RUSNANO

FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS

Application of Nanotechnological Solutions for Economic Performance Improvement of Organizations and Enterprises

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High-tech security and business monitoring systems

ЭЛВЕС Неотек

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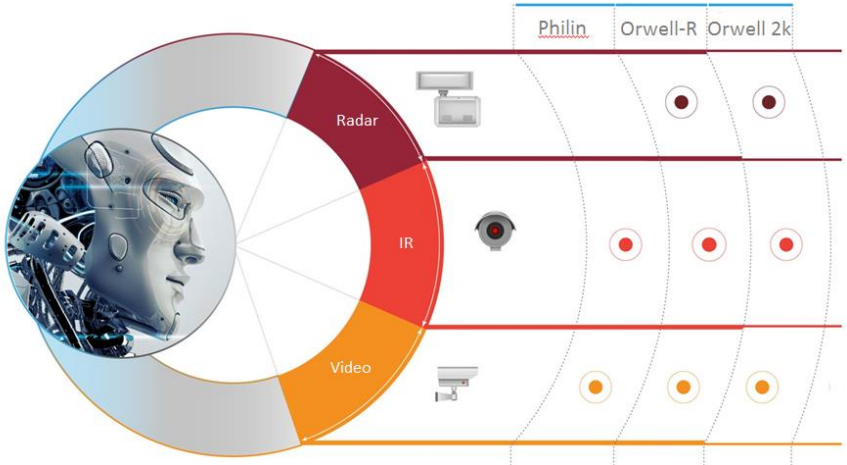
Security and Business-monitoring systems

ELVEES NeoTek

- ELVEES NeoTek is a Russian developer and manufacturer of high-tech security and business monitoring systems using technologies of image recognition, computer vision, radar, video and thermal imaging surveillance and biometric identification, etc.

- ELVEES NeoTek is affiliated with ELVEES group of companies. The company has been on the market for more than a decade.

- ELVEES group employs more than 500 specialists, 6 Doctors of Engineering and 26 PhDs.



ТЕХНОСЕРВ · SAMSUNG · ISECURITY · SENESYS Security Network Systems · РТИ · THALES
ETP · ГАЗПРОМАВТОМАТИКА · RONEX Security · Сого НИКИРЭТ · ЭСКОРТ ЦЕНТР · КОМПАНИЯ БЕЗОПАСНОСТЬ
SHARP · BOSCH · HITACHI · CM · BIONES · АЛЬТАИР
LUKOIL · IMPERIAL VIN · GAZPROM · icontext · AMTEA · CQG
EURO GROUP · ФАБРИКА ВМАРГА · makita · Банк Образование · CAS · Pfizer

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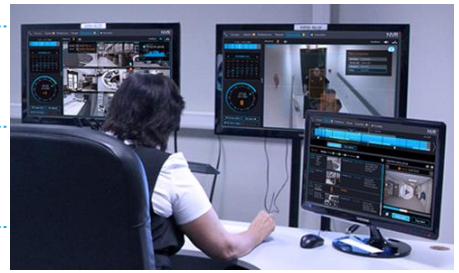
Security and Business-monitoring systems
Orwell 2k video surveillance system with computer vision

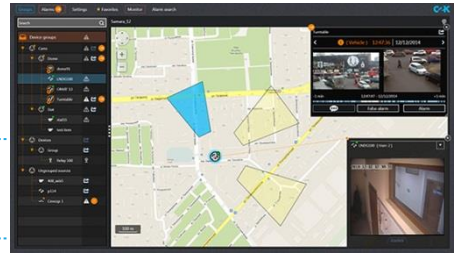
Neotek

Orwell 2k offers automatic targets and situations detection and classification and transmission of the video information to the operator in a real-time mode.

Orwell 2k recognized situations:

- Fire and fumigation;
- abandoned objects;
- thrown over objects;
- counting of targets crossing virtual barrier;
- crossing the line in the specified direction;
- crowds of people;
- camera being covered;
- number plate recognition;
- red light running;
- traffic accounting;
- speed measurement;
- entering oncoming traffic lane;
- prohibited stop;
- driving in the prohibited direction;
- prohibited pedestrian crossing;
- other.





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Security and Business-monitoring systems

Orwell-R radar systems

Elwees Neotek

Radar stations of Orwell-R series are intended for 24-hours all-weather perimeter, object territories and their approaches guarding by means of radar surveillance. The radar viewing sector is up to 360°. Radar stations of Orwell-R series operate within the integrated security system Orwell 2k.

- 24/7 all-weather target detection and classification (humans, vehicles, vessels, etc.)
at the distance of up to 3 km over land and water;

- FOV up to 360 degrees;

- determination of target location, speed and movement direction;

- integration with PTZ video cameras and thermal imaging cameras;

- the radiation level complies with Sanitary Regulations and Standards and is minimal (75mW);

- radar networking capability.

Security and Business-monitoring systems

“Philin” Thermal-imaging all-round surveillance radar

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Automatic 24-hour all-weather system for object territory and its approaches surveillance by means of continuous patrolling with the help of thermal scanners and video cameras.

Philin automatically detects the moving targets (humans, vehicles, boats, etc.) analyzing the thermal image.

The system projects their location onto the electronic object map and informs the operation about the target appearance in a real-time mode.

- Thermal scanner;
- video camera;
- rotary platform.

data processing and analyzing all-weather unit (IP-66)

operator workstation with the pre-installed software

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Composites

Polyurethane Pultrusion (JSC “PulTech”)

Pultrusion is a closed reactive process in which reinforcing fibers are pulled from a series of creels through an injection box, where they are thoroughly mixed with a polyurethane resin.
Once the reinforcing fibers are impregnated with resin, the material is passed through a heated steel die where the resin matrix is shaped and cured. The profile is continually pulled until it exits the die, where it is cooled then cut to the desired length.

PE vs PU Mechanical Properties

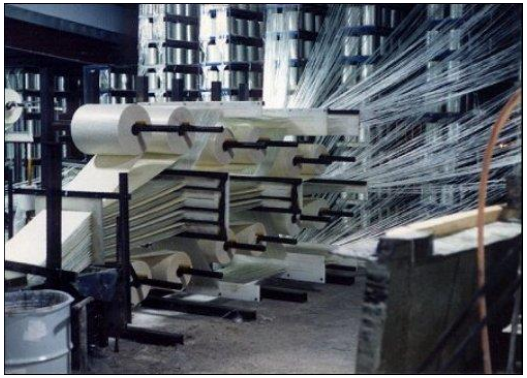
PU is stronger even when thinner !!

Test Details	Units					
Resin		Polyester	Polyester	Polyester	Polyurethane	Polyurethane
Glass		1 Oz Mat	1.5 Oz Mat	3 Oz Mat	All Roving	1 Oz Mat
Thickness	in	0.125	0.125	0.125	0.08	0.08
ASTM D 2584 Ignition Loss Percent Ash	%	70.4	69.4	69.6	79.2	73
ASTM D 1622 Apparent Overall Density	kg/m³	1819	1757	1726	2067	1933
ASTM D 1622 Apparent Overall Density-	lb/ft³	114	110	108	129	121
ASTM D 790 Flexural Modulus Transverse	Mpsi	1.3	1.3	1.4	1.8	1.8
ASTM D 790 Flexural Strength, Transverse	ksi	11.5	15.5	20.8	12.8	42.0
ASTM D 790 Flexural Modulus Parallel	Mpsi	3.2	2.8	2	7.9	3.2
ASTM D 790 Flexural Strength, Parallel	ksi	87.1	74.1	46.3	203	119
ASTM D2344 Short Beam Shear Strength, Transverse	ksi	1.9	2.2	2.9	2	4.0

- **Superior toughness** of PU polymer matrix across a broad range of temperatures, enabling thinner profiles and/or simplified reinforcements.
- High **production speeds** thanks to fast curing and/or the use of simplified reinforcement.
- Polyurethane processing improves **industrial hygiene** due to low emissions (no styrene).

Polyurethane Pultrusion

Since November 2012 Pultrusion Technologies, JSC markets a fiberglass composite Sheetpile system SHC-150, designed for marine seawalls, bulkheads, sheet piles and retaining walls. Pultruded fiber reinforced polymer composite seawall bulkhead retaining wall offer significant advantages over wood, concrete, steel, aluminum and vinyl sheet piles.

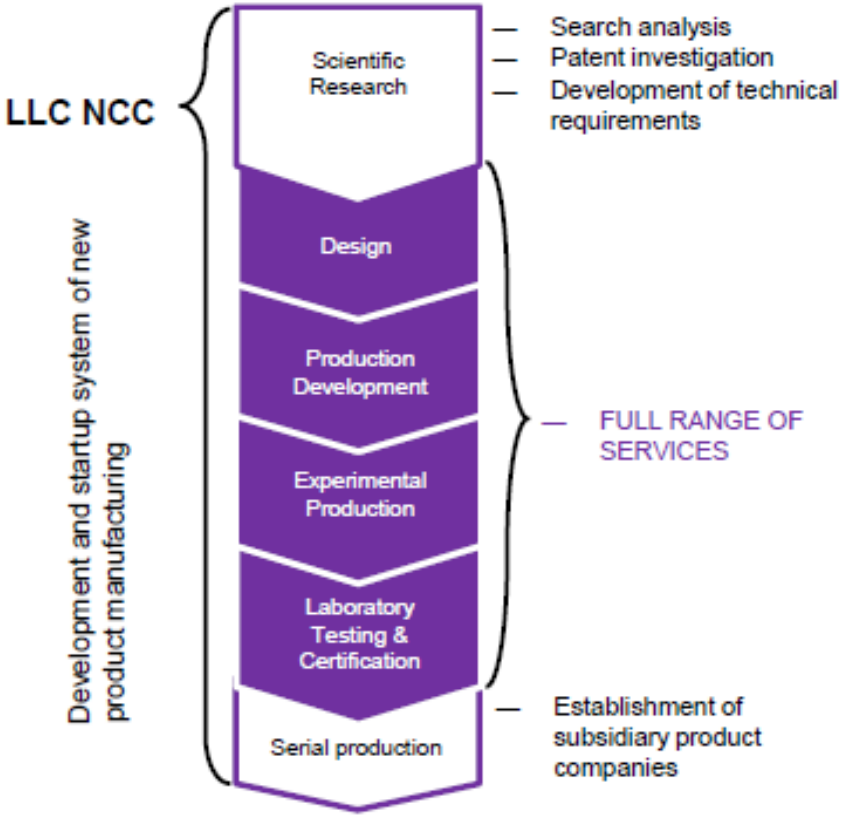


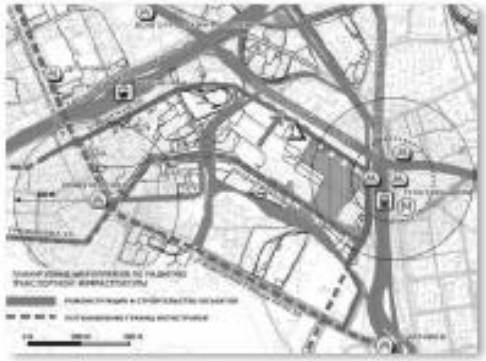
Interlocking corrugated design, composite fiberglass seawall is ideal for many applications, such as lakes, rivers, streams, canals, causeways, docks, harbors, residential and non-residential developments and retention ponds. Unique technology of high pressure injection pultrusion with pure urethane resin makes our sheetpiles stronger than others made from polyester, vinyl ester and hybrid urethane resins.

Fiberglass Sheetpile SHC-150 and bulkhead construction retaining walls are attractive, corrosion-resistant, high strength, and have long-term performance. Construction requires similar installation techniques as other types of corrugated seawalls/bulkheads.

Nanocenter of composites

We are dealing with developing of products from FRP





MOSKVICH production and development site houses are modern industrial buildings with a total area of 240,000 square meters.

The total area of the initially rented space is 8,323.2 sq. m.

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Nanocenter of composites
Products for construction

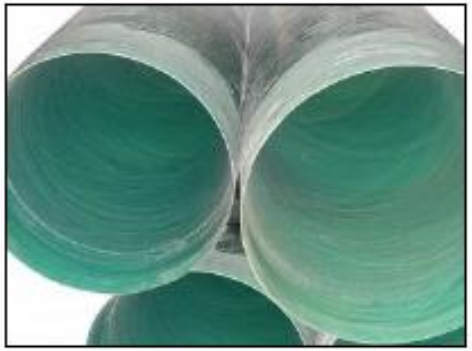
NCC

Carbon laminate system of external reinforcement

Profiles of FRP
№ РОСС RU.АГ92.Н07287, 29.11.2013, ООО «KapitalStroy»

Plates for temporary roads of FRP

Fiber for concrete and asphalt
№ РОСС RU.АГ75.Н04472, 11.07.2013, ООО «ProdMashTest



FRP pipes

Composite rebar

Fiberglass pipes GRP

Nanocenter of composites

Utilities

Fiberglass lighting poles

Fiberglass road sign poles

Tactile paving

№ РОСС RU.АГ75 Н05149 22.08.2013,
ООО «ProdMashTest»

Bracket overhead catenary for trolley

Composite pipes

Nanocenter of composites
Other products

In total more than 30 kinds of products

The core wire transmission line

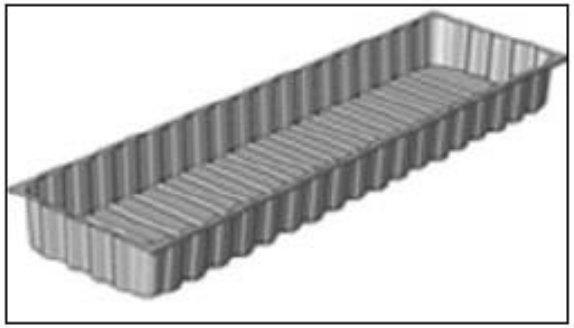
The packer and sucker rods from FRP

Coatings for industrial use

Connecting sleeve head for fire hoses

Sheet piling

Satellite dishes



Manure removal baths for pig farms

Automotive parts (Exterior and interior)

Innovative composite and geosynthetics

RUSCOMPOZIT key products are designed for construction of transport infrastructure as well a soil & gas production and transport facilities. RUSCOMPOZIT aims at developing and delivering complete integrated polymer composite-based solutions.

To develop integrated polymer-composite solutions for various applications, a highly effective Research & Development Department has been created in the Company. The Department comprises a numerical simulation unit, design, technology and test sections, a material properties research laboratory and a prototype production facility. The Department's activity provides for a minimum time between development and manufacturing application of new products.

Composite materials.
Mobile road pavements “MOBISTEK”

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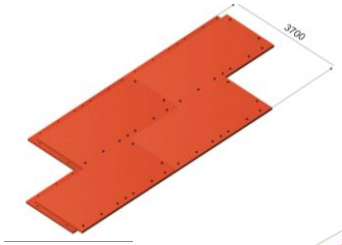
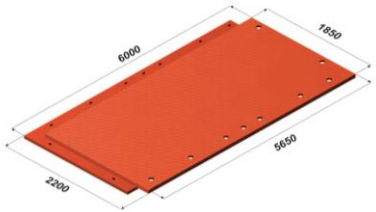
RUSCOMPOZIT

Applications and advantages

Mobile Road Pavements (MRP-MOBISTEK) represent composite plates allowing a prompt lay up of temporary roads and construction sites on land plots featuring complex soil and geological conditions, in particular, on swamps of types I and II. Those plates provide for access of heavy caterpillar and wheeled vehicles featuring a weight of up to 80 tons.





MRP “MOBISTEK” applications:

- provision of prompt access and delivery of equipment in cross-country conditions, including swamps of different types
- construction of temporary passages and sites to protect the topsoil
- arrangement of access passages and sites while construction and installation works on main pipelines
- construction of temporary crossings over various ways of communication elimination of emergencies

MRP “MOBISTEK” key advantages:

- prompt system deployment
- positive buoyancy
- multiple repeated application (cash savings)
- modular design (sites of any dimensions whatsoever may be constructed)
- preservation of vegetation cover and reduction of natural resources consumption
- plate surface structure prevents sliding
- weather resistance

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All-composites upper structures for above-ground pedestrian overpasses over highways and railroads

RUSCOMPOZIT

Glass-composite materials may be applied in super structures design of highway and pedestrian bridges, road pavement plating and for external reinforcement.

Superstructure installation is very easy and takes barely several hours. Assembly speed is an important factor, especially for big cities, where traffic limitation either is not allowed, or has severe time constraints. Application of light weight composite superstructures reduces economic losses, pollution and noise intensity.

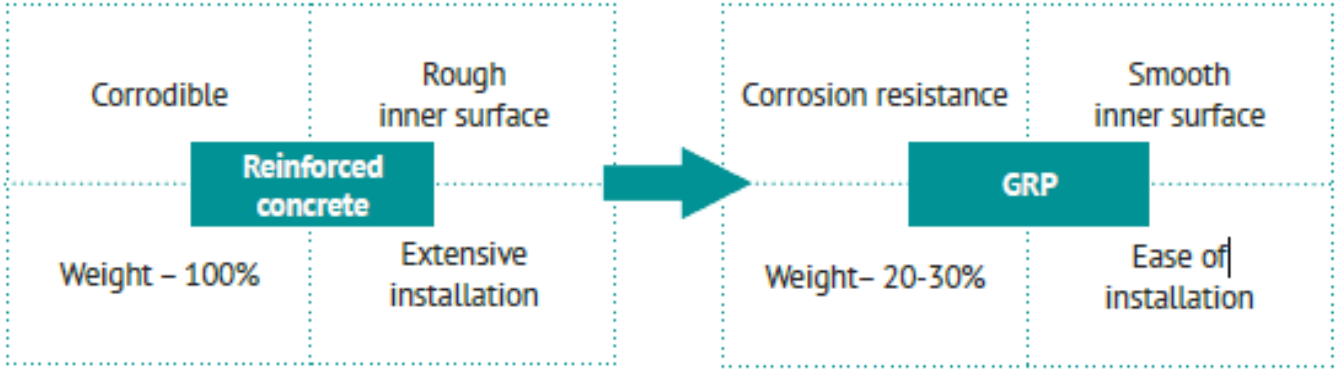
Technical and economic efficiency	Bridge structures using reinforced concrete and metal	Bridge structures made of composite materials
Durability	35-50 years	> 100 years
Construction costs, including materials	100%	70-75%
Maintenance and repair within the first 35-40 years of operation	35-50% of the original value	15% of the original value
Final value with account to operational costs for a period of 25 years	135-150%	80-90%

**This table shows technical and economic efficiency of composite bridges application. Construction costs of a reinforced-concrete bridge are taken as 100%. The reinforced-concrete bridge costs for the whole life cycle exceed twofold the composite bridge costs for the same period. The economic effect equals to 50-65%.*

GRP water-flow tube. Application

Water-flow tubes represent engineering structures designed to let permanently or periodically active water flows pass under earth fills of highways and railroads.

GRP water-flow tubes are applied to construct new water-flow facilities and repair the existing ones in moderate and cold climate, at an ambient temperature between -50°C and +60°C.



- no corrosion
- wear resistance
- weather resistance and resistance to corrosion environment
- increase of periods between repairs and total life
- no combined foundations (segment blocks) required
- construction without culvert heads possible
- light weight (10 times lighter than reinforced-concrete tubes), convenience of transportation and installation
- reduced total value of property

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Other products

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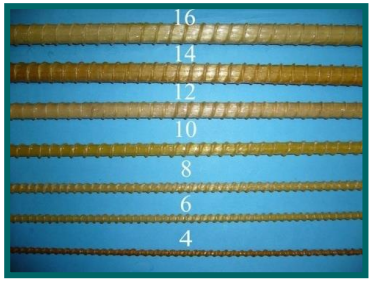
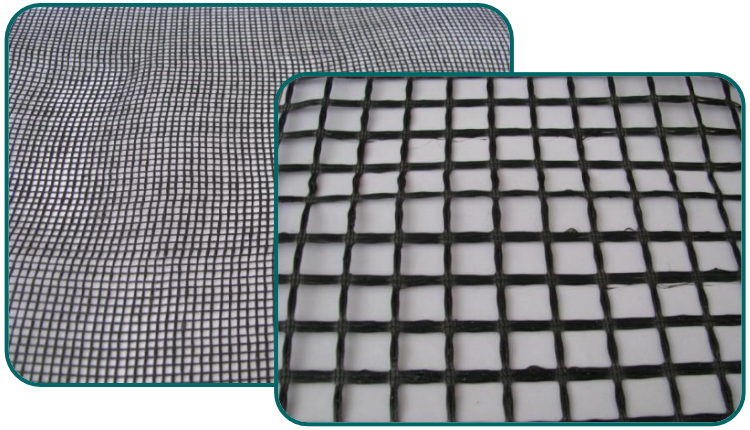
Storm water treatment facilities

Water storage capacities and reservoirs

Composite Reinforcement Bars CRB “STEKON”



Geosynthetics. Geogrids, three-dimentional mats



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Functional coatings

CJSC «Plakart»

CJSC «Plakart»

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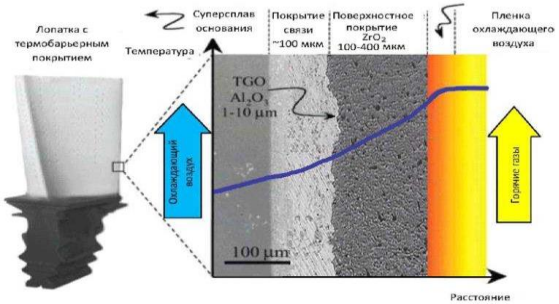
Functional coatings

Company conduct research and development, to apply and implement in the production of customer functional coatings

of metals

ceramics



metal ceramics

Solutions allow to increase the overhaul cycle in 3-10 times!

Application:

Protecting column equipment at the refinery in the city of Astrakhan.

Economic effect - more than 3 million dollars a year

The total economic effect by 2013. - 65 million dollars

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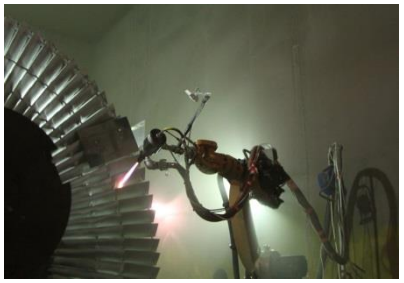
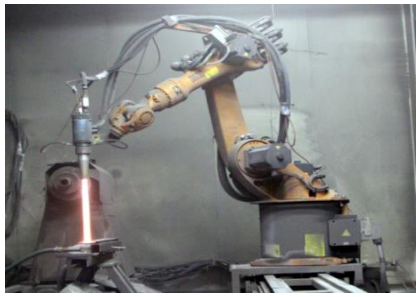
CJSC «Plakart»

Application of the functional coatings

Protection against vapor-droplet erosion of steam turbine blades and increase the life in not less than 2 times.





Thermal barrier coating for protection of gas turbine components.
Improving efficiency by 2-4%.

Thermal spray coating as a replacement for the galvanic chrome plating
The most striking examples replace electroplating process using high-speed spray coating surfaces are rods of hydraulic cylinders.

Other applications: Manufacturing and restoration of the unique parts of machines with increased resource; wear protection and restoration of the rod of the hydraulic cylinder; sacrificial steel coatings of tanks, reservoirs, steel constructions; isolating steel coatings for chemical, petrochemical equipment, oil-refining manufactures, for tanks with aggressive environment.

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Semiconductor IDM

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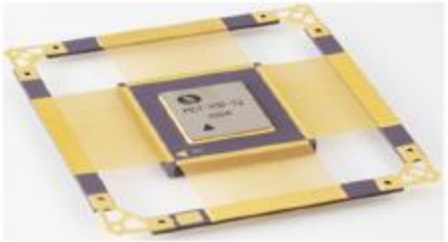
Main product groups

mikron

- Microprocessors for cards and ID documents
  - 300+ million SIM-cards produced
  - 400, 000 ICs for Universal Electronic Card (UEC – Russian ID-card) produced
  - 3+ million ICs for new biometric passport produced
  - 15+ million bank cards manufactured yearly

- RFID tags, inlays and cards
  - 50 million tags and inlays manufactured monthly
  - 400+ million transport cards manufactured yearly
  - 3+ billion transport cards produced

- Power management & power electronics ICs, discretes and ICs for harsh environments (aerospace, nuclear power generation industry)
  - 400, 000 ICs manufactured monthly



Product portfolio

Microprocessors for smart-cards

Standard: ISO14443 (F=13.56 MHz)

Applications:
- Biometric passport
- Citizen cards
- Bank cards
- SIM cards with e-signature
- Social cards, etc.

Power management
- DC-DC / AC-DC converters
- Voltage regulators (LDO, standard)
- Pulse-width-modulation controllers
- Comparators and operational amplifiers
- LED drivers

RFID tags, inlays and cards

Standard: ISO 18000 (F=856 MHz); ISO15693 (F=13.56 MHz); ISO 14443 (F=13.56 MHz)

Applications
- Retail
- Logistics
- Mail delivery
- Pharmaceutical
- SCM
- Transportation

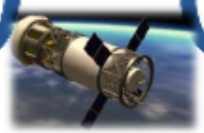
Power management ICs

Aerospace , nuclear power generation industry
- Memory
- Logic, etc.

Power electronics
- Fast Recovery diodes
- Schottky diodes
- LC-EMI / RS-EMI filters
- TVS
- ESD

Discrete semiconductor devices

ICs for harsh environments



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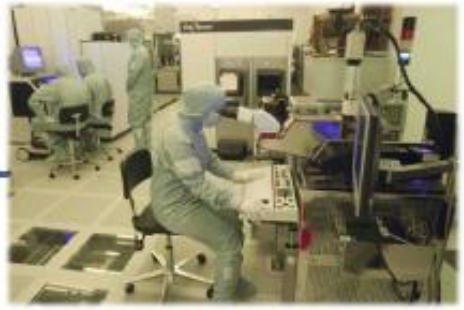
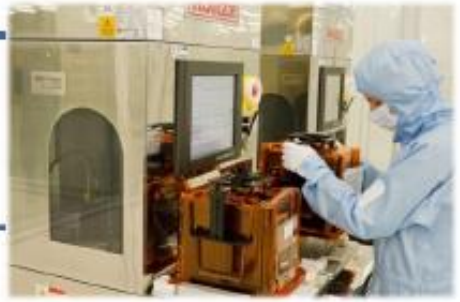
Services

mikron

IC design	Development of new designs for ICs, application specific ICs and discrete semiconductor devices
Testing	Probe testing equipment for wafers and reliability testing equipment for packaged devices
RFID prototyping, antenna design	Full cycle RFID tag and antenna development, from design to mass production. Prototypes developed within 6-8 weeks
Foundry services	Mikron production lines can be used for mass manufacturing of IC designs developed by independent design houses. 8', 6' and 4' wafer lines available.
Packaging	Contract packaging services of ICs and discrete semiconductor devices





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BIOCHIPS

powerful diagnostic tool for multiparameter analysis of biological specimens

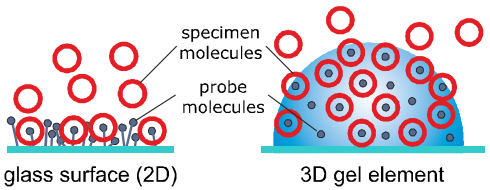
БИОЧИП

BIOCHIP-IMB LLC

Biochips

The gel-based biochips developed by the Engelhardt Institute of Molecular Biology RAS (EIMB) bear an array of three-dimensional hydrogel elements on the hydrophobic surface. Up to a hundred individual gel elements are positioned within 1 sq.mm? each element contains specific probe to study DNA, RNA of proteins. Being small in size and highly sensitive, the biochips revolutionize diagnostics in medicine, veterinary, agriculture, toxicology, environmental monitoring, etc.

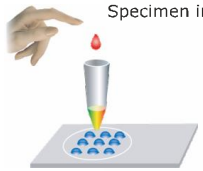
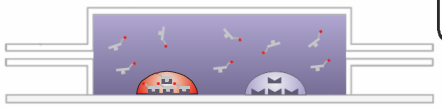
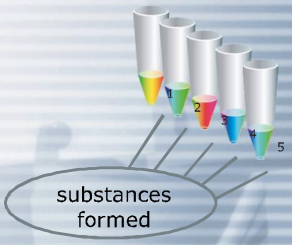
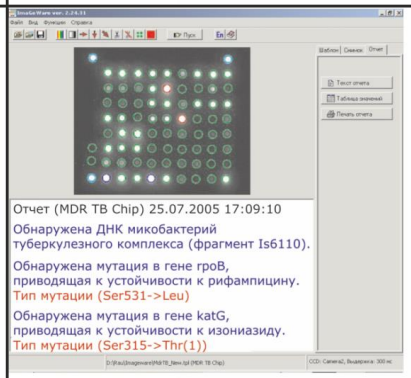
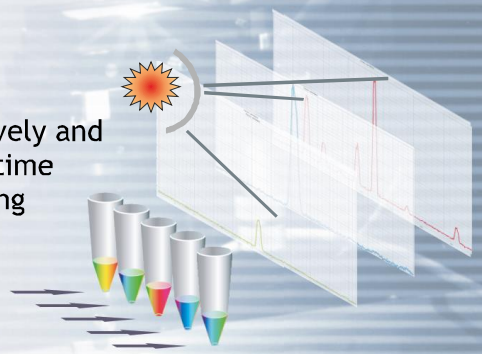
The biochip technology does not require costly equipment and highly qualified personnel, it can be widely introduced in ordinary medical and genetic laboratories.



The advantages of three-dimensional biochips are the following:

- The hydrogel-immobilized molecules retain their biological activity
- Each element of a microchip is an individual nanotube with the probe
- Three-dimensional structure of the gel ensures the signal specificity and high intensity

The comparison of diagnostic methods

	Analysis steps	The multiparametric analysis on biochips	The single-parametric analysis in tubes
1	The selection and preliminary treatment of an analyzed specimen	 ☑ A lower amount of the analyzed specimen	A step of the specimen division into parts is necessary for different analyses 
2	The specimen interaction with the probe and formation of a new product	 ☑ A lower amount of the reagent	The interaction with different reagents proceeds: → under the same conditions • under similar conditions 
3	Detection and analysis of the product formed	 ☑ It is easier to automate measurements and data processing	Analysis is carried out: → simultaneously • successively and is more time consuming 

Biochips for laboratory diagnostics of tuberculosis

TB-BIOCHIP detection of mutations leading to rifampin and isoniazid resistance of *M.tuberculosis*

TB-BIOCHIP-2 detection of mutations leading to fluoroquinolones resistance of *M.tuberculosis*

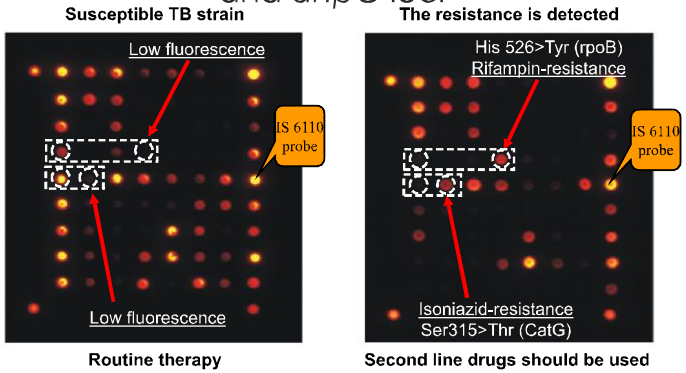
SPOLIGO-BIOCHIP spoligotyping of Mycobacterium tuberculosis complex

According to WHO data there were an estimated 8.7 million incident cases and also 1.4 million deaths from TB in 2011

There were an estimated 310 000 MDR-TB cases among notified TB in 2011. Almost 60% of these cases were in India, China and the Russian Federation.

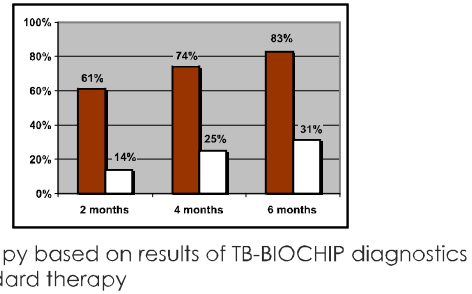
TB-BIOCHIP

Analysis of 47 mutations in *rpoB, inhA, katG* and *ahpC* loci



1 day analysis
Sensitivity **>90%**
Specificity **>95%**

Caverns healing dynamics in patients with MDR-TB



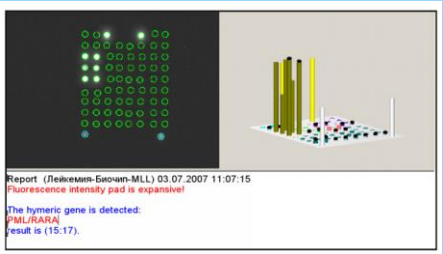
Identification of chromosomal translocations for subtyping of leukemia

LEUKEMIA is an oncological disease of haematopoietic stem cells

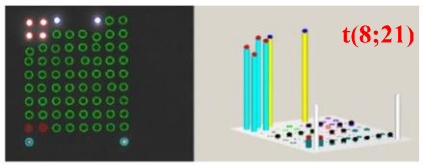
In Russia leukemia is newly diagnosed in 3000-4000 of children and 1000-2000 of adults per year.
Leukemia is a very heterogeneous disease which is divided into subsets depending on lineage and differentation status of haematopoetic cells involved in malignization. The differences in morphology, immunophenotype of leukemic cells and their response to chemotherapeutic agents leading to different clinical outcome are mostly explained by molecular abnormalities

LK-Biochip

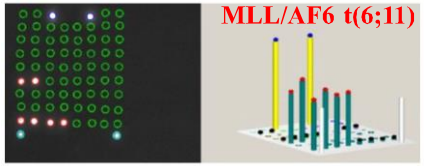
Analyses simultaneously 13 translocations and more than 50 Junctions between genes
Identifies 1 blast cell with translocation among 1000 normal cells in blood and bone marrow samples
Applied in diagnostics and therapy since 2005 (more than 30000 patients tested)



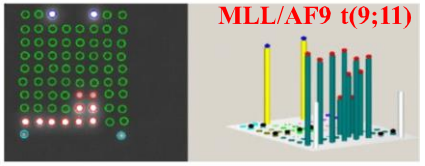
LK-Biochip
Chimeric transript is detected **PML/RAPA**.
Result:
t(15;17)PML/RAPA, Junction **bcr1**.



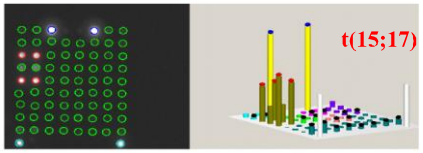
Good response for specific therapy



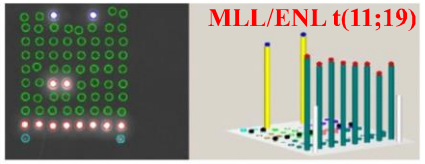
Poor prognosis; bone marrow transplantation is required



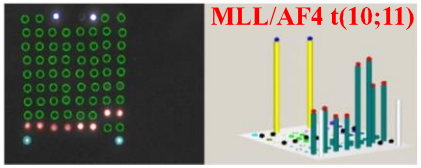
Poor prognosis; bone marrow transplantation is required



Specific therapy with retinoic acid (ATRA).
About 95% of patients recover.



Poor prognosis; bone marrow transplantation is required



Very poor prognosis in infants, specific high-dose therapy

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Rapid tests and kits for the quality control of food safety

PCR diagnostics

Advantages:

- Direct study of the Genetic material of bacteria;
- Ability to analyze **Hard Cultivated** microorganisms;
- **High Sensitivity** - from single copies of the pathogen in the sample;
- Possibility of reliable diagnosis of bacteria on **Early Stages**;
- Genetic material is not pathogenic - **Safety of the Staff.**

PCR kits for food products quality control:

diagnosis of bacterial contamination of meat products and poultry products (Escherichia coli, Listeria monocytogenes, Proteus spp, Enterobacter spp, Klebsiella spp, Pseudomonas aeruginosa)

Formats of Kits:

- **OneStep in strips**
- **OneStep in test-tube**

⇨ Completely ready to go, just add a sample
Storage at -20 ° C, the shelf life of 4 months
One defrost to +8 C for 5 days is possible

- **TwoStep in test tubes**

⇨ Thermostable (storage 6 months. At 4 C .... + 8) and thermolabile (6 months storage. at -20 C) components are separated in test tube

- **Nondripped**

⇨ The prepared samples to store at 4C + ... + 8/5 days.
Untrained samples to store at -17 C ....-20 C / 6 months.

Kits are adapted to the following equipment: BioRad (CFX96, IQ5, MiniOpticon), Corbett Research (Rotor-Gene Q, Rotor-Gene 6000, Rotor-Gene 3000), Roche (LightCycler 96, TagMan 48), DNK Technologies (DT-96)

Analysis of mycotoxins in food by ELISA (enzyme-linked immunosorbent assay)

Advantages:

- Validated for typical sample types (e.g., serum, plasma, supernatant, lysates)
- Low cost
- Sufficiently high sensitivity
- Optimized for sensitive, accurate, and consistent performance

ELISA kits for control residues of mycotoxins in food products:
Half-Quantitative ELISA method allows you to quickly analyze such mycotoxins as: Aflatoxin M1, Ochratoxin A, Zearalenone, Fumonisin, T2-toxin, deoxynivalenol.

Kits are adapted to the following equipment: Bio-Plex 200, Bio-Plex MAGPIX, Multiskan FC, iMark, Multiskan FC with incubator, PST-60HL, PST-60HL-4, PSU-2T, PW 40 washer, Wellwash, Wellwash Versa, Immunochem-2100, Immunochem-2200-2(4).

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Water filtration

About company

RM Nanotech is the only Russian company among the world's manufacturers of nanostructured membrane flatsheet and membrane elements for reverse osmosis (RO), nanofiltration (NF) and ultrafiltration (UF).

Our mission is to increase efficiency of pure water production using state-of-the-art membrane technologies

History of the membrane technology development in Russia and former USSR dates back to over 40 years ago. Everything was started with set up of *Industrial Membranes Scientific and Technical Center (ISTC)*, further known as ***Polymersintez***

1970 - first R&D works on membrane development started

Based on R&D and applied workshop of ISTC, in **1998** Membranes, Scientific and Technical Center Vladipor was established who later leaded to start up of RM Nanotech in **2010** with major support and investments from RUSNANO (Russia's state fund for Nano industry) www.rusnano.com

Products and technologies

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rm nanotech
membranium

UF membrane flatsheet

- ✓ brackish water
- ✓ sea water
- ✓ low pressure
- ✓ extra low pressure

NF and RO composite membrane flatsheet

- ✓ Industrial applications (8040, 4040)
- ✓ Commercial applications (4021, 2540)
- ✓ Household applications (2012, 1812)

Manual and automatic rolling

ISO 9001

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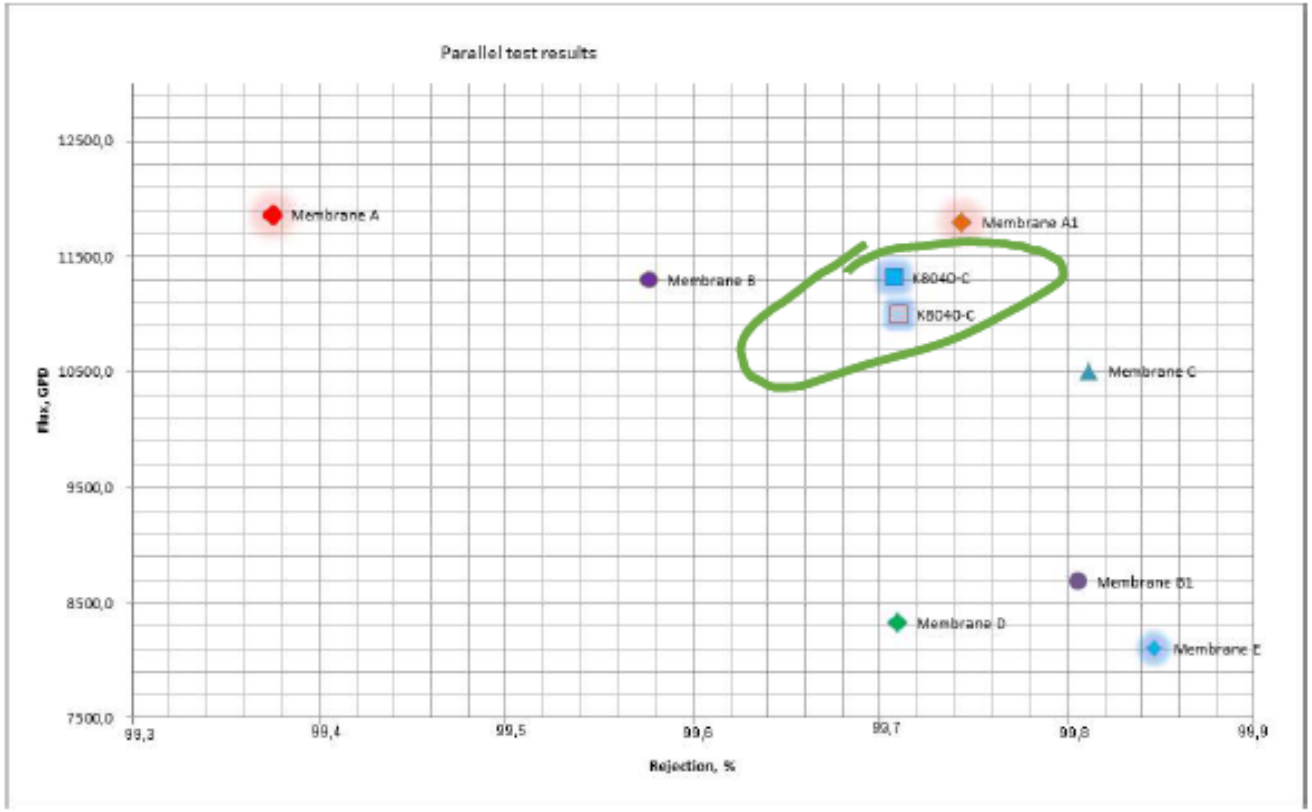
Membrane tests

RM Nanotech brackish water desalination membranes' performance comparative analysis

Parallel tests with GE Osmonics AG-400; Hydranuatics CPA3; DOW Filmtec BW30-400, BW30HR-440i; Hydramem (IonExchange membranes) HM8040BWD365; Toray TM720-440, TM720C-430



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Water treatment and plants protection

POLYINFORM

Water treatment and purification

Sewage treatment

Domestic sewage treatment

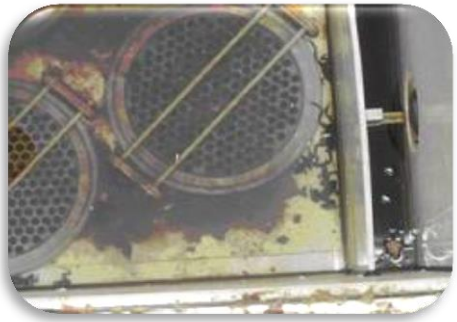
- The traditional stages of treatment are used – both mechanical and biological
- The after-purification is carried out by means of ultraviolet, which leads to stabilization of purified water characteristics during all operation life of equipment

Rain and snow water treatment

- The treatment of sewage from the polluted areas is possible. The water can be reused or thrown into a pond
- The techniques of electrochemical treatment and filtering without reagents are used
- There is no need in the expensive consumables
- The technique can be used in complex treatment systems as the system of after-purification

Industrial sewage and water from the polluted areas treatment:

- Treatment of sewage from the ions of the heavy metals;
- Neutralization of surface flow from the processing sites of domestic and industrial waste



The technology of the reverse water supplying allows lowing water consumption up to 90%, installation at the sites not equipped with a drainage system and water nets.

Plants protection

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POLYINFORM

Biopreparation Alirin-D and Gamair

Dry powder or pills: Shelf life –2 years, Cell titer –1011cell/g

Based on the hydrogels:

Moisture capacity: 1 g of dry hydrogel can absorb 1 liter of water

High elements exchange capacity: Shelf life - 1 year, 1010 cells/gram

Field test results

	PHOMOSUS			
	Spreading %	**Development%**	**Biological yield, c/ha**	**Yield addition to the control, %**
Gamair (5 g/ha)	55	6	35,2	22
Albit (40 g/ha)	78	33,8	36,0	24
Control	77	43,6	28,9	-

Biopreparation BiAVA

Crops	**Biological efficiency against root rot, %**	**Product quality**
Salad lines	85-92	Heightening of sugar, ascorbic acid and solids content
Vegetables	75-80	
Flower-decorative culture	65-72	Heightening of development of the plants

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Identification of explosives

нейтронные технологии

neutron technologies

Neutron identification of explosives

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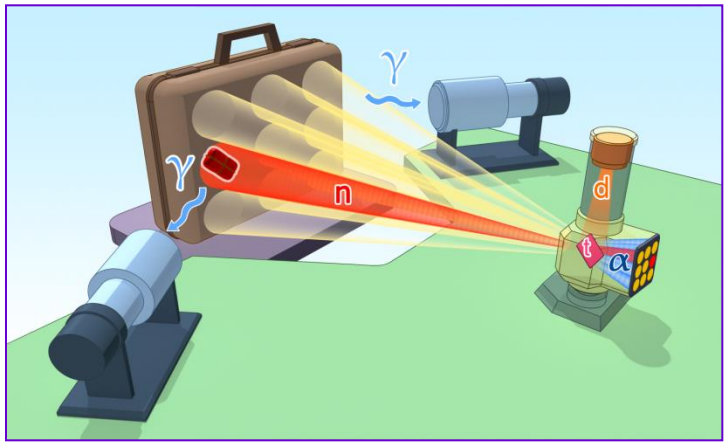
нейтронные технологии
neutron technologies

TNM detectors:

- Provide full 3D information on hidden explosives
- Allow inspection of closed volumes
- Allow inspection of large cargo and sea containers



Objects in question are irradiated by fast neutron beams

γ-rays generated in the objects are registered

Range of existing TNM detectors:

- Portable detector DVIN-1
- Stationary explosives detector
- Car-bomb inspection detectors
- Large cargo inspection systems




TNT ($C_7N_3O_6$)
&
Hexogen ($C_3N_6O_6$)

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Thank you!

For extra information please contact:

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