–30 million economic impact rub./m^3 liquid and from the processing of waste 250 m^3 — to 7.5 billion rubles.
Offers on sale	Sale of products on a contractual basis; delivery by individual orders; joint production; introduction of technology.
Level of readiness	Experimental model; pilot lot.
The transfer of rights object	Experimental model; others.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Joint Institute for Power and Nuclear Research — Sosny***

XIV. Agroindustrial Complex

XIV-1. Biopesticide "Ecogreen"

Application field
Protection of vegetable and green cultures in conditions of low-capacity hydroponics. Consumers: greenhouse and hothouse farms.

Description of products	Biopesticide "Ecogreen" is intended for protecting cucumbers, parsley and dill, cultivated on mineral cotton and peat in conditions of low-capacity hydroponics, from sulphur and root rot, caused by phytopathogenic fungi *Botrytis cinerea*, *Fusarium sp.* and *Pythium sp.*
Competitiveness	The biopesticide will allow to reduce losses of production and provide an increase of crop up to 10 %.
Expected outcome	Competitive. Import substitution.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-2. Microbial disinfectant "Enatin"

Application field
Sanitation of premises of pig-breeding complexes and prevention of infectious diseases among agricultural animals. Consumers: pig-breeding complexes.

Description of products	Microbial disinfectant "Enatin" is intended for disinfecting premises of pig-breeding complexes and prevention of infectious diseases among agricultural animals caused by bacteria of colibacillus and staphylococcus-streptococcus groups.
Competitiveness	Competitive.
Expected outcome	Preparation application allows to reduce the number of sanitary-indicative microflora in the air and on the surface of premises of pig-breeding complexes by 81–100 % (for colibacillus group) and by 68–89 % (for staphylococcus-streptococcus group). Import substitution.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-3. Microbial fertilizer "Gordebac"

Application field
Agriculture, plant growing. One of the ways to improve the quality of brewing barley, and also economic efficiency during its cultivation is introduction of biological preparations raising immunity to pathogens and stressful environmental factors, and besides, the elements of mineral nutrition improving digestion into the integrated brewing barley protection.

Description of products	"Gordebac" is a microbial fertilizer (liquid and peat-based) for preplant processing of seeds and vegetating brewing barley plants to obtain ecologically friendly grain with high technological properties and reduce doses of applied mineral fertilizers. "Gordebac" is created on the basis of nitrogen-fixing and phosphate-mobilizing bacteria. It is capable to increase the supply of plants with nitrogen and phosphorus.
Competitiveness	Competitive.
Expected outcome	It raises productivity by 5–10 %. Protein content in grain decreases by 0.2–0.4 %. "Gordebac" is an ecologically friendly preparation; it is safe for humans and animals.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; sale of a license; license agreement, contract.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Invention.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-4. Microbial fertilizer "SoyaRiz"

Application field
Agriculture, plant growing. Expansion of soya cultivation areas in the Republic of Belarus will allow to solve a problem of shortage of fodder protein in animal husbandry, and also will help to provide the population with qualitative vegetable oil.

Description of products	Dry biofertilizer based on a peat substratum-carrier is applied for preplant soya seeds processing to form symbiosis with soya nodule bacteria, which are absent in soil, with a host plant, provides obtaining high crop of ecologically pure soya seeds and verdurous mass, decreasing the doses of applying mineral fertilizers.
Competitiveness	Competitive.
Expected outcome	It improves nitric plant alimentation, provides decreasing the doses of applied mineral nitric fertilizers, raises technological properties of grain and soya verdurous mass. It promotes receiving increase of corn crop by 40 %, of protein per hectare — by 66 %.
Offers on sale	Manufacturing and supply.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Undisclosed information (know-how); scientific and technical information.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-5. Microbial preparation "Cleanbac"

Application field
The preparation is intended for intensification of clearing agricultural and municipal drains at biological treatment plants. It also possesses versatile consumer properties: at industrial enterprises, in housing and communal services, agriculture, and everyday life.

Description of products	Microbial preparation on the basis of nontoxic and nonpathogenic microorganisms.
Competitiveness	Competitiveness is based on preparation cost 3 times lower the price of market analogues, and more efficiency — 2 times lower the preparation consumption.
Expected outcome	It contributes to energy saving and preserving the environment.
Offers on sale	Manufacturing and supply; organization of serial manufacture; serial production; delivery of the finished product.
Level of readiness	Limited production.
The transfer of rights object	Undisclosed information (know-how); scientific and technical information.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-6. Microbic fertilizer "Rhizophos"

Application field	Agriculture, plant growing. For preplant seed inoculation of permanent leguminous grasses.
Description of products	Microbic preparation "Rhizophos" is obtained by joint deep strain fermentation of root nodule and phosphatmobilising bacteria. The production technology is wasteless, preparation form is liquid. The peculiarity of the preparation is in combining its ability to fix molecular nitrogen of the atmosphere and hydrolyze insoluble phosphorus compounds with making them accessible to plants.
Competitiveness	Competitive.
Expected outcome	"Rizophos" application increases supply of leguminous cultures with nitrogen and phosphorus, raises their productivity, provides replacement of nitric and phosphoric fertilizers, promotes the increase of a biological variety of symbiotic and rhizospheric microflorae of soils.
Offers on sale	Sale of products on a contractual basis; manufacturing and supply; sale of technology; license agreement, contract.
Level of readiness	Pilot lot; limited production.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-7. Microclonal cultures of valuable forms of poplar genus species

Application field	Microclonal cultures of various poplar forms can be used in forestry and landscape gardening in settlements. Cultures of micro plants in vitro are a basis for mass production of high-quality planting material selected by efficiency and stability of poplar forms.
Description of products	Microclonal cultures are test-tube micro plants received from vegetative material of mature trees of the Poplar genus, selected on seed-trial grounds. Microclonal cultures allow to receive a considerable quantity of clonal planting material (to 10–15 thousand plants from one micro sprout a year) in short terms. Microclonal poplar cultures are used for receiving necessary quantity of planting material for plantation forest-growing and carrying out selection work on creating new highly productive forms. The development is directed on preserving biodiversity of poplar genus species.
Competitiveness	Microclonal poplar cultures are received from the forms, differing by stability to adverse factors and possessing efficiency, which exceeds productivity of natural aspen forests by 10–30 %.
Expected outcome	The development has no analogues in the Republic of Belarus and corresponds to the best foreign analogues.
Offers on sale	Organization of serial manufacture; sale of technology; introduction of technology.
Level of readiness	Experimental model; pilot lot.
The transfer of rights object	Scientific and technical information; experimental model.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works; joint production.
Organization-developer	***Forest Institute of the National Academy of Sciences of Belarus***

XIV-8. Probiotic "Bilavet"

Application field
Animal husbandry, veterinary medicine.

Description of products
"Bilavet" is a liquid probiotic preparation on the basis of lactic and bifidus bacteria, intended for young growth of farm stock and poultry. It is the alternative to fodder antibiotics.

Competitiveness	It contains highly effective bacteria strains with a high rate of viability; it has advantages by storage time.
Expected outcome	It stimulates growth and development of young growth of farm stock and poultry, possesses the immune-correcting effect, improves metabolism, and raises fodder absorbency. It reduces prevalence of disease by 40–45 %, reduces sickness period to 3–4 days. It provides increase of young growth preservation.
Offers on sale	Sale of products on a contractual basis; joint enterprise; manufacturing and supply; license agreement, contract.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-eveloper	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-9. Probiotic preparation "Vetosporin"

Application field
Therapy of diseases of farm stock with purulent-necrotic defeats of their skin and hoofs.
Consumers: cattle-breeding complexes.

Description of products
The preparation possesses antagonistic activity concerning a wide spectrum of pathogenic and conditionally pathogenic microorganisms, including escherichia, salmonellas, mud puppy, staphyloccoccus, *Friedlander's bacillus* and other species causing purulent-necrotic diseases of farm animals.

Competitiveness	Competitive.
Expected outcome	While using preparation "Vetosporin", healing and also recovery of outlimb function of stock come on average 8 days earlier than before. Import substitution.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XIV-10. Technology of canning production based on canned sweet corn

Application field	Fruit and vegetable processing industry.
Description of products	The technology for production and assortment of new kinds of canned products from sweet corn are oriented to increase the competitiveness of domestic canned corn. The assortment of canned garnish was created due to the organization of production, providing the enterprises receiving high quality finished products at the enterprises of the Republic of Belarus in accordance with international requirements and demanded on the domestic market and abroad.
Competitiveness	It corresponds to the high scientific and technical level in relation to foreign analogs.
Expected outcome	The developed product is import-substituting and export-oriented.
Offers on sale	Transfer of engineering specifications and specialist advice on development; Introduction of technology.
Level of readiness	Pilot lot.
The transfer of rights object	Production prototype; scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Scientific and Practical Center for Foodstuffs of the National Academy of Sciences of Belarus***

XIV-11. The intensive technology of production of ethanol from starch-containing raw materials

Application field	Alcohol industry.
Description of products	The developed intensive technology based on processing of high-concentrated wort allows maximum effective use of biopolymers of grain raw material and input range of enzyme preparations of fungal origin, without re-fermentation process material cost, to shorten the digestion duration of highly concentrated wort from 72–80 to 60–66 h, to increase turnover fermentation equipment and improve enterprise productivity by 7–10 %. The developed technology due to reducing costs only for general expenses of production and general running costs will reduce the cost of 1decilitre of rectified ethyl alcohol by 1.5–2.1 %. The introduction of technology will reduce the cost of acquisition of subsidiary materials used for growing yeast.
Competitiveness	Corresponds to the best achievements in this field.
Expected outcome	Optimizing of ethyl alcohol production.
Offers on sale	Transfer of engineering specifications and specialist advice on development; introduction of technology.
Level of readiness	Pilot lot.
The transfer of rights object	Production prototype; scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Scientific and Practical Center for Foodstuffs of the National Academy of Sciences of Belarus***

XIV-12. Treatment-and-prophylactic preparation "Bacinil"

Application field
Correction of gastrointestinal tract microbocenosis and stimulation of immune system when livestock and pigs fall ill. Consumers: cattle-breeding complexes.

Description of products	The preparation is applied for prevention and treatment of pigs and calves from enteritis.
Competitiveness	Competitive.
Expected outcome	Preparation application allows to reduce the disease rate of enteritis by 25–30 %, reduce duration of illness 2 times and increase live weight gain by 20 %. Import substitution.
Offers on sale	Manufacturing and supply.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	License agreement.
Offers for cooperation	Joint production.
Organization-developer	***Institute of Microbiology of the National Academy of Sciences of Belarus***

XV. Medicine

XV-1. Anti tumor drug "Oxaliplatin", powder for solution for infusion 50 and 100 mg, used for treatment of colon cancer, and the technology of its receipt

Application field	Medicine and oncology.
Description of products	A generic drug which has antitumor activity and used in combination with 5-fluorouracil and "Leucovorin" for the treatment of colon cancer has been developed. After-registration clinical researches of the developed drug in comparison with the original drug "Eloxatin" are being held (manufactured by "Sanofi Aventis", France).
Competitiveness	Generic drug "Oxaliplatin" has been developed, powder for solution for infusions 50 and 100 mg. The drug is registered by the Ministry of Health Care.
Expected outcome	Production of the domestic product will provide the Ministry of Health Care with the up-to-date drug which is not inferior to foreign analogues in its efficiency and quality, but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-2. Antibacterial drug "Klindatsil", solution for injections 150 mg/ml in ampoules 2 and 4 ml

Application field	The drug is intended for treatment of bacterial infections caused by sensitive microorganisms: upper respiratory tract infections, respiratory tracts, bones and joints, suppurative infections of the skin and soft tissues, infections of the pelvic organs, gynecological diseases, etc.
Description of products	Drug "Klindatsil" is an antibiotic of lincomycin group. It has a wide spectrum of action. According to its chemical structure it is a 7-chlorine-deoxy-derived lincomycin. It is close to it for the antimicrobial spectrum and mechanism of action, but in relation to certain types of microorganisms (especially to bacterial iodine and asporogenous anaerobes) it is more active — 2–10 times. It is effective for treatment of asymptomatic carriage of diphtheria.
Competitiveness	Drug "Klindatsil" has been produced in Belarus for the first time, there are no domestic analogues. Effectiveness of its pharmacological action is not inferior to foreign analogues, but it has a lower price.
Expected outcome	Ensuring the needs of the Ministry of Health Care of the Republic of Belarus in the drug "Klindatsil". Saving of budget currency due to import substitution. In the future — drug registration in foreign countries and its export.
Offers on sale	Sale of products; serial production; delivery of the finished product.
Level of readiness	Serial production.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	License agreement.
Offers for cooperation	Investments.
Organization-developer	***"Borisovskiy zavod medicinckih preparatov" JSC***

XV-3. Anticancer drug "Cisplacel"; production technology.

Application field
Medicine (oncology, neuro-oncology). "Cisplacel" is used for local chemotherapy of malignant neoplasms of cerebrum, head and neck regions by means of its implantation into the bed of surgical extracted tumor.

Description of products	Drug "Cisplacel" in the form of sterile napkins made from oxidated cellulose with immobilized cis-diamminedichloroplatinum (II) (size 1.5 × 1.5 or 3.0 × 5.0 cm or 20 pieces per 1 package). The medicinal product has styptic and prolonged cytostatic effects; during implantation in the organism the drug resolves during 20–30 days, provides prolonged antineoplastic action directly in the affected organ at simultaneous decrease of cytostatic agent dose and its toxic stress on the organism in whole.
Competitiveness	Competitiveness of "Cisplacel" in comparison with its analogue — medicinal agent "Gliadel", "MGI Pharma, Inc" (USA) — is ensured by considerably low price (≈ 60 times cheaper) at considerably high qualitative measure (hemostatic action, stability).
Expected outcome	Increase in life span and quality of patients with brain tumor, decrease of the number of relapses and increase of the number of totally recovered patients with malignant neoplasms in head and neck regions.
Offers on sale	Sale of a license; joint production; sale of technology; delivery of the finished product.
Level of readiness	Experimental model; pilot lot; limited production.
The transfer of rights object	Invention; scientific and technical information; experimental model.
The transfer of rights form	License agreement.
Offers for cooperation	Investments; joint production; joint enterprise.
Organization-developer	***Research Institute for Physical Chemical Problems of the Belarusian State University***

XV-4. Anticancer drug "Fludaberl", powder for solution preparation for injections; production technology

Application field	Medicine. Oncology.
Description of products	The generic drug has been developed with anticancer activity that is used for the treatment of B-cell chronic lymphatic leukemia, non-Hodgkin's lymphoma. Manufacturing of the drug has been arranged.
Competitiveness	The generic medicinal agent has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with an up-to-date medicinal agent that is not inferior to foreign analogues in relation to its effectiveness and quality, but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-5. Anticancer drug "Paklitaxel, 0.6 % concentrate for solution preparation for infusions"; production technology

Application field	Medicine. Oncology.
Description of products	Pharmaceutical development of generic anticancer drug "Paklitaxel" used to treat breast cancer, non-small cell lung cancer, ovarian carcinoma, head and neck squamous cell carcinoma, transitional cell bladder cancer, Kaposi's sarcoma at patients with AIDS (second-line treatment).
Competitiveness	The generic drug has been developed — an analogue of medicinal agent "Taksol" (produced by "Bristol-Mayers Squibb", Italy). Issue of the domestic product will provide medicine with an up-to-date medicinal agent that is not inferior to foreign analogues in relation to its effectiveness and quality; but more affordable for the consumer.
Expected outcome	The developed drug will provide the Ministry of Health Care with an up-to-date generic medicinal agent.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-6. Antiemetic drug "Tropisetron, 0.1 % solution for injections"; production technology

Application field	Medicine. Oncology.
Description of products	Generic antiemetic drug "Tropisetron, 0.1 % solution for injections" has been developed. The medicinal agent is registered in the Ministry of Health Care.
Competitiveness	The generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent that is particularly used to minimize injurious effect of cytotoxic agents on the organism, to reduce significantly the risk of life-threatening complications, and to improve life quality of oncologic patients.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-7. Antiemetic drug "Tropisetron, capsules"; production technology

Application field	Medicine. Oncology.
Description of products	Generic antiemetic drug "Tropisetron, capsules" has been developed. The medicinal agent is registered in the Ministry of Health Care.
Competitiveness	The generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent particularly used to minimize injurious effect of cytotoxic agents on the organism, to reduce the risk of life-threatening complications, and to improve life quality of oncologic patients.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-8. Antituberculous drug "PASK sodium salt" granules; production technology

Application field	Medicine. Treatment of multi-drug resistant forms of tuberculosis.
Description of products	Generic drug for multi-drug resistant forms of tuberculosis treatment has been developed. Medicinal agent is registered by the Ministry of Health Care.
Competitiveness	The generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent for multi-drug resistant forms of tuberculosis treatment.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-9. Antituberculous drug "PASK sodium salt", powder frozen-dried for solution preparation for infusions; production technology

Application field
Medicine. Treatment of multi-drug resistant forms of tuberculosis.

Description of products
Generic drug for multi-drug resistant forms of tuberculosis treatment has been developed. The medicinal agent is registered by the Ministry of Health Care.

Competitiveness	Generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent for multi-drug resistant forms of tuberculosis treatment.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-10. Antiviral drug "Nukleavir, 3 % eye ointment"; production technology

Application field	Medicine. Treatment of ophthalmic herpes (herpetic dendritic, geographic keratitis; keratoiridocyclitis with ulceration).
Description of products	Original antiviral drug has been developed for the treatment of ophthalmic herpes. Manufacturing of the drug has been arranged.
Competitiveness	The original antiviral drug has been developed that exceeds its analogues at antiviral activity in relation to acyclovir resistant strains.
Expected outcome	The developed drug will provide the Ministry of Health Care with an antiviral medicinal agent.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-11. Antiviral drug "Nukleavir, 5 % eye ointment"; production technology

Application field	Medicine. Treatment of herpetic skin lesions and mucous membranes.
Description of products	The original antiviral drug has been developed for treatment of herpetic skin lesions. Issue of medicinal agent has been mastered.
Competitiveness	The original antiviral drug has been developed that exceeds ointment "Aciclovir 5 %" at antiherpetic activity in relation to acyclovir resistant strains.
Expected outcome	The developed drug will provide the Ministry of Health Care with the original antiviral medicinal agent.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

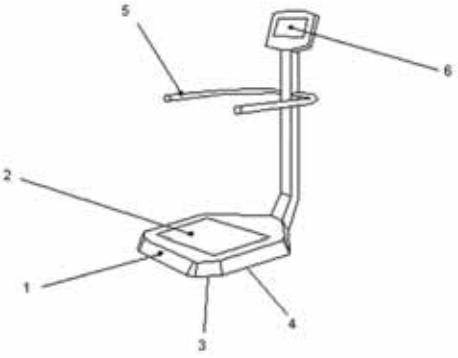
XV-12. Cellular biotechnology of combined transplantation of mesenchymal and allogeneic hemopoietic stem cells for therapy of patients with pathology of blood formation

Application field	Oncohaematology, transplantology, immunology.
Description of products	The technology of tandem transplantation of allogeneic hematopoietic and mesenchymal stem cells will allow using of cultures of mesenchymal stem cells during bone marrow transplantation, improving patient selection criteria, individualizing of therapy and increasing of level of clinical-laboratory and scientific researches. Recovery of blood formation and immune system of patients after bone marrow transplantation within earlier period reduces the period of hospital stay by an average of 4 days.
Competitiveness	Application of this technology increases the efficiency of treatment of oncohaematological patients with the method of allogeneic bone marrow transplantation due to earlier primary engraftment and reduction of the risk of development of acute and chronic reaction "graft — versus — host".
Expected outcome	Co-transplantation of mesenchymal stem cells contributes to: improvement of survival rates of patients during transplantation, reduction of the period of stay in hospital for 4 days within the period of cytopenia, reduction the period of stay in hospital for 6 days, reduction of mortality after transplantation.
Offers on sale	Introduction of technology.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Belarusian Medical Academy of Post-Graduate Education***

XV-13. Combined vitamin drug "BoriVit solution for injections" in 2 ml ampoules

Application field	The drug is indicated as a medicine for symptomatic therapy of diseases of the nervous systems of different origin: neuritis, neuralgia, polyneuropathy, myalgias, radicular syndromes, peripheral paresis; neurological diseases caused by deficiency of vitamins *B1* and *B6*.
Description of products	"BoriVit" — a medicine of vitamin *B1* (thiamine hydrochloride) in combination with vitamins *B6* (pyridoxine hydrochloride) and *B12* (cyanocobalamin). Neurotropic vitamins of the group *B* have a positive effect on inflammatory and degenerative diseases of the nerves and musculoskeletal system; are used for elimination of deficiency states, and in high doses it has analgesic properties, improve blood circulation and normalize the work of nervous system and the process of blood formation.
Competitiveness	Drug "BoriVit" is produced in Belarus for the first time, there are no domestic analogues. The effectiveness of pharmacological action of the drug is not inferior to foreign analogues, but it has a lower price.
Expected outcome	Ensuring of the requirement of the Ministry of Health of Belarus for drug "BoriVit". Saving of budget currency is realized by means of import substitution. In the future it is planned to arrange registration of the drug in foreign countries and its export.
Offers on sale	Sale of products; serial production; delivery of the finished product.
Level of readiness	Serial production.
The transfer of rights object	Scientific and technical information.
The transfer of rights form	License agreement.
Offers for cooperation	Investments.
Organization-developer	***"Borisovskiy zavod medicinckih preparatov" JSC***

XV-14. Computerized rehabilitation trainer "Velogeymik"



1. Основание. 2. Опорная платформа. 3. Угрово-внутренняя конструкция (не видна – находится внутри основания). 4. Измерительный преобразователь (не виден – находится внутри основания). 5. Опора для рук пациента. 6. Компьютер, монитор, планшет.

Application field

In pediatrics, orthopedics, pediatric neurology, rehabilitation and physiotherapy for the diagnosis and training of equilibrium function of children with movement disorders, as well as of children with cerebral palsy of varying severity.

Description of products	Rehabilitation simulator "Velogeymik" can be used for diagnosis and training of the equilibrium function of children with movement disorders, as well as of children with cerebral palsy of varying severity.
Competitiveness	The simulator is equipped with the support for hands in the form of a non-closed loop frame with the presence of at least three stands on which strain gauges are installed, that extends functionality of the model and reduces traumatic danger during the training.
Expected outcome	Implementation of the program of therapy of children suffering from cerebral palsy, on base of the developed computerized rehabilitation training device will reduce the severity of motor and sensory disturbances, which will improve the quality of life of children with disabilities.
Offers on sale	Manufacturing and supply; organization of serial manufacture; service maintenance; delivery of the finished product.
Level of readiness	Limited production.
The transfer of rights object	Effective model; production prototype; software.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Investments.
Organization-developer	***Republican Scientific and Practical Centre "Mother and Child"***

XV-15. Drug "Lakemox, eye drops"; production technology

Application field

Drug "Lakemoks, eye drops" is used in ophthalmology for treatment of conditions accompanied by epithelial dystrophy of cornea and following types of conjunctiva: blepharitis, conjunctivitis, xerophthalmia, conditions after the use of contact lenses, conditions after keratorefractive surgery, etc.

Description of products	Drug "Lakemox, eye drops" is produced in the form of transparent viscous solution in vials 5 and 10 g in package No. 1. It has tear-substituting, epithelium-protective, and antioxidant actions. The medicinal agent produces an effect on main stages of pathogenesis of different diseases of the front eye segment that are connected with free-radical oxidation processes, and improves biological combustion processes.
Competitiveness	Competitiveness of "Lakemox" in comparison with eye drops "Natural tear II" ("Alcon", USA) is ensured by the former's durable anti-oxidant action.
Expected outcome	Quality and effectiveness improvement of treatment of ophthalmologic diseases accompanied by epitheliopathies of cornea and conjunctiva.
Offers on sale	Sale of a license; joint production; sale of technology; delivery of the finished product.
Level of readiness	Experimental model; pilot lot; limited production.
The transfer of rights object	Invention; scientific and technical information; experimental model.
The transfer of rights form	License agreement.
Offers for cooperation	Investments; joint production; joint enterprise.
Organization-developer	***Research Institute for Physical Chemical Problems of the Belarusian State University***

XV-16. Drug "Methotrexate, frozen-dried powder" for solution preparation for injections 10 and 20 mg, that is used in treatment of hematologic and cancer diseases; production technology

Application field	Medicine. Treatment of hematologic and cancer diseases, rheumatoid disease therapy, psoriasis, systemic lupus, Crohn's disease, and reaction "graft — versus — host".
Description of products	Generic drug "Methotrexate, frozen-dried powder" for solution preparation for injections 10 and 20 mg has been developed. The medicinal product is registered by the Ministry of Health Care.
Competitiveness	The generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent that is not inferior to foreign analogues in relation to its effectiveness and quality; and but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-17. Drug "Methotrexate", tablets 2.5 and 5 mg, that is used for treatment of hematologic and cancer diseases; production technology

Application field	Medicine. Treatment of hematologic and cancer diseases, rheumatoid disease therapy, psoriasis, systemic lupus, Crohn's disease, and reaction "Transplant Against Host".
Description of products	The generic drug has been developed. Post-registration clinical trials of the developed medicinal agent are carried out in comparison with the original drug "Methotrexat-Ebewe", tablets 2.5 and 5 mg (production of "Pharma GmbH", Austria).
Competitiveness	The generic drug has been developed.
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent that is not inferior to foreign analogues in relation to its effectiveness and quality; but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-18. Drug "Photopon, ointment for external use"; production technology

Application field	Medicine. Oncology. Stomatology.
Description of products	Original drug "Photopon, ointment for external use" in tubes 5 g that is used in the sphere of photodynamic therapy during treatment of neoplasms of external location and inflammatory diseases of periodontium.
Competitiveness	New drug "Photopon, ointment for external use" in tubes 5 g has been developed that is used during treatment of neoplasms of external location and inflammatory diseases of periodontium. The medicinal agent has selectivity and low phototoxity.
Expected outcome	Developed original drug "Photopon, ointment for external use" will provide clinical agencies of the Ministry of Health Care with the medicinal agent that is used in photodynamic therapy during treatment of basal cell carcinoma and inflammatory diseases of periodontium.
Offers on sale	Sale of products; sale of a license; cooperation with the customer on application; delivery of the finished product.
Level of readiness	Serial production.
The transfer of rights object	Undisclosed information (know-how).
The transfer of rights form	License agreement.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-19. Drug "Temobel", 20, 100 and 250 mg capsules, which has antitumor activity, is used for the therapy of malignant gliomas, and the technology of its receipt

Application field	Medicine, oncology.
Description of products	The generic drug that has antitumor activity and used for the therapy of malignant gliomas has been developed. Manufacturing of the drug is being arranged. Drug "Temobel" is registered in the Ministry of Health Care of Belarus.
Competitiveness	The generic drug has been developed.
Expected outcome	Production of the domestic product will provide the Ministry of Health Care with the up-to-date drug, which is not inferior to foreign analogues in efficiency and quality, but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-20. Drug "Zoledronic acid, powder for solution preparation for infusions 4 mg" of anticancer activity used for bone metastases treatment and prevention; production technology

Application field	Medicine. Oncology.
Description of products	The generic drug has been developed, that has anticancer activity and used during prevention and treatment of bone metastases. Post approval clinical trials that conform compliance to the medicinal agent "Zometa" (produced by "Novartis Pharma", Switzerland).
Competitiveness	The generic drug has been developed — an analogue of medicinal agent "Zometa" (produced by "Novartis Pharma", Switzerland).
Expected outcome	Issue of the domestic product will provide the Ministry of Health Care with the up-to-date medicinal agent that is not inferior to foreign analogues in relation to its effectiveness and quality; but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-21. Drug with pro-biological effect "Lactobacyllin", 5 doses, frozen-dried powder for suspension preparation for external use; consists of live frozen-dried cells of two bacterial strains: Bacillus subtilis S and Lactobacillus acidophillus 95/25; production technology

Application field
Medicine. Prevention and treatment of microbiocenosis disorders of gastrointestinal tract.

Description of products	Complex drug with pro-biological effect "Lactobacyllin", 5 doses, frozen-dried powder for suspension preparation for external use, has been developed. The medicinal product consists of live frozen-dried cells of two bacterial strains: *Bacillus subtilis S* and *Lactobacillus acidophillus 95/25*; it is used for prevention and treatment of microbiocenosis disorders of gastrointestinal tract.
Competitiveness	Drug "Lactobacyllin" is the original medicine in relation to its composition. There is no complex pro-biological drug with the selected of bacteria in the domestic pharmaceutical market.
Expected outcome	The developed drug will provide the Ministry of Health Care with complex probiotic based on bacteria *Bacillus subtilis* and lactic-acid bacteria *Lactobacillus acidophillus* that are used for prevention and treatment of microbiocenosis disorders of gastrointestinal tract.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-22. Emoxipin substance and dosage form on its basis are drug "Selenobel, tablets 0.0004 g" used in replacement therapy during development of pathological state of selenium deficiency, prevention and treatment of selenium deficiency manifestations; production technology of the substance and ready dosage form

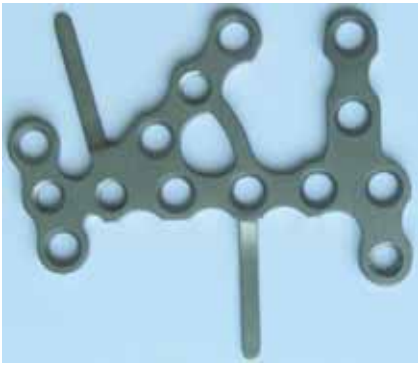
Application field
Medicine. Replacement therapy at development of pathological state of selenium deficiency, prevention and treatment of selenium deficiency manifestations.

Description of products	Technologies have been developed concerning the production of diacetophenonilselenid and medicinal agent on its basis "Selenobel, tablets 0.0004 g" that is used in replacement therapy during development of pathological state of selenium deficiency, at prevention and treatment of selenium deficiency manifestations. Selenium is an active antioxidant on cellular basis and is able to modulate oxidant cell stress.
Competitiveness	New original drug "Selenobel, tablets 0.0004 g". Main active ingredient is an organic compound of selenium; selenium releases slowly out of this compound that provides maintaining of steady-state concentration of the microelement in the organism.
Expected outcome	Developed original drug "Selenobel, tablets 0.0004 g" will provide clinical agencies of the Ministry of Health Care with the medicine used at the pathological state of selenium deficiency, as well as for the prevention and treatment of manifestation of selenium insufficiency.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-23. Emoxipin substance and dosage form on its basis is drug "Emoxilin, 0.5 % solution for infusion" used in ophthalmologic practice and cardiology

Application field	Medicine. Cardiology. Ophthalmology.
Description of products	Production technologies for obtaining emoxipin substance and medicinal agent on its basis "Emoxipin, 0.5 % solution for infusion" have been developed that are used for the treatment of intraocular haemorrhage, diabetic retinopathy, glaucoma. It is also used when acute myocardial infarction, for "reperfusion syndrome", and when instable angina.
Competitiveness	Drug "Emoxipin 0.5 % solution for infusion" has been developed that corresponds to the best foreign analogues.
Expected outcome	Developed drug "Emoxipin, 0.5 % solution for infusion" will provide clinical agencies of the Ministry of Health Care with the medicinal agent used in ophthalmologic practice and cardiology.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-24. Fixation device of the heel bone with locking of screws and installation tools



Application field
The fixation device is designed for use in traumatology and orthopedics for stable osteosynthesis of intra-articular fractures of heel bone after open reposition.

Description of products	The fixation device is a bone structure (plate) of a special configuration, which conforms to the form of heel bone (3 sizes) and the location of the lines of its fractures. Several holes of the plate are threaded, allowing locking head of screws in them that creates an angular stability and increases the strength of fixation in conditions of fragmentation and osteoporosis. The possibility to block the screws on both sides of the plate allows applying it for right and left heel bones.
Competitiveness	Scientific and technical characteristics of the fixation device correspond to the best foreign analogues, and its price is 2 times lower.
Expected outcome	The use of osteosynthesis of the heel bone fractures with the developed fixation device will reduce the time of treatment and disability of this category of patients, increase the proportion of positive results of treatment, and reduce the need for repeated interventions. The number of patients can be up to 300 per year, which will allow receiving of economic effect only for the cost of the implant — 45,000 US dollars.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Organization-developer	***Republican Scientific and Practical Centre of Traumatology and Orthopedics***

XV-25. Nootropic, anxiolytic, sedative agent and also antidepressant "Neyramin" that normalizes metabolism

Application field

"Neyramin" is prescribed to treat stress, neurosis, hyperexcitability, vegetovascular disorders, neurotic reactions, depression of mild and moderate severity, acute alcoholic intoxication, treatment of neuroinfection consequences, and craniocerebral traumas for stabilization of nutritional motivation when therapy is aimed at loss of body weight.

Description of products

The drug improves metabolic processes in the cerebrum and is of sedative, anxiolytic, and nootropic effect. The medicinal product improves mental work, suppresses depressive disorders, increased irritability, as well as normalizes sleep, improves mood and satiation during food intake, facilitates loss of body weight, neutralization, and excretion of ammonia out of the body.

Competitiveness	"Neyramin" consists of natural amino acids. They are well absorbed from the bowels, penetrate all organs and tissues, and are included in natural metabolic processes.
Expected outcome	Removal of depression and inquietudes, improvement of mental work, restoration of sleep pattern, relief of termination of drinking bouts and relief of hangover escaping.
Offers on sale	Agreement on cooperation.
Level of readiness	Serial production.
The transfer of rights object	Others.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Institute of Physical Organic Chemistry of the National Academy of Sciences of Belarus***

XV-26. Scientific and technological level of production is not inferior to foreign analogs. Antileukemic drug "Leykladin, 0.1 % solution for injections" and technology of its reception

Application field	Medicine. Treatment of systemic connective tissue diseases.
Description of products	The generic drug that is used in oncohaematology for the treatment of multiple sclerosis, systemic connective tissue diseases, has been developed. Manufacturing of the drug is being arranged.
Competitiveness	The generic drug has been developed.
Expected outcome	Production of the domestic product will provide the Ministry of Health Care with the up-to-date drug which is not inferior to foreign analogues in efficiency and quality; but more affordable for the consumer.
Offers on sale	Sale of products.
Level of readiness	Serial production.
The transfer of rights object	Production prototype.
The transfer of rights form	Purchase and sale contract.
Offers for cooperation	Investments.
Organization-developer	***"BELMEDPREPARATY" RUE***

XV-27. Software complex for individual biomechanical analysis of dental system "3D-MathDent"

Application field	The software complex can be used for the diagnosis and planning of orthopedic and orthodontic treatment of patients with complex pathology of dental system, for arrangement of scientific researches and for work with images which are received during computer-aided tomography.
Description of products	A promising area is the development of the software complexes which combine the opportunities to work with RN-images of dental systems and treatment planning. To ground the constructions of dentures the method of mathematical modeling was used, it allows an efficient, indication based distribution of functional loads on supporting tissues, and it facilitates the work of a dentist, allowing construction of fixed and removable dentures, taking into account individual features of the patient.
Competitiveness	Functionality of the software complex has no direct analogues in the near and far abroad.
Expected outcome	Application of the software complex for the choice of structures of fixed and removable dental prostheses improves their quality and durability and prolongs service life of the supporting teeth of the patient.
Offers on sale	Delivery by individual orders; assignment of intellectual property rights; venture financing; agreement on cooperation.
Level of readiness	Experimental model.
The transfer of rights object	Software; scientific and technical information.
The transfer of rights form	Agreement on the creation and use of intellectual property; purchase and sale contract.
Offers for cooperation	Investments; cooperated research and experimental designing (technical) works.
Organization-developer	***Belarusian State Medical University***

XV-28. Test system "Biolaktam" is to determine the beta-lactamase activity of biological substrates, which allows to quantify the beta-lactamase activity in biological substrates (serum, saliva, sputum, cerebrospinal fluid, culture liquid)

Application field

The developed test system can be used for clinical and bacteriological laboratories of infectious hospitals and departments, bacteriological laboratories of Hygienic and Epidemiological Center and research institutes. The test system can be implemented in Belarus and in Russia, Ukraine and other CIS countries.

Description of products

The test system that allows to identify and quantify the beta-lactamase activity in biological substrates (serum, saliva, sputum, cerebrospinal fluid, culture liquid) was developed. Determination of beta-lactamase activity in biological fluids can be used in clinical practice to determine the tactics of antibiotic therapy or determine the indications for the replacement of conventional beta-lactam antibiotics to drugs from other pharmacological groups in contagious patients.

Competitiveness	The closest and only analogue — are disks for the disk-diffusion analysis of Beckton Dickinson BBL production (Cat. number 231650), which does not allow to evaluate the beta-lactamase activity quantitatively, is only suitable for the analysis of bacterial cultures, the study requires a prolonged incubation (up to 24 hours).
Expected outcome	The expected result of application — reducing the length of hospitalization of patients receiving antibiotic therapy, reducing morbidity and mortality associated with severe bacterial infections, reducing the cost of ineffective antibiotic therapy.
Offers on sale	Sale of products on a contractual basis.
Level of readiness	Limited production.
The transfer of rights object	Production prototype; scientific and technical information.
The transfer of rights form	Contract for assignment of rights.
Offers for cooperation	Joint production; joint enterprise.
Organization-developer	***Vitebsk State Medical University***

XV-29. The method of surgical correction of posttraumatic syringohydromyelia with the use of shunt systems for patients with traumatic spinal cord disease

Application field	Medicine and neurosurgery.
Description of products	Among the complications of traumatic disease of the spinal cord the secondary affections of spinal cord are the most frequent reason of increase of neurological disorders. Approximately 70 % of them are associated with progressive circulation loss of cerebrospinal fluid. Pathological processes, occurring in the cerebrospinal fluid spaces, lead not only to mechanical barriers for cerebrospinal fluid drainage but also to a breach of its suction. To stop this process and correct it, the use of shunt cerebrospinal fluid systems was proposed during the development of syringohydromyelia when there is a traumatic disease of spinal cord. Installation of cerebrospinal fluid shunt systems allows draining cerebrospinal fluid conductive tracts, and normalizes cerebrospinal fluid pressure by means of installation of the valve system of appropriate pressure. Technology of installation of shunt cerebrospinal fluid systems is quite simple, low-traumatic and effective, as the drained cerebrospinal fluid is sucked in the abdominal cavity without damage of the body.
Competitiveness	The technology of surgical correction of traumatic spinal cord disease, complicated with the development of syringohydromyelia, with the help of use of shunt valve systems is not used in the world and it is patented.
Expected outcome	The result of the use of surgical correction of syringohydromyelia with traumatic disease of spinal cord — improvement and regression of neurological disorders by 80–85 %, stabilization of the state — by 10 %.
Offers on sale	Cooperation with the customer on application; introduction of technology; agreement on cooperation.
Level of readiness	Idea, concept.
The transfer of rights object	Others.
The transfer of rights form	Agreement on the creation and use of intellectual property.
Offers for cooperation	Cooperated research and experimental designing (technical) works.
Organization-developer	***Republican Scientific and Practical Centre of Traumatology and Orthopedics***

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