

**MADE  
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The image features a central logo for 'Sk Energy' set against a background of a grid of squares. The grid is composed of squares in various shades of yellow, gold, and light red, arranged in a pattern that resembles a stylized map or a decorative border. The central square is a solid, bright yellow and contains the logo. The logo consists of the letters 'Sk' in a large, bold, white, sans-serif font, with the 'S' and 'k' connected. Below 'Sk', the word 'Energy' is written in a smaller, white, sans-serif font.

**Sk**  
Energy

**INNOVATION DEVELOPMENT CENTER STM****SHUNTING LOCOMOTIVE WITH HYBRID DIESEL-ELECTRIC POWER UNIT AND ASYNCHRONOUS DRIVE REDUCES FUEL CONSUMPTION BY 30%****COMPETITIVE ADVANTAGES /**

Locomotive fuel consumption reduced by 30%.  
Greenhouse gas emission reduced by 55%.  
Life-cycle cost reduced by 31%.  
Up to an hour of noiseless work inside buildings.

**ESSENCE OF INNOVATION /**

Efficient diesel-electric drive with microprocessor control.  
More than 20 innovative technical solutions.  
Track profile prediction with GPS and GLONASS.

**RESULTS ACHIEVED /**

Hybrid locomotive technical specifications approved by JSC «Russian Railways».  
Declaration of Intention to purchase locomotives signed by JSC «Russian Railways».  
The prototype is currently passing set of certification acceptance tests.  
Four patents issued, three Russian patents pending, one international patent pending.

**MARKET POTENTIAL /**

10,000 shunting locomotives in JSC «Russian Railways» park.  
7,000-8,000 locomotives at industrial enterprises.  
Up to 70% of shunting locomotives are work-worn.  
Global market over 120 shunting locomotives till 2015 values 240M Euros.

**THE TEAM /**

**Anton Zubikhin**, D. Tech., Director of the Innovation Development Center STM Center.

**Yevgeny Fyodorov**, chief designer, 17 years' experience in vehicle manufacturing.

**Aleksei Tarasov**, dep. head developer, an engineer with 10 years' experience.

*There are over 90 engineers and developers at the company with experience in vehicle manufacturing.*

**CONTACTS /**

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# LITHIUM-AIR BATTERIES WITH LARGE ENERGY CAPACITY WILL INCREASE OPERATING TIME FOR PORTABLE DEVICES AND ELECTRICAL VEHICLES UP TO FIVE TIMES

## COMPETITIVE ADVANTAGES /

With its specific capacity of 1000 Watt-hours per kilogram lithium-air batteries outperform current lithium-ion batteries by at least five times. Specific energy capacity is comparable to petroleum.

## ESSENCE OF INNOVATION /

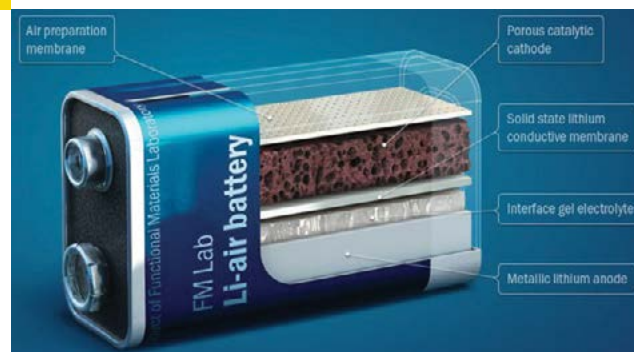
Rechargeable chemical power source. Oxygen for reduction reaction is taken from the atmosphere.

## RESULTS ACHIEVED /

Battery cell prototypes are already developed and tested.  
Patent protection strategy is under implementation.  
Joint Development Agreement with international market leader is in progress.  
Two patents pending.

## MARKET POTENTIAL /

Global battery market is expected to grow and reach \$30B by 2020.  
Electrical vehicles market is the most promising segment for batteries. Such application will increase vehicle mileage up to 700 km.



## THE TEAM /

**Denis Shabratov**, CEO, founder of a number of hi-tech companies.

**Daniil Itkis**, PhD Phys. and Mathematics, head designer, laureate of the RAS prize and winner of the Moscow State University award for young scientists.

*Graduates from Faculty of Science and Materials at Lomonosov Moscow State University joint the team.*

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## **ENERGY STORAGE SYSTEMS BASED ON ULTRACAPASITORS WITH 15 YEAR RESOURCE FOR RECUPERATION IN ELECTRICAL VEHICLES AND COMPENSATION OF SHORT-TERM POWER OUTAGES IN ELECTRICAL GRID**

### **COMPETITIVE ADVANTAGES /**

High power at high specific capacity of up to 20 Watt-hours per kilogram.  
Service life of over 15 years (up to 1 mln cycles).  
Cost of energy storage is 1.5 times cheaper than equivalent technology.  
Operating temperatures is from -50 °C to +65 °C.

### **ESSENCE OF INNOVATION /**

Development of production technology for asymmetric electrochemical capacitors that run on non-toxic water electrolytes.

### **RESULTS ACHIEVED /**

Storage system prototypes are already developed and tested.  
Storage systems for Smart Grid passed lab tests in the USA (Sandia Lab, EPRI, EnerSys).  
Technical and economic feasibility studies are implemented for railway, auto transport and electrical grid.  
Two domestic patents pending, one international patent pending.

### **MARKET POTENTIAL /**

Compensation of short-term power outages (up to 1 minute) in electrical grid (up to 95% of all outages).  
Energy recuperation, start-stop systems for hybrid vehicles.  
Super-capacitors segment is expected to reach \$400M in 2013 (\$50M in 2012) within total capacitors market of \$10B.



### **THE TEAM /**

**Mikhail Rodionov**, PhD Phys. & Math., CEO, director of development.

The team leaders are PhD scientists in physics, mathematics and chemistry from Physical Institute RAS, Lomonosov Moscow State University, and US consultants.

*The project team has been successfully operating on the capacitor market since 1993. Elton capacitors have been on the market in the USA since 1998.*

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**TEEMP**

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# **SUPERCAPACITORS FOR ELECTRICAL VEHICLES, RENEWABLES INTEGRATION AND SMART GRIDS WITH 3-4 TIMES EXCEEDED SPECIFIC CAPACITY AT COMPARABLE TO MARKET ANALOGUES COSTS**

## **COMPETITIVE ADVANTAGES /**

Specific capacity of supercapacitors (25 Watt-hours per kilogram) is 3-4 times higher than equivalents on the market at comparable energy storage costs of less than \$1 per Watt-hour.

Cost of energy storage for impulse capacitors (power density 5 kilowatt per kilogram) is less than \$20 per watt.

## **ESSENCE OF INNOVATION /**

Super-capacitors with acid electrolyte.

Composite hydrocarbon nanomaterial electrodes, for effective double layer formation.

## **RESULTS ACHIEVED /**

Power and impulse super-capacitor cells has been developed.

Cell parameters are confirmed by CNAM electrochemical's lab in Paris, France.

One Russian patent pending, seven international patents pending .

## **MARKET POTENTIAL /**

Recuperators and impulse current source for electric vehicles.

Grid energy storage, renewable energy sources integration.

Average super-capacitors annual market growth is 30%.



## **THE TEAM /**

**Anatoly Dolgolaptev**, Sc.Dr. Tech., CEO and scientific director of the project.

**Vyacheslav Filin**, Sc.Dr. Tech., head designer for the project, former director of development of complex space systems.

**Oleg Dashko**, PhD. Tech., dep. CEO, owns 50 copyright certificates and patents.

*Team consists of 6 PhD scientists, 11 Doctors of Sciences and over 40 qualified researchers and engineers.*

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## NEW SILICON TECHNOLOGIES

# SILICON CARBIDE SEMICONDUCTOR SUBSTRATES WITH ENHANCED ELECTRICAL AND THERMAL CONDUCTIVITY WITH EXCEPTIONALLY FEW DEFECTS

### COMPETITIVE ADVANTAGES /

The technology for creating SiC/Si is cheaper than rival solutions.

SiC/Si plates conduct heat and electricity better. Silicon can easily be removed, and this means that independent plates with thick layers of silicon carbide and gallium nitride can be obtained.

### ESSENCE OF INNOVATION /

SiC/Si epitaxy, whereby a porous layer between the SiC and the Si is formed directly during the growth process.

The porous layer leads to significant relaxation of the springy tension between the Si and the SiC and, as a result, to a large reduction in the number of defects in the SiC.

### RESULTS ACHIEVED /

To date the following have been achieved:

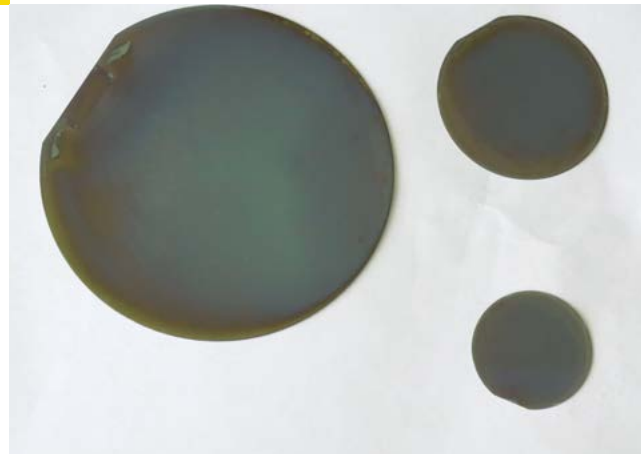
- SiC/Si plates with a diameter of 6 inches,
- GaN heterostructures on SiC/Si plates with a diameter of 2 inches.

2 Russian patent applications and several international ones have been submitted.

### MARKET POTENTIAL /

The global market for semiconductor substrate appliances amounts to tens of billions of dollars a year.

In real terms the market amounted to over 9 bln square inches of substrates in 2012.



### THE TEAM /

**Andrey Lukyanov**, PhD. Tech., project director, CEO.

**Sergey Kukushkin**, Sc.Dr. Phys. and Mathematics., Prof., key developer. Hirsch index 13.

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## ENERGOTEHNIKA

# HEAT EXCHANGERS FOR HEATING SYSTEMS.

# UTILITY COMPANIES CAN SAVE UP TO 30% ON MAINTENANCE COSTS

### COMPETITIVE ADVANTAGES /

The heat conduction coefficient is 1.5-2.5 times higher while the hydraulic resistance, salt and deposit formation are lower than heat exchangers currently in use.

A compact design that can withstand thermal and hydraulic impacts.

Production and maintenance costs are up to 30% less.

### ESSENCE OF INNOVATION /

Cellular heat exchangers that use Spin-Cell swirl pipes.

The heat exchanging efficiency is increased by swirling the liquid passing through the pipes.

A cellular design with no pipe board.

The space between the pipes is taken up by hollow spiral ribs.

### RESULTS ACHIEVED /

Prototype heat exchangers are used in the Chelyabinsk Region to heat water.

Installation agreements for prototype heat exchangers were signed with OJSC MOEK, OJSC Samaraneftgaz, CJSC KES.

Laureate of the Civil Technologies for Defence 2012 contest.

### MARKET POTENTIAL /

The market for heat exchangers in Russia is growing at 15% per year. The potential market for heat exchanging pipes that swirl the water flow is over 1 billion RUB (utilities only).



### THE TEAM /

**Alexander Lebedev**, a correspondent member of the REA, developer of the technology, general director/project leader.

**Yuri Kuzma-Kichta**, Sc.Dr. Tech., professor at Moscow Power Engineering Institute, scientific consultant.

**Sergey Lebedev**, promotion manager.

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# A BREAKTHROUGH TECHNOLOGY FOR THE GLOBAL MARKET OF EURO-5 HIGH OCTANE PETROL, BASED ON COMBINING THE CATALYTIC AND RECTIFICATION PROCESSES IN A SINGLE DEVICE

## COMPETITIVE ADVANTAGES /

CAPEX is less than a third of those of the competition.  
 Energy consumption is less than a fifth of that of the competition.  
 Compliance with EURO-5, MSAT-2 standards.

## ESSENCE OF INNOVATION /

The catalytic and rectification processes take place in the same device (an isomerisation reactor, a hydraulic isomerisation reactor, a rectification system).

## RESULTS ACHIEVED /

A prototype was tested successfully and an independent assessment of the new catalysts was made.

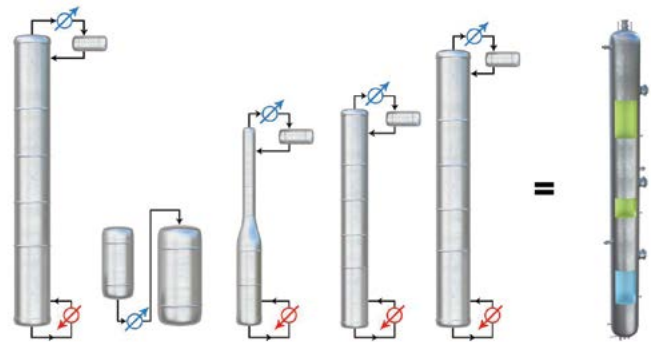
First contracts were signed in Russia and abroad.

3 prototypes are being designed for industrial use.  
 Offices have been opened in the US and India.

1 patent has been received and 3 international patent applications have been submitted.

## MARKET POTENTIAL /

The global market for high octane petrol is over 16 billion USD.  
 The number of oil refineries is expected to increase 2.5 times by 2030.



## THE TEAM /

**Oleg Giyazov**, director in Russia, key developer.

**Oleg Parpuz**, Ph.D. Tech., R&D director, key developer.

**Douglas Harris**, general director, ex vice president of British Petroleum.

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**NOVAS SK**

# THE NEW TECHNOLOGY TREATS OIL RESERVOIRS WITH PLASMA IMPULSES TO INCREASE THE OIL RECOVERY OF WELLS BY A FACTOR OF 2

## COMPETITIVE ADVANTAGES /

Plasma impulse technology treats oil reservoirs to increase the oil recovery of wells by a factor of 2. Environmentally friendly process. Payback period of under 6 months. 90% success rate. High effectiveness of repeat treatments.

## ESSENCE OF INNOVATION /

The device generates powerful plasma impulses inside an oil well (up to several thousand impulses per well) that propagate through the oil reservoir cleaning the perforation intervals from sealing particles, salts and asphalt-paraffin compounds.

## RESULTS ACHIEVED /

The technology was successfully used in more than 150 wells in Russia and the US. An office has been opened in Houston, Texas. 6 patents have been received in Russia and 1 in the US. A co-investor for North America has been found.

## MARKET POTENTIAL /

The market for oil services is over 250 billion USD. The market for technologies to increase oil recovery is over 26 billion USD. The number of oil wells in the world is over 1.5 million.



## THE TEAM /

**Nikita Ageev**, Ph.D. Econ., general director.

**Anatoly Molchanov**, Sc.Dr. Tech., R&D director, developer of the technology.

**Valentin Strelchenko**, doctor of technical sciences., provost of the Russian State University of Oil and Gas.

**Joe Herley**, former senior advisor to Texaco.

*The team has a total of 13 people, including 4 doctors and 4 candidates of sciences affiliated with leading Russian universities.*

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# SOLUTIONS BASED ON EFFICIENT USE OF THE THERMAL ENERGY DURING THE OIL AND GAS PROCESSING AT OIL REFINERIES REDUCE ENERGY CONSUMPTION BY 20%

## COMPETITIVE ADVANTAGES /

A set of technical solutions that can together reduce energy consumption at an oil refinery by 10-20%.  
 Reduced percentage of oil that goes to waste or is used in-house from 5-7% to 3-4%.  
 Imperial College London is the R&D partner.

## ESSENCE OF INNOVATION /

Set of technologies:

- New high efficiency catalysts, equipment and methods;
- Increased heat exchange and use of low grade heat;
- Reduced Carbohydrates transportation costs due to reduced viscosity, friction and deposits.

## RESULTS ACHIEVED /

R&D facilities has been established and 12 subprojects have been launched.  
 BP has been brought in as a partner and investor.  
 2 international patent applications have been submitted.  
 19 articles have been published in international journals.

## MARKET POTENTIAL /

On a global scale, reduction in the energy consumption of the oil refining process by 15% will save over 4 billion USD per year.  
 The amount of oil that is used in-house or goes to waste every day across the world is over 5 million barrels.

## THE TEAM /



**Pavel Snytnikov**, Ph.D. Chem., director.

**Oleg Marianov**, Sc.Dr. Chem., R&D manager of the project.

**Sandro Macetto**, Ph.D., R&D manager of the project, Professor of Imperial College London.

*There are a total of 40 Russians and 30 from Imperial College London in the team.*

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## OPTOGAN. NEW TECHNOLOGIES OF LIGHT

# A NEW CLASS OF LED LIGHT SOURCES WITH INCREASED LIGHT OUTPUT BASED ON INTEGRATED AI MODULES CAN REDUCE THE COST OF DOMESTIC LED LAMPS TO 10 USD

### COMPETITIVE ADVANTAGES /

The light output of an integrated module exceeds 130 lumen per watt.  
Colour Rendering Index CRI >94.4.  
The cost of a consumer LED lamp is no more than USD 10.  
Lamps can be designed to have beams of any shape.

### ESSENCE OF INNOVATION /

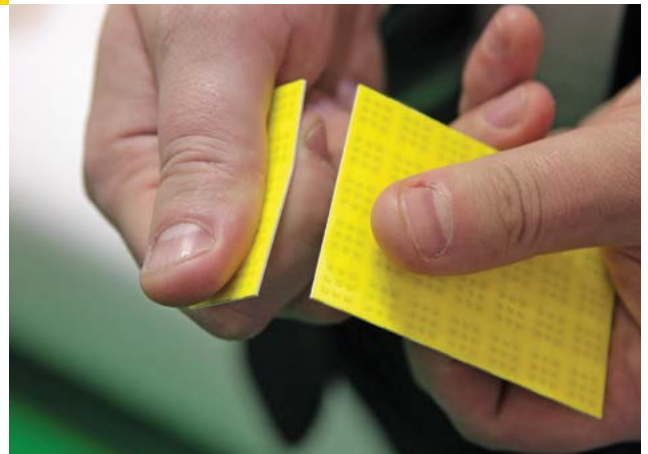
A qualitative leap to a completely integrated smart lighting scheme (module).  
A single wafer housing the diode, the driver, and the optics.  
A completely new class of energy efficient multifunctional integrated lighting systems.

### RESULTS ACHIEVED /

Trial batches of the Optogan X10 LED module are being manufactured.  
5 patent applications have been registered, 1 in Russia, 1 in Taiwan and 3 in PCT.  
in 2013 Optogan X10 LED was named Product of the Year by the German industry magazine Elektronik.

### MARKET POTENTIAL /

By 2015 the market for LED lamps replacing standard lamps will exceed 3 billion USD while the market for lamps themselves can reach 5 billion USD.  
This market segment grows at about 80% per year.



### THE TEAM /

**Vladislav Bugrov**, Ph.D. Phys. and Math., author of 50 patents and patent applications, executive vice president.

**Aleksey Kovsh**, Sc.Dr. Phys. and Math., executive vice president, author of more than 400 scientific articles and 10 patents.

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**Sk**  
Biomed

# UNIVERSAL BIODEGRADABLE INTRAVASCULAR IMPLANTS (Stents), WHICH RESTORE BLOOD CIRCULATION. AN ALTERNATIVE TO METAL ANALOGUES

## COMPETITIVE ADVANTAGES /

Restore blood circulation in vessels like metallic stents, but in contrast to them they dissolve completely after one year. The vessel restores its normal function, including motility.

They prevent local inflammation at the site of positioning and restenosis.

## MAIN POINTS OF INNOVATION /

Use of innovative multi-component polymer compound as the material for stents has the following advantages:

- It simplifies the design of stents;
- It improves the mechanical properties as compared with existing stents.

## ACHIEVED RESULTS /

A thermoplastic polymer compound has been developed.

Prototypes of biodegradable stents with specified mechanical parameters have been obtained.

A primary test for histocompatibility and biological safety has been performed.

Patent protection of the technology has been implemented.

## MARKET POTENTIAL /

The global market for coronary stents in 2016 will reach \$ 10.6 billion\*.

Expected market annual growth rate - 8.3% \*.

\* (BCC Research estimate).



## THE TEAM /

**Yegor Lukyanov**, General Director.

**Oksana Manzenyuk**, Candidate of Medical Sciences, Deputy General Director, Project Manager.

**Nikolai Solovyov**, Doctor of Physical and Mathematical Sciences., Chief of Laboratory of Laser Discharges, Institute of Mechanics of the Russian Academy of Sciences (IPMech RAS).

**Dmitry Kapustin**, Candidate of Chemical Sciences, "Polymers for Biology" laboratory, M.M. Shemyakin and Yu.A. Ovchinnikov. Institute of bioorganic chemistry of the Russian Academy of Sciences (IBCh RAS).

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**REGENEX**

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# **AUTOLOGOUS T-REGULATORY CELL VACCINE FOR AUTOIMMUNE DISEASES TREATMENT WITHOUT TOTAL IMMUNE SUPPRESSION**

## **COMPETITIVE ADVANTAGES /**

Lower costs with higher efficacy compared to standard therapy.  
Compensation for regulatory cells.  
No negative systemic effects on the immune system, individual intolerance which is characteristic for conventional immunosuppressive drugs is also lacking.

## **MAIN POINTS OF INNOVATION /**

Patented way of autologous regulatory T-cell expansion provides a 1500-fold increase in the number of cells within a short period of time (6 days).  
The vitality and full capacity of expanded cells.

## **ACHIEVED RESULTS /**

Pilot clinical trials for remitting multiple sclerosis and GVHD have been successfully completed.  
These trials have demonstrated the safety and efficacy of this method (9 patients with RMS, 7 patients with GVHD).  
Patents have been received in the Russian Federation, the application for patent has been filed in the USA.  
Planned date of commercialization is 2017.

## **MARKET POTENTIAL /**

More than 2.5 million people worldwide suffer from multiple sclerosis.  
Total number of patients with autoimmune diseases is more than 40 million.  
Cell technologies, including the development of a Treg vaccine, is a unique innovative approach in the treatment of autoimmune diseases.



## **THE TEAM /**

**Vladimir Mukhin**, General Director.

**Svetlana Bykovskaya**, MD, Prof., Project Research Manager.

**Mikhail Schurin**, MD, PhD, scientific consultant.

**Yevgeny Nasonov**, scientific consultant.

**Leslie P. Weiner**, Prof. of Neurology and Molecular Microbiology and Immunology at the Keck School of Medicine of the University of Southern California (USA), scientific consultant.

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**TEST FOR EARLY THROMBOSIS  
DIAGNOSIS.  
OPPORTUNITY TO PREDICT A  
«VASCULAR CATASTROPHE»**

**COMPETITIVE ADVANTAGES /**

Method of thrombodynamics-4D allows detecting thrombosis at the early stage, when early treatment can prevent the development of life-threatening conditions.

**MAIN POINTS OF INNOVATION /**

Method of thrombodynamics-4D is used for whole blood and has high sensitivity to hypo- and hypercoagulable states indicating abnormal blood conditions.

**ACHIEVED RESULTS /**

Laboratory samples have been created. The results of the first pre-clinical trials have been published.

Major clinical trials for the device are going to be completed, and the recommendations for its use are under development.

Its introduction into clinical practice is currently planned.

Term is 2015.

**MARKET POTENTIAL /**

A unique technology, which has no analogues in the world.

Due to the extreme urgency in identifying thrombosis at the early stage this method is in high demand in the global market.



**THE TEAM /**

**Igor Pivovarov**, General Director.

**Andrei Kondratovich**, Executive Director.

**Fazly Atullakhanov**, Doctor of Physical and Mathematical Sciences, Prof., Research Director.

**Mikhail Panteleev**, Cand. Sc. (Biology), Doctor of Physical and Mathematical Sciences, Head of Science Department.

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# NOVEL CANCER DRUG, WHICH DOES NOT CAUSE NORMAL DNA DAMAGE

## COMPETITIVE ADVANTAGES /

The drug acts directly on several targets in the tumor cell, reducing its ability to produce drug resistance and increasing the efficiency of tumor growth suppression.

Due to the lack of genotoxicity safe long-term use is possible.

## MAIN POINTS OF INNOVATION /

A new class of drugs (first-in-class), fundamentally different from the existing drugs, developed by other international companies insofar as the mechanism of action and efficacy are concerned.

Curaxins do not cause DNA damage, as opposed to conventional chemotherapeutic agents.

## ACHIEVED RESULTS /

- CBL0102

Phase I clinical trials (RF) have been completed.

Phase I/II clinical trials of combination with erlotinib (USA) were launched.

- CBL0137

Equator of Phase I clinical trials (RF).

Start of Phase I clinical trials (USA).

Date of drug release is 2016 in the Russian Federation, 2018 in the USA.

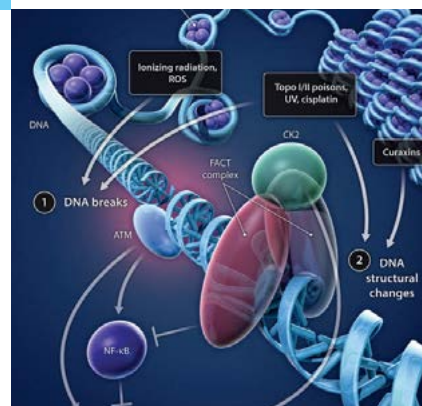
Worldwide patents are owned by Incuron LLC.

10 invention patents, 26 international applications that during 2013-2014 will become national patents covering the world's pharmaceutical market.

## MARKET POTENTIAL /

Oncological diseases hold the leading positions in the structure of morbidity and mortality.

Segment of targeted anticancer drugs is 65-70% of the total market.



## THE TEAM /

**Andrei Leonov**, Candidate of Chemical Sciences, General Director.

**Roman Ivanov**, Candidate of Chemical Sciences.

**Ramiz Salimov**, Doctor of Biological Sciences.

**Polina Shpigotskaya**, Candidate of Medical Science.

**Andrei Gudkov**, Doctor of Biological Sciences, Roswell Park Cancer Institute.

**Andrei Purmal**, Candidate of Chemical Sciences, Cleveland Biolabs.

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## MEDICINE FOR TREATMENT OF AUTOIMMUNE DISEASES AND CHRONIC LYMPHOCYTIC LEUKEMIA HAVING A POWERFUL THERAPEUTIC POTENTIAL

### COMPETITIVE ADVANTAGES /

A unique mechanism of TAV08 action on the key stages of pathogenesis by restoring the balance of different types of cells, but not by eliminating the consequences of autoimmune disease pathogenesis.

### MAIN POINTS OF INNOVATION /

A unique Russian drug for treatment of B-cell chronic lymphocytic leukemia and autoimmune diseases.

### ACHIEVED RESULTS /

The first phase of clinical trials for TAB08 has been completed.

Since the launch of the project 10 international patents (PCT, US), including for developed in-vitro technology resTore have been received.

All intellectual property is owned by TheraMAB LLC.

### MARKET POTENTIAL /

Involving an additional round of funding will allow completing Phase 3 clinical trials for TAV08 in the Russian Federation or other countries and launch TAV08 in the market.

At the moment, there is evidence of a powerful therapeutic potential of TAV08.

На данный момент есть данные, свидетельствующие о мощном терапевтическом потенциале TAB08.

### THE TEAM /

**Dmitry Tyrsin**, Ph.D University of Würzburg, General Director.

**Alexei Matskevich**, Candidate of Biological Sciences, Research Director.

**Yuri Fedotov**, Pre-clinical and Clinical Research Director.

**Mikhail Panteleev**, Candidate of Biological Sciences, Head of Science Department.

**Daniil Nemenov**, Clinical Research Manager.

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## ORIGINAL PEPTIDE DRUGS FOR TREATMENT OF NEUROLOGICAL AND AUTOIMMUNE DISEASES

### COMPETITIVE ADVANTAGES /

The technologies for obtaining the pharmaceutical substances of peptide drugs with a wide range of indications for clinical use have been developed. Modern methods of synthesis and purification were used.

### MAIN POINTS OF INNOVATION /

The lines of original «non-invasive» forms of peptide drugs and ways of their delivery to the body have been developed.

### ACHIEVED RESULTS /

Stemokine has been approved for the Russian market.

IBCh-07Me passes Phase I studies.

IBCh-05OH passes Phase I studies.

C12-OB passes pre-clinical studies.

Thymodepressin was approved for sale in the Russian Federation.

### MARKET POTENTIAL /

New original peptide drugs are intended for treatment of a number of socially significant diseases. These drugs are desired in the global pharmaceutical market.



### THE TEAM /

**Vladislav Deygin**, Doctor of Biological Sciences, Candidate of Chemical Sciences, Prof., General Director.

**Vadim Ivanov**, member of RAS, Doctor of Chemistry, Prof., Project Research Manager.

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## QUANTUM PHARMACEUTICALS

# DRUG PRODUCT AGAINST HIV/AIDS WITH A UNIQUE MECHANISM OF ACTION DEVELOPED USING COMPUTER-BASED MODELLING

### COMPETITIVE ADVANTAGES /

A unique low molecular weight compound with a mechanism of action (an inhibitor of glycolysis), based on inhibition of p17/MA protein activity of human immunodeficiency virus (HIV), has been developed.

### MAIN POINTS OF INNOVATION /

Developed drugs have a fundamentally new mechanism of action and do not produce severe side effects.

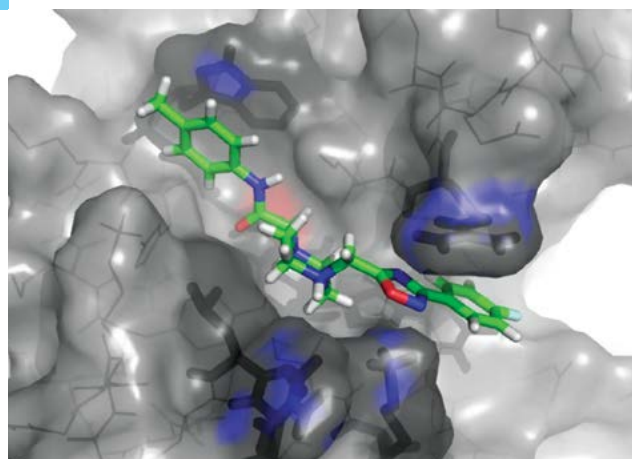
The basis of the drugs are low molecular weight compounds «designed» by means of computer simulation.

### ACHIEVED RESULTS/

Pre-clinical trials for both molecules.  
The compound inhibits the activity of protein r17/MA and has a low level of toxicity in vitro.  
2014-2015 - conducting Phase 1 and 2 clinical trials.  
Product release: 2015.  
Patent applications in the Russian Federation, Germany, USA and Japan.  
7 publications in the international scientific journals.

### MARKET POTENTIAL /

Control of cancer and HIV worldwide is one of the major challenges of modern medicine.



### THE TEAM /

**Peter Fedichev**, Doctor of Physical and Mathematical Sciences, General Director and Research Director.

**Maxim Kholin**, Deputy General Director, LEONID MENSHIKOV, Head of Theoretical Department.

**Alexander Kadushkin**, Candidate of Chemical Sciences, Head of Chemistry Department.

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# TECHNOLOGY OF EXTREMITY PROSTHESIS MANAGING WITH THE AID OF BRAIN-COMPUTER INTERFACE

## COMPETITIVE ADVANTAGES /

A technology for comfortable non-invasive control by manipulator (including prosthesis) is now under development.

The technology will allow varied and precise movement of the prosthesis / manipulator.

## MAIN POINTS OF INNOVATION /

Neural controller will allow detecting volitional impulse to different movements in the patterns of human biological currents and transform them into commands for prosthesis electromechanical actuators. A person will be able to move prosthesis / manipulator with mere intention to action.

## ACHIEVED RESULTS /

2013-2014 - The development and improvement of neural controller prototype.

2015-2016 – Release of neural controller into the market.

8 scientific articles in the international and Russian journals have been published.

## MARKET POTENTIAL /

Precision of processing and detection of brain signals is up to 95%, compared to 80 - 85% for the most advanced international interfaces.



## THE TEAM /

**Alexander Kaplan**, Doctor of Biological Sciences, Prof.

*The project involves an experienced team in the area of neurophysiology, with many years experience in successful research in the field of human neurophysiology at major Russian and foreign specialized centers (Japan, Germany, South Korea).*

## CONTACTS /

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## NEW LOW-TOXICITY DRUG FOR KIDNEY CANCER TREATMENT

### COMPETITIVE ADVANTAGES /

Previously, this molecule has never been used as a target in treatment of renal cell carcinoma. New drug is capable of inhibiting tumor growth by more than 90%, has low immunogenicity and toxicity due to high levels of human protein (93%).

### MAIN POINTS OF INNOVATION /

OM-RCA-01 is an antiangiogenic drug on the basis of monoclonal antibodies to the fibroblast growth factor receptor for cancer treatment.

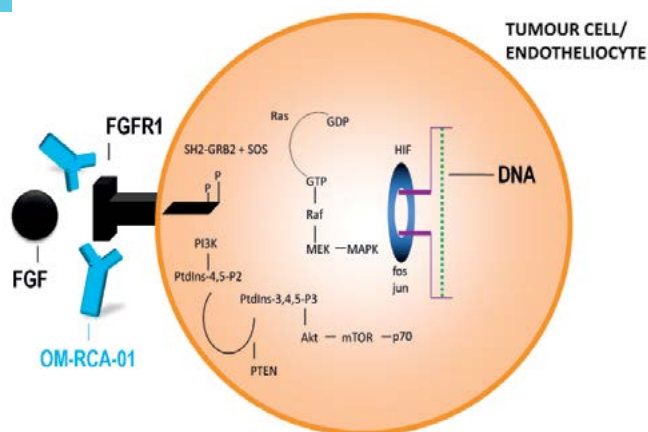
### ACHIEVED RESULTS /

Antibody humanization has been performed; producer has been developed. Efficacy in vitro and in vivo has been confirmed. Preclinical safety studies were initiated. Patents have been received in the Russian Federation and USA. 6 scientific articles, including articles in the International Journal of Cancer, have been published.

### MARKET POTENTIAL /

Drugs based on monoclonal antibodies to fibroblast growth factor receptor are practically unavailable on the market.

Drugs available on the market for treatment of renal cell carcinoma (United States, Japan and the EU) amounts to about \$ 950 million. Russian market capacity is about 5 billion rubles.



### THE TEAM /

**Elina Zaveleva**, Cand. Sc. (Biology), General Director.

**Ilya Timofeev**, Scientific Consultant, author of development.

### COMPANY PARTNERS:

Research and Development – PX'Therapeutics, Goodwin Biotechnology, Genetika, EUGENEX Biotechnologies, Charles River. Company management – Maxwell Biotech Group.

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Skolkovo Grantee

**BIOSOFT.RU**

25

# INFORMATION PLATFORM FOR BIOMEDICAL DATA ANALYSIS AND DEVELOPMENT OF INNOVATIVE DRUG PRODUCTS

## COMPETITIVE ADVANTAGES /

The high modularity of the platform will allow developing a large number of programs covering all areas of bioinformatics and systems biology, necessary to develop innovative medication.

## MAIN POINTS OF INNOVATION /

Conveyor system «from the genome to the drug» for conducting research in the area of biomedical data analysis and drug discovery with the use of software modules for BioUML platform and experimental validation of the computer forecast.

## ACHIEVED RESULTS /

First commercial version of the platform successfully commercialized under the name geneXplain platform has been launched. A prototype of BioStore trading platform has been developed and launched into operation.

85 research papers have been published in the Russian and international journals.

## MARKET POTENTIAL /

The global bioinformatics market will reach \$ 8.3 billion in 2014, while the bioinformatics platform market will be the largest and is estimated to stand at \$ 3.9 billion.



## THE TEAM /

**Alexander Kel**, Cand. Sc. (Biology), General Director.

**Fedor Kolpakov**, Cand. Sc. (Biology), Executive Director.

**Vladimir Poroykov**, Doctor of Biological Sciences, Prof., Research Director.

**Edgar Vingender**, Prof., Director of Bioinformatics Department, University Medical Center Göttingen.

**Alexander Tropsha**, Prof. and Deputy Dean for Academic Affairs in Eshelman School of Pharmacy, UNC-Chapel Hill, NC, USA.

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**SK**  
Nuclear

## CORPORATION OF NUCLEAR CONTAINERS

# MOBILE FACILITY FOR DECONTAMINATION TERRITORIES FROM RADIONUCLIDES, MERCURY AND OTHER HEAVY METALS. USING THE SYSTEM REDUCE THE DISPOSAL VOLUME OF SOIL UP TO 5 TIMES

### COMPETITIVE ADVANTAGES /

- System mobility.
- Selectivity of soil purification – 70–95%.
- Reduction of operational costs in comparison with existing solutions – 3–5 times.
- Productivity – up to 5 tonnes/hour for soil purification.

### ESSENCE OF INNOVATION /

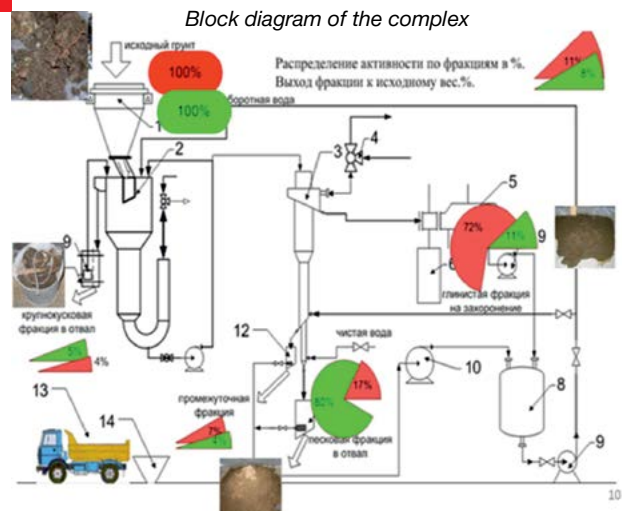
- The method is based on properties of the soil whereby over 80% of radio nuclides and heavy metals are concentrated in the fine clay fraction, which constitutes 10% of the mass of the original soil.
- The technology of fractioning an aqueous suspension of soil in teeter water is used.

### RESULTS ACHIEVED /

- Contaminated soil processing technology was developed and a stationary laboratory installation was produced.
- Tests on the soils contaminated with radionuclides were carried out.
- A 5-times reduction in the mass of the soil requiring disposal was demonstrated.

### MARKET POTENTIAL /

- The Russian market for radioactive waste disposal alone is worth an estimated 400 billion RUR.
- Under the Federal Targeted Programme of Nuclear and Radiation Safety, 10–11 billion RUR will be set aside each year between 2013 and 2015 in order to solve problems.



According to the Hydromet for 2011, only in Russia more than 60 thousand square kilometers areas in excess of the allowable health standards for grounds.

### THE TEAM /

**Anna Chernikova**, general director of the company.

**Mikhail Radchenko**, project manager, head of the group of companies working in the field of engineering, handling radioactive waste and spent nuclear fuel. Partner at the FLUOR Group.

**Nikolay Naumenko**, PhD in chemistry, technical director, expert in the field of technology and equipment, handling radioactive waste and spent nuclear fuel. 1975 – 2009 – deputy director of JSC VNIINM unit.

**Evgeniy Nikolsky**, chief engineer, designing equipment handling radioactive waste and worked out nuclear fuel.

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## SUPEROX-INNOVATIONS

# SUPERCONDUCTING MATERIALS FOR POWER, ELECTRICAL ENGINEERING, TRANSPORT AND MEDICAL APPLICATIONS. MATERIAL PRICE IN 5-10 TIMES BELOW THE MARKET

### COMPETITIVE ADVANTAGES /

Reduction in the cost of finished products (high-temperature, second-generation superconductor-tapes) by means of the flexible combination of various technological approaches.

Production of a superconductor in accordance with the needs of the each customer, due to the ability to promptly reorganize the technological process.

### ESSENCE OF INNOVATION /

Concept of hybrid superconductor and methods of its production.

The business model for the project's development as an accelerating centre, focused on bringing in developers of devices made from superconducting tape.

Ability to customize the tape for specific applications.

### RESULTS ACHIEVED /

The main components of this hybrid technology were developed at the International superconductivity center (in Tokyo), at JSC Superox, and at the chemistry faculty of Moscow State University:

- RABiTS
- MOCVD
- PLD/IBAD

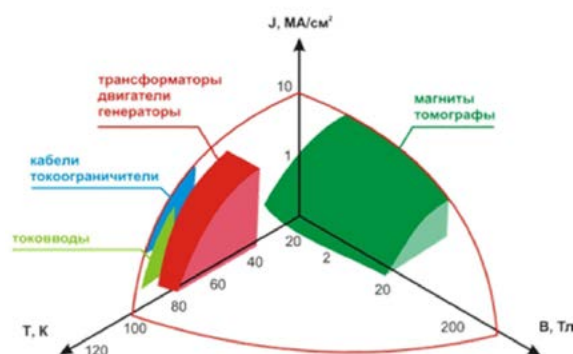
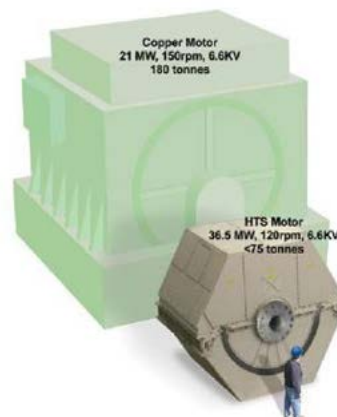
A world-class team of professionals has been created.

### MARKET POTENTIAL /

The market for superconductor materials has risen to 1 billion USD, with a growth rate of 12%.

The proportion of high-temperature superconducting tape (HTST) has risen to 60%.

29 thousand km of high-temperature superconducting tape is estimated to be produced by 2020.



### THE TEAM /

**Andrey Kaul**, research project manager.

**Vladimir Matias**, technical expert.

**Sergey Lee**, ISTECS's technical expert.

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**AXION-RDM****ION EXCHANGE SELECTIVE SORBENTS FOR ADAPTIVE EXTRACTION OF RARE EARTH AND PRECIOUS METALS.****THE EFFECTIVENESS OF THE SORBENT IN 10 TIMES HIGHER IN COMPARISON WITH FIRST-RATE ANALOGUES****COMPETITIVE ADVANTAGES /**

Adaptive selectivity.  
Efficiency of extraction of metals from high acidity solutions.  
Exchange capacity is higher than equivalent systems around the world.  
Reusability is possible.

**ESSENCE OF INNOVATION /**

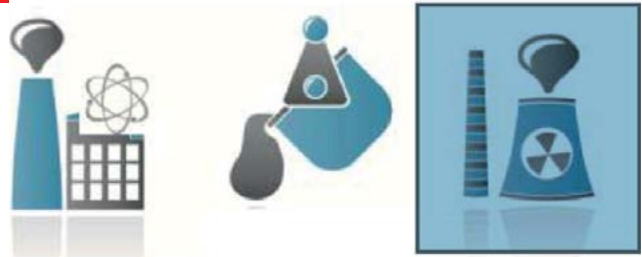
Adaptivity of basic polymer related to use in specific applications, enabling high selectivity and efficiency to be achieved.  
High-quality results are achieved as a result of the formation of specific macromolecular metal compounds with polymeric matrix.

**RESULTS ACHIEVED /**

Laboratory samples of ion-exchange resins were prepared.  
Pilot installation at JSC Acron, JSC Uralelektromel has been commenced.  
Intellectual property protection, including international patents.  
Laboratory set-up of ion-exchange resins synthesis was created.

**MARKET POTENTIAL /**

The market for ion-exchange sorbents amounts to around 500 million USD a year, while the capacity of the Russian market is 50 million USD.  
Share of imported production in the Russian market – 80% Main market areas – mining industry; production of fertilizer.

**THE TEAM /**

**Dmitry Kondrutsky**, PhD in chemistry, general director, inventor of technology.

**Alexander Bobrov**, executive director.

**Victor Kablov**, scientific consultant, doctor of chemistry, professor.

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**UIC**

# SOLID OXIDE FUEL CELL (SOFC) POWER PLANT - AUTONOMOUS ECO-FRIENDLY ENERGY SOURCE ON THE HYDROCARBON FUEL

**COMPETITIVE ADVANTAGES /**

Efficiency of conversion of chemical energy fuel into electrical – up to 70%, which cannot be achieved by rival technologies.  
 Extended period of continuous performance – more than 44 000 hours.  
 Ability to use any hydrocarbon raw materials containing sulfur compounds and water as fuel.  
 Environmentally friendly.

**ESSENCE OF INNOVATION /**

Algorithms and intellectual hardware and complex program software.  
 Technological modes of electric power installation providing the most effective, safe and independent operation of the electrochemical generator based on solid oxide fuel cell.

**RESULTS ACHIEVED /**

Prototype of electric power installation has been developed and built, preparation for factory service tests (at Gazprom’s site) has been carried out.  
 Work on patenting of technical and design solutions for the unit are being carried out.

**MARKET POTENTIAL /**

Creation of manufacture with total products sales of more than 30 billion RUR annually that will allow to enter the world global market with total volume of 859 billion.  
 By 2020 total amount of sales of electric power installations based on solid oxide fuel cell for various branches will amount to more than 74 000 units worth more than 132 billion RUR.



**THE TEAM /**

**Nikita Plotnikov**, general director of JSC UIC; experience in implementing and investing in innovative projects.

**Andrey Misyura**, chief designer; experience in developing and operating rocketry management systems.

**Julia Volkova**, chief marketing specialist.

**Alexey Mitin**, chief designer in the field, development of technological process control systems.

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## SIEMENS RESEARCH AND DEVELOPMENT CENTRE

# SOLID-STATE MICROWAVE GENERATOR. SEMICONDUCTOR REVOLUTION IN UHF EQUIPMENT. TECHNOLOGY FOR A WIDE RANGE OF APPLICATIONS - FROM MEDICAL DIAGNOSTIC EQUIPMENT TO THE PARTICLE ACCELERATOR

### COMPETITIVE ADVANTAGES /

Small dimensions, reliability and high performance of semiconductor HF generators of high power. Ability to create compact particle accelerators for a vast scope of application – fundamental physics, nuclear medicine and applied science.

### ESSENCE OF INNOVATION /

Technology of combining of power efficiencies of several dozen transistors, to obtain a power efficiency of 3-5 MW.

Semiconductor technology for microwave generators replaces old-fashioned and bulky lamp technology in the generation of powerful microwave pulses.

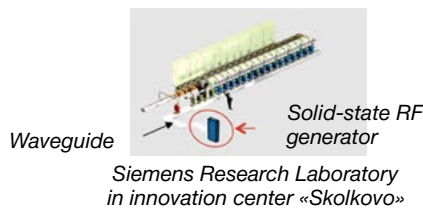
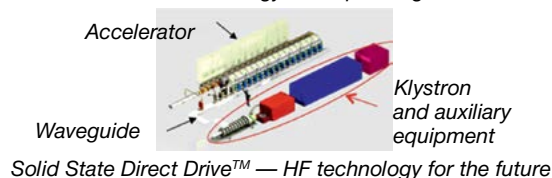
### RESULTS ACHIEVED /

Generators with a power efficiency of up to 5 MW and frequency of up to 700 MHz are under development. Among the potential customers are: ESS, Siemens Medical Solutions, D.V. Yefremov Research Institute for Electrophysical Apparatus. Organization of a joint manufacturing facility with the G. I. Budker Institute of Nuclear Physics is in the plan view (Novosibirsk).

### MARKET POTENTIAL /

Volume of the market of HF generators – about 1.5 billion USD, including 5–9% – instruments for scientific use. 4 large European accelerating projects, to be implemented within the next 10 years, require about 840 HF systems – the total value of the market is about 0.5 billion USD.

Traditional technology of RF power generators



### THE TEAM /

**Stepan Polikhov**, project manager, employee of department of CT Siemens Russia in 2007 - 2012.

**Martin Gitzels**, general director of JSC Siemens Research and Development Centre.

**Oliver Hyde**, researcher of Siemens AG, manager of department of Siemens Healthcare, author of the concept of Solid State Direct Drive™.

**Evgenia Levichev**, Doctor of Physical and Mathematical Sciences, prof. of G. I. Budker Institute of Nuclear Physics, (Novosibirsk); has developed a variety of accelerating installations.

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## LaserSpark

# COMPACT HIGHLY STABLE FEMTOSECOND LASER WITH PARAMETERS PROVIDING A BROAD APPLICATION IN MEDICINE AND INDUSTRY. HIGH STABILITY OF LASER OPERATION AND 1.5 TIMES CHEAPER PRICE THAN EXISTING EQUIVALENTS

### COMPETITIVE ADVANTAGES /

Substitution of «manual» operations in eye microsurgery.  
 High stability of parameters for laser radiation, absence of adjustable elements.  
 Reasonable price (up to 1.5 times cheaper than existing equivalents).

### ESSENCE OF INNOVATION /

Completely fibre-based femtosecond laser:

- no manual adjustment elements and unreliable, expensive semiconductor impregnable mirrors,
- modulators of laser radiation based on graphene and carbon nanotubes in self-start mode, and synchronization of modulators.

### RESULTS ACHIEVED /

Fiber master oscillator of laser system was created:

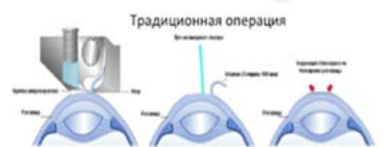
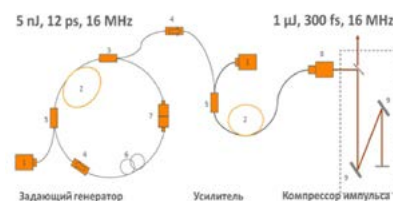
- Laser pulse energy of up to 10 nJ;
- Frequency - up to 1 MHz;
- Duration - up to 250 fs;
- The stability of the laser pulse parameters -  $\pm 5\%$ ;

An application for a patent for the invention of the Russian Federation.

### MARKET POTENTIAL /

The global market for ophthalmologic lasers is so far worth only 606 million USD. By 2015, with a market growth rate of 6.37% a year, the market will have grown to 880 million USD.  
 Capacity of the Russian market for femtosecond lasers for ophthalmology is estimated to be worth 50 units or 75 million RUR a year.

Schematic of the femtosecond fiber laser



### THE TEAM /

**Konstantin Popov**, general director of JSC LaserSpark. Founder and participant of technological start-ups.

**Sergey Vartapetov**, research manager, director of the Centre of physical instrumentation of Institute of General Physics of Russian Academy of Sciences.

**Igor Veselovsky**, manager of research group.

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## TEKHNOSCAN-LAB

# LASER SYSTEMS FOR A NEW GENERATION OF INFO-, NANO- AND BIOTECHNOLOGIES. HIGH QUALITY LASER SYSTEMS FOR RESEARCH AND DEVELOPMENT MARKET

### COMPETITIVE ADVANTAGES /

- Broad range of change of radiation parameters in systems with automatic reorganization of narrow spectral line.
- Laser systems with a unique set of parameters are 25% cheaper than the best installations of competitors.

### ESSENCE OF INNOVATION /

Framework of the laser system allowing to receive record-breaking high energies of pulses without use of additional amplifying stages in the master oscillator.

The spectral range varies due to the selection of different active media or wavelength conversion with the help of additional modules.

### RESULTS ACHIEVED /

- Constructions of next-generation fiber, solid-state and hybrid laser systems have been developed.
- Mode of smooth automatic scanning of narrow emission line in a relatively simple diagram of adjustable laser was implemented.

### MARKET POTENTIAL /

Size of the laser systems market – 7.9 billion USD in 2011, expected growth by 2017 – up to 14-20 billion USD.

Estimates of the segment of lasers for research and development amount to 5 to 10% of the total size of the laser systems market.



### THE TEAM /

**Sergey Mikhailovich Kobtsev**, general director. Author/co-author of more than 200 scientific publications and more than 10 patents. Over 30 years' experience in research and development and deliveries of advanced laser systems and laser equipment.

**Sergey Vladimirovich Kukarin**, development and tests of laser systems. More than 120 scientific publications and 2 patents.

**Alexey Vladimirovich Ivanenko**, optimization of parameters of laser systems. Experience of working at the Institute for the technologies of photonics at Aston University (Birmingham, Great Britain).

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## OPTOGARD-NANOTECH

# LASER- PLASMA NON-VACUUM TECHNOLOGY FOR THE ULTRA-HARD COATINGS AND SURFACE-MODIFICATION TREATMENT. THE TECHNOLOGY PROVIDES 7-10 TIMES HIGHER PRODUCTION RATE OF ULTRA-HARD COATINGS THAN COMPETITIVE SYSTEMS

### COMPETITIVE ADVANTAGES /

The low value of the application is determined by the ability to carry out surface modification without the use of a vacuum, using cheap starting components. Surface processing rate exceeds that of existing equivalents by 7-10 times. Operating characteristics of the coatings obtained cannot be achieved by traditional technologies.

### ESSENCE OF INNOVATION /

Method of ignition of laser plasma in a high-speed flow of gas at atmospheric pressure. Consumer value of the technology is determined by the ability to extend service life, obtaining new properties and characteristics for the products processed.

### RESULTS ACHIEVED /

Laboratory prototype of the installation was created, scalability of technology was shown. Hardness parameters up to 35 hPa at processing rate exceeding that of existing methods by 7-10 times were received. Quality of the coating was confirmed by reports from independent laboratories.

### MARKET POTENTIAL /

Size of the market for engineering solutions in the field of laser deposition of protective coatings was 25 billion USD in 2012. The growing demand for technologies used to deposit protective coatings is determined by financial losses due to excessive wear and corrosion, which for the USA alone is worth 500 billion USD a year.



### THE TEAM /

**Pavel Yuryevich Smirnov**, of JSC Optogard-Nanotech, developer, co-author of inventions, has successful experience in the implementation of innovative technologies.

**Sergey Nikolayevich Bagaev**, academician of the Russian Academy of Sciences, research supervisor of the Program of Presidium of the Russian Academy of Sciences, director of the Institute of laser physics at the Siberian Branch of the Russian Academy of Science.

**Tamara Pavlovna Smirnova**, doctor of chemistry, chief researcher, leading expert in materials science.

*Total number of employees – 42 people.*

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## EUV LABS

# INDUSTRIAL EXTREME ULTRAVIOLET (EUV, $\lambda=13.5$ nm) SOURCES FOR LITHOGRAPHY

### COMPETITIVE ADVANTAGES /

Revolutionary approach to the creation of an EUV-radiator for 22 nanometer lithographic technology provides a high theoretical source power, simplicity of operation and a lower price than that of the rivals.

### ESSENCE OF INNOVATION /

Use of liquid metal jets as discharge electrodes for the generation of EUV radiation.

Use of individual spectra of chromophoric molecules implemented in the medium under examination as probes for the purposes of monitoring system operation.

Use for cleaning of optics and mirrors, surfaces of plasma induced by EUV radiation.

### RESULTS ACHIEVED /

Capacity of light radiation of 100 W was demonstrated, and work on the development of a source with 500 W of power is taking place.

A technique for determining the molecular coordinates of nanoprobe in the lateral plane of a sample, with an accuracy of 5 nanometres, was developed.

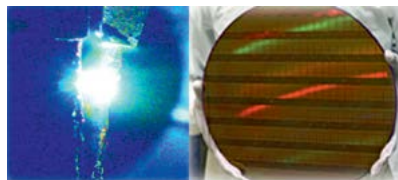
Methods of purification of multi-layer optics from contamination by amorphous carbon, under the influence of EUV radiation, were developed.

### MARKET POTENTIAL /

Volume of the market of lithographic equipment is 29.9 billion USD in 2012.

Mass transition of production of microelectronics to 22 nanometer technology and market growth in 2014 is expected.

The main customer and consumer of the technology is ASML, the largest manufacturer of lithographic machines (share of global market – 62 %).



*Fund for Infrastructure and Educational Programs RUS-NANO signed an investment agreement to establish a technological engineering company «EUV Labs» in Troitsk (project budget - 200 million RUR).*

### THE TEAM /

**Artem Krotov**, managing director of JSC EUV Labs, experience of innovative projects management, attraction of investments and structuring transactions in the Russian Federation and abroad.

**Konstantin Koshelev**, PhD in Physical and Mathematical Sciences, leading research assistant, head of laboratory of spectroscopy of plasma of Institute of Spectroscopy of the Russian Academy of Sciences, professor of Paris-Sud and Pierre et Marie Curie universities (France). K.N.Koshelev's group is involved in EUV topic since 2001.

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## RAMMICS

# COMPACT RAMAN-FLUORESCENT MICROSCOPE FOR EXPRESS ANALYSIS OF SMALL AMOUNTS OF ORGANIC AND INORGANIC SUBSTANCES. ANALYSIS AND IDENTIFICATION OF 2.3 MICRON-SIZE PARTICLES IN 100 ms

### COMPETITIVE ADVANTAGES /

The original design of the spectral part enables the instrument to be compact and leads to a tenfold reduction in cost.

High speed of analysis. Raman and luminescent spectra are registered in one cycle of inquiry of the multi-channel detector.

Accuracy of detection of the chemical composition of complex chemical compounds.

### ESSENCE OF INNOVATION /

The integration of a Rammics spectrometer into the optical scheme of the microscope means that a surface analysis of the substance can be carried out, with high spatial resolution.

Application of supports made using the Surface-enhanced Raman scattering effect (SERS) for a multiple increase in the instrument's sensitivity.

### RESULTS ACHIEVED /

20 sets of Rammics were developed and provided for test operation to key users.

The instruments are being designed in accordance with the requirements of the engineering specifications from pharmaceutical and chemical companies.

2 applications for inventions and 2 applications for a useful model were filed with Rospatent.

### MARKET POTENTIAL /

The market of analytical instruments was 9.1 billion USD in 2011; in 2015 it will be worth 10.5 billion USD.

In this growing market the share of Raman instruments is growing even faster – by 10% per year, mainly due to the substitution of infrared spectrometers.



### THE TEAM /

**Alexey Steblev**, development director.

**Alexander Vankov**, PhD in Physical and Mathematical Sciences, general director of JSC Rammics.

**Igor Kukushkin**, Doctor of Physical and Mathematical Sciences, director of research, corresponding member of the Russian Academy of Sciences.

**Leonid Kulik**, Doctor of Physical and Mathematical Sciences, technologies director, leading research assistant of Institute for Solid State Physics of Russian Academy of Sciences.

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Sk  
IT



# SOFTWARE TO OPTIMIZE THE DESIGN PROCESS IN FIELDS RANGING FROM AVIATION TO PHARMACEUTICALS. ITS IMPLEMENTATION REDUCES THE TIME FOR A WING DESIGN BY 10 TIMES

## COMPETITIVE ADVANTAGES /

Significant time and cost reduction of design.  
Automated engineering calculations.  
Improved product performance.  
For example when MACROS was used to design wing panels, the designing time was reduced by 10 times while allowing an easier wing design process.

## ESSENCE OF INNOVATIONS /

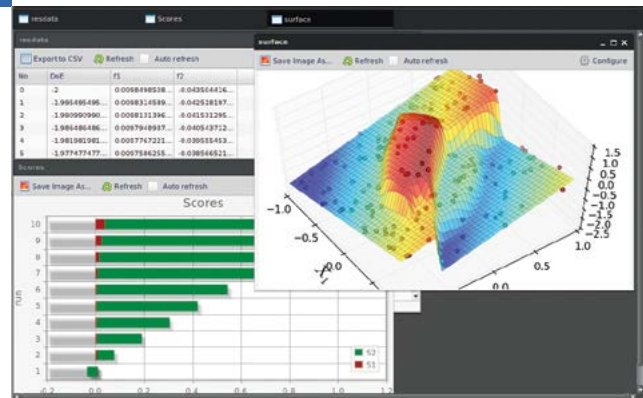
Software for high-performance BI and multidisciplinary optimisation.  
Automatic selection of a solution and its customization.

## RESULTS ACHIEVED /

MACROS is used in a variety of industries: aviation, automotive, power engineering, electronics and many others.  
- Revenue in 2013 - RUR 17 million;  
- External co-financing – RUR 51 million.  
Co-investor - EADS.

## MARKET POTENTIAL /

The global market of engineering product analysis exceeded \$4 billion in 2012.  
The most rapidly growing segment of the market of product lifecycle management accounted for over 35 % of growth seen in 2012.



## THE TEAM /

**Sergey Morozov**, PhD in Physics and Mathematics, General Director.

**Alexander Prokhorov**, Head of Development.

**Evgeny Burnaev**, PhD in Physics and Mathematics, key developer  
**FYODOR GUBAREV**, PhD in Physics and Mathematics, key developer.

Staff - 36 employees.

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Skolkovo Grantee

## ROCK FLOW DYNAMICS

# SOFTWARE SOLUTION FOR REAL TIME 3D MODELLING OF NATURAL RESOURCES DEPOSITS. MODELLING TAKES 8-12 TIMES LESS THAN WITH ANY OTHER MODELLING TOOL AVAILABLE ON THE MARKET

### COMPETITIVE ADVANTAGES /

A unique software solution for real time 3D modelling and simulation of deposits of natural resources. Modelling takes 8-12 times less than with any other tool available on the market.

### ESSENCE OF INNOVATIONS /

The company's flagship product is tNavigator, a software tool for hydrodynamic simulation of oil and gas formations using an interactive 3D GUI.

### RESULTS ACHIEVED /

Commercialiation of the technology. The company's products are used by companies in Russia, USA, UAE, Japan, UK, China, Qatar, Bahrain, Germany, Kazakhstan.

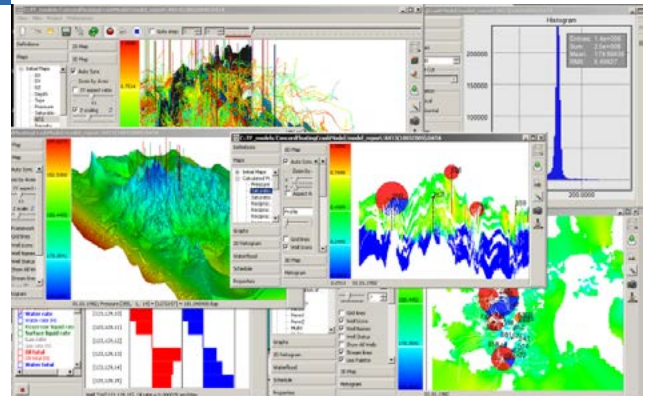
Revenue:

- 2013 – RUR 74 million.;
- Foreign investments – RUR 86 million;
- Number of intellectual property objects - 6.

Co-investor - Intel Capital.

### MARKET POTENTIAL /

The market for oil field simulation software in Russia is \$ 150 million, the global market is more than \$2 billion.



### THE TEAM /

**Vasily Shelkov**, Director, PhD in High Energy Physics.

*Staff – 50 employees.*

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# SOFTWARE AND SENSORS FOR DETECTING FOREST FIRES, PINPOINTING THEIR LOCATIONS WITHIN A FEW DOZEN METRES. THE FIRES CAN THEN BE EXTINGUISHED USING THE POINT CONTACT METHOD

## COMPETITIVE ADVANTAGES /

The system can pinpoint the location of fire with greater accuracy (to a couple of dozen metres) to be then extinguished using the point contact method.

## ESSENCE OF INNOVATIONS /

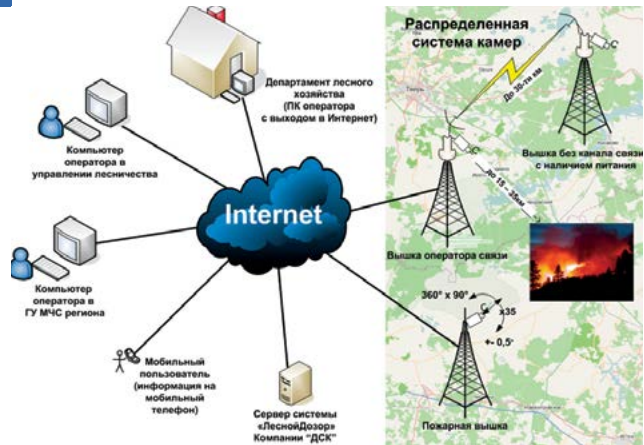
The software is a distributed system for monitoring large forested areas and detecting wild fires. The system is based on a network of sensors placed on high rise structures and operating as a single distributed system.

## RESULTS ACHIEVED /

Forest Watch is used in 26 regions in Russia and Belarus.  
There are 277 CCTV cameras in the system.  
Revenue:  
- 2012 – RUR 20 million;  
- H1 2013 – RUR 10 million;  
- Number of intellectual property objects created - 3.

## MARKET POTENTIAL /

The market can be viewed as part of the larger market for security systems (CCTV surveillance is also part of it) or as part of the market for solutions to facilitate decision making for environmental protection.  
There is a market for about 10 thousand forest fire sensors.



## THE TEAM /

**Ivan Shishalov** - Director, winner of the Smart Alec and START programmes organized by the Fund for the Support of R&D Entrepreneurship.

*Staff- 25 employees.*

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Skolkovo Grantee

## ABBY INFOSEARCH

# THE UNIVERSAL LINGUISTIC TECHNOLOGY IS ONE OF ITS KIND IN THE WORLD, OFFERING SOLUTIONS TO A RANGE OF APPLIED LINGUISTICS PROBLEMS FROM MACHINE TRANSLATION AND INTELLIGENT MULTILINGUAL SEARCH TO AUTOMATED DATA MINING AND PATTERN DETECTION

### COMPETITIVE ADVANTAGES /

Independent assessments have shown that Compreno's translation quality far surpasses that of other systems. Russian to English and English to Russian translations done by Compreno require 10-20% less editing than those done by Google or Promt.

### ESSENCE OF INNOVATIONS /

Development and commercialisation of software for universal semantic analysis and construction of semantic representations for natural language sentences.

The software can 'understand' copy written by people, boosting its semantic analysis capabilities.

### RESULTS ACHIEVED /

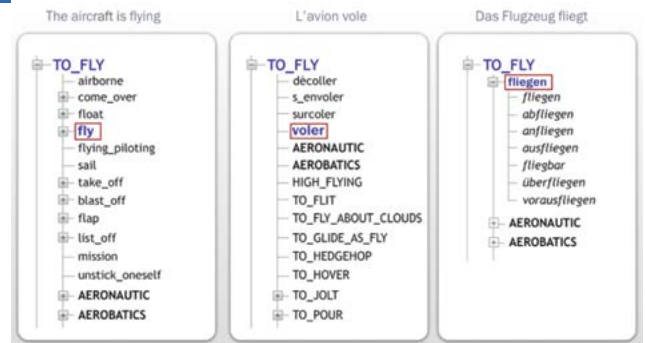
The product is being trialled.

Revenue:

- 2012 – RUR 254 million;
- External co-financing – RUR 450 million;
- Number of intellectual property objects - 42.

### MARKET POTENTIAL /

The total market may be as large as \$200 billion.



### THE TEAM /

**Sergey Andreev**, Director, President of ABBYY.

Staff – 279 employees.

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**WORKLE**

# AN ONLINE TRAINING AND TELECOMMUTING SOLUTION FOR INSURANCE, BANKING AND TOURISM – INDUSTRIES THAT NEVER USED TELECOMMUTING OR ONLINE TRAINING BEFORE

**COMPETITIVE ADVANTAGES /**

Broad range of partners offering numerous opportunities for monetization.  
A safe and legal fees payment scheme.

**ESSENCE OF INNOVATIONS /**

The Workle online platform is a unique service operating in Russia and offering customers opportunities to learn new skills and work through the Internet. Practically any adult citizen of Russia can master any of the popular professions for which online telecommuting was never available before.

**RESULTS ACHIEVED /**

Commercialisation of the product.

380 thousand users.

More than 60 partners.

Revenue:

- 2013 – RUR 17 million;
- External co-financing – RUR 130 million;
- Number of intellectual property objects - 2.
- Co-investor - Clever group.

**MARKET POTENTIAL /**

Workle offers jobs in insurance, banking and tourism.

The banking services market in 2012:

- Loans- \$247 billion dollars;
- Deposits - \$456 billion dollars.

**THE TEAM/**

**Vladimir Gorbunov**, experience in investment companies (personal sales + sales management).

*Staff- 64 employees.*

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Skolkovo Grantee

## KINITECH LABORATORY

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# SOFTWARE FOR MODELLING MACHINES AND DEVICES DRASTICALLY REDUCES THE NUMBER OF EXPERIMENTS NEEDED. IN MECHANICAL ENGINEERING PRODUCTS CAN BE BROUGHT TO MARKET 2-3 TIMES FASTER

### COMPETITIVE ADVANTAGES /

The software reduces the number of prototypes and experiments needed by 3-6 times. Thus a new product can be brought to market 2 to 3 times faster.

### ESSENCE OF INNOVATIONS /

The software utilises multi-level modelling bringing together fundamental science and engineering. A key feature of the system is that it can build models without experimental data, which reduces the amount of experiments that need to be conducted.

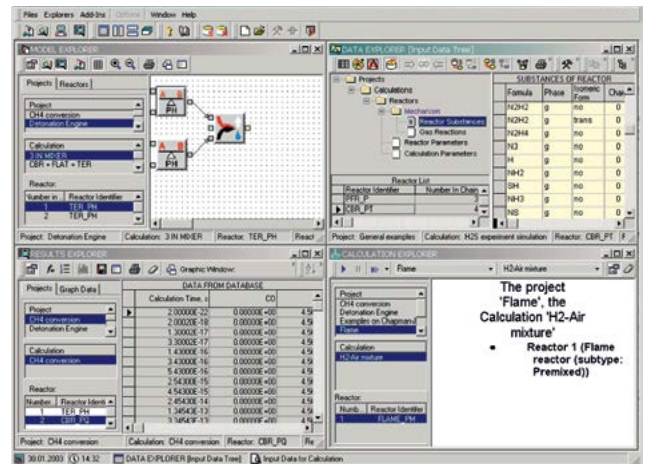
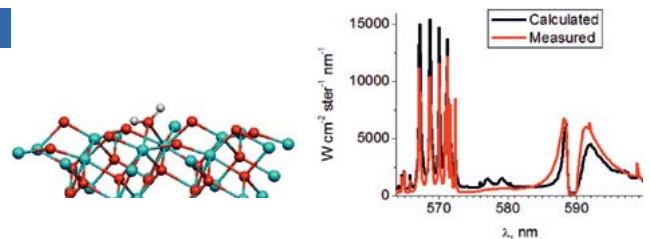
### RESULTS ACHIEVED /

The project is at the trials stage.  
5 industrial and academic partners.  
Revenue:

- 2012 – RUR 46 million;
- 2013 – RUR 15 million;
- External co-financing – RUR 13 million;
- Number of intellectual property objects - 4.

### MARKET POTENTIAL /

The solution will be in demand among R&D departments of industrial companies as well as universities and research labs.  
The market is \$400 million and is growing at an annual rate of 10-15%.



### THE TEAM /

**Boris Potapkin**, Director, plasma physics and chemistry expert, co-founder of several successful high-tech start-ups.

Staff- 17 employees.

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## CENTER OF APPLIED RESEARCHES OF COMPUTER NETWORKS

# THE NEW TECHNOLOGY RELYING PROGRAMMABLE COMPUTER NETWORKS WILL INCREASE THE THROUGHPUT CAPACITY OF COMMUNICATIONS CHANNELS, SIMPLIFY NETWORK MANAGEMENT AND IMPROVE NETWORK SCALABILITY

### COMPETITIVE ADVANTAGES /

Increased productivity, optimised traffic.  
Reduced network building and maintenance costs  
20-30% increase in utilisation of data centres  
reduced operating costs.  
Programmable network services.  
Visualisation of network resources.  
Safety.

### ESSENCE OF INNOVATIONS /

Revival of applied research in Internet and computer networks in Russia, development of advanced next-gen network technologies.

### RESULTS ACHIEVED /

Projects implemented:

- Rostelecom: an experimental cloud platform - RUR 21.6 million;
- Intel: a Software Application Switch – RUR 3.9 million;
- EMC: improving the efficiency of data center through virtualisation: - RUR 4.5 million.

### MARKET POTENTIAL /

The market for programmable networks is just beginning to move from the drawing board to actual products.

In 2013 the estimated market is \$360 million.

Estimates for the market size differs:

- Dell'Oro Group: 2016 - \$2 billion;
- IDC: 2016 - \$ 3.7 billion;
- SDN Central: 2018 - \$35 billion.



### THE TEAM /

**Ruslan L.Smelyansky**, R&D Director, corresponding member of RAS, D.Sc., Professor of Moscow State University named by M.V. Lomonosov, Honored scientist of Russia, Honored Professor of Moscow State University named by M.V. Lomonosov, Member of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society, Association for Computing Machinery (ACM).

*Staff- 50 employees.*

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## **INTERNATIONAL UNIVERSAL EDUCATIONAL NETWORK FOR STUDENTS AND TEACHERS. MORE THAN 800 SCHOOLS REGISTERED**

### **COMPETITIVE ADVANTAGES /**

The goal is to get every school student with access to the Internet involved with natural sciences without increasing the amount of face-to-face teaching needed.

The solution integrates with digital labs and interactive learning environments.

### **ESSENCE OF INNOVATIONS /**

The unique side of the project is the way it combines methodologies and educational programmes with a brand new software platform that can be reliably accessed in the cloud.

A broad range of digital sensors can be used in conjunction with the system.

### **RESULTS ACHIEVED /**

The project is in the prototype stage.

- Number of schools connected - 860;
- Number of teachers involved - 3000;
- Number of intellectual property objects - 2.

Co-investor - VEB Innovation.

### **MARKET POTENTIAL /**

GlobalLab is the only product for joint R&D projects carried out by school students and teachers in the Social Learning (SL) market.

The social learning market:

- Current market- RUR 126 billion;
- Potential market – RUR 170 billion;
- Annual growth rate - 5.7%.



### **THE TEAM /**

**Tatyana Krupa** — director.

*Staff- 36 employees.*

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## BAZELEVS INNOVATIONS

# THE SOFTWARE BUILDS 3D ANIMATION DIRECTLY FROM A TEXT SCRIPT, THUS NO SKILLS ARE REQUIRED IN EITHER ANIMATION OR COMPUTER GRAPHICS, MAKING PRODUCTION OF 3D ANIMATION FOR TV 2 TIMES FASTER

### COMPETITIVE ADVANTAGES /

The technology halved the time needed to produce 3D animation for TV.  
The technology can also be used in education and defence.

### ESSENCE OF INNOVATIONS /

The software converts text directly into 3D animation.  
No special skills in animation or computer graphics are required to make 3D animation.

### RESULTS ACHIEVED /

The project is at the stage of prototype development.  
Number of created intellectual property objects - 3.

### MARKET POTENTIAL /

User content - 7% average annual growth, \$4 billion global market.  
Mobile applications - 42% market growth totalling 0.5 billion dollars.  
Uses in education - 9% market growth totalling 0.3 billion dollars.



### THE TEAM /

**Sergey Kuzmin**, Director, MBA.

*Staff- 31 employees.*

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**SYNESIS**

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## THE VIDEO ANALYSIS SYSTEM AUTOMATICALLY RECOGNIZES OBJECTS AND SITUATIONS IN STREAMED VIDEO, MINIMIZING OPERATOR ERROR

### COMPETITIVE ADVANTAGES /

Kipod increases the operator's productivity by minimising false alarms and showing the causes of alarms.

The interface is based on international standards. The product is cheaper than the competition because it is based on Linux.

### ESSENCE OF INNOVATIONS /

Development and commercialisation allows customers to cost-effectively implement the solution for video surveillance.

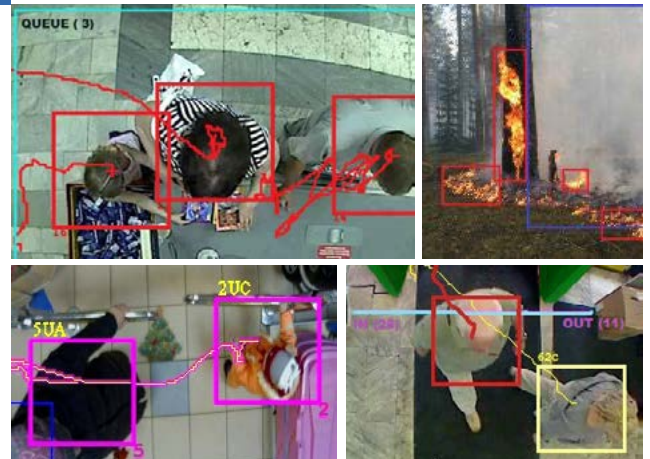
### RESULTS ACHIEVED /

The project is at the stage of prototype development. Pilot use in the Moscow metro. Number of intellectual property objects created - 5.

### MARKET POTENTIAL /

Synesis products are business and security products that include video analysis (BI and security solutions incorporating video analysis).

Synesis services are offered in the video surveillance as a service market (VSaaS).



### THE TEAM /

**Nikolai Ptitsyn**, Director.

Graduated from Bauman Moscow State Technical University a red diploma, and a degree in Information Processing and Management Systems.

*Staff- 31 employees.*

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Sk  
Space

# COMPACT EMITTER FOR ON-BOARD LASER SPACE COMMUNICATION SYSTEM. PROVIDES THE POWER AND MODULATION OF THE SIGNAL WITHOUT ADDITIONAL DEVICES

## COMPETITIVE ADVANTAGES /

Radical simplification and improved compactness of the emitter of laser space communication on-board system as a whole, while increasing its reliability.

## ESSENCE OF INNOVATIONS /

Providing sufficient power and modulation of signal without additional devices.

## RESULTS ACHIEVED /

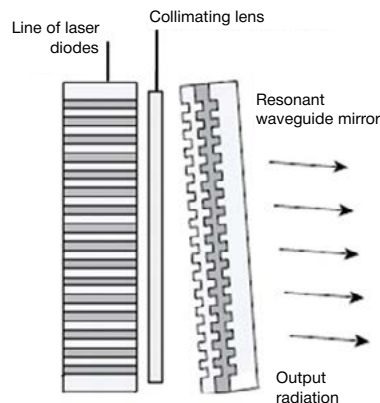
Single-mode generation of a line of 100 laser diodes has been stabilized by phasing, using resonant waveguide mirror.

Output is interference peak with near-diffraction divergence containing practically the whole beam power (~ 1.5 W continuously, ~ 5 W by impulse).

## MARKET POTENTIAL /

Market segment of laser space communication is just beginning to take shape, and its rapid growth is expected in the next 5 years.

According to indirect estimates, the annual volume of this segment of communication equipment market can amount to several billion dollars.



## THE TEAM /

**Sergey Derzhavin**, scientific project manager.

Key experience: development of high-power diode lasers, research in the field of semi-conductor lasers phasing.

**Valery Timoshkin**, researcher. Key experience:

development of high-power diode lasers, research in the field of semi-conductor lasers phasing.

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## NEW ENERGY TECHNOLOGIES

# COMPACT ATOMIC CLOCK (CAC). TWICE CHEAPER THAN ITS U.S. COUNTERPART

### COMPETITIVE ADVANTAGES /

Smaller size and less power consumption, high long-term stability as opposed to crystal oscillators and Rubidium standards – this is important for navigation and data transmission. Stability is not inferior to  $5 \times 10^{-12}$  per 1 hour, volume is less than  $50 \text{ cm}^3$ , power consumption is less than 0.3 W.

### ESSENCE OF INNOVATIONS /

CAC uses a new physical principle – the quantum effect of coherent trapping of energy levels occupation in rubidium-87 atoms.

### RESULTS ACHIEVED /

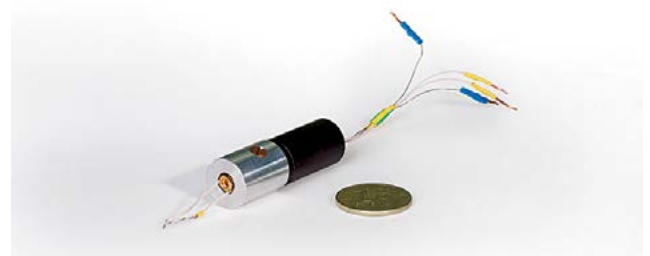
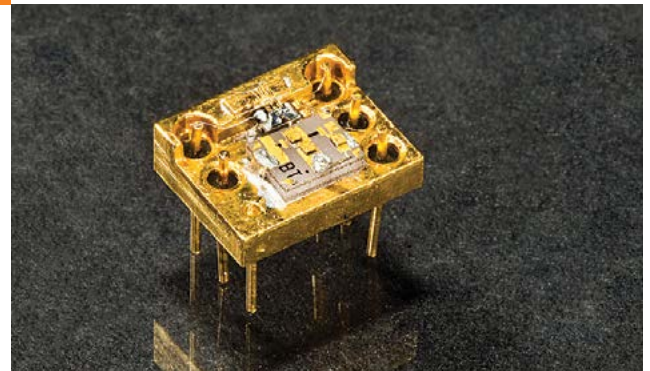
A model of the quantum discriminator has been developed. All physical processes take place within it. Device proof of concept has been achieved.

The plan is to complete the development of electronics, build the prototypes, undergo testing and certification by the third quarter of 2014.

### MARKET POTENTIAL /

Original technical solutions make the device twice cheaper and more reliable than its American counterpart.

By 2018 the company plans to take up 4% of the global market, which will amount to about \$ 50 million.



### THE TEAM /

**Vladimir Velichansky**, Ph. D. BC., Assoc., supervisor.

**Alexander Kuznetsov**, Ph. D., CEO.

**Alexander Zibrov**, Ph. D., Senior Research Consultant.

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# MOBILE SATELLITE SERVICES AUTOMATIC SYSTEM FOR THE CARS AND BOATS

## COMPETITIVE ADVANTAGES /

Operations with satellites in the Ku-and Ka bands.  
 Provision of Internet access for passengers.  
 Amplification factor up to 44 dB, possibility of rapid (5 microseconds) beam pattern control within 360° by the azimuth and from 10° to 90° by the place.

## ESSENCE OF INNOVATIONS /

At the heart of iSkyTracker is the planar reflection-type array manufactured according to standard printing technology.

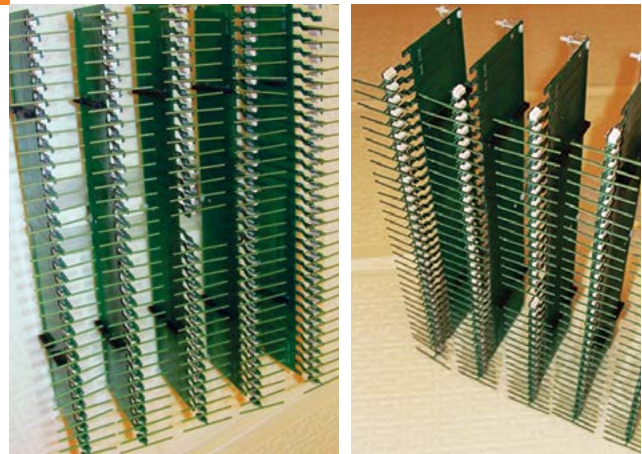
## RESULTS ACHIEVED /

- Wi-Fi band system prototype has been developed.
- Ku-band system concept model has been developed.
- System numerical simulation and testing have been performed for the Ku and the Ka bands.
- Field tests and pilot implementation are planned for the 2nd quarter 2014.

## MARKET POTENTIAL /

Revenues of the satellite communications market in the last 10 years have risen by a factor of 2.7 or even more, reaching USD 168 billion. At the same time the sales of ground equipment account for more than 30% of the income (51.6 billion dollars).

Total estimated market of iSkyTracker - \$ 2-3.5 billion.



## THE TEAM /

**Maxim Shuralev**, CEO, ideologist and manager of system development and its commercialization.

**Maxim Sokolov**, development of positioning and management system.

**Andrey Yeltsov**, development of system and interface blocks.

**Diana Arutyunova**, organization and development of cooperation with partners and customers.

## CONTACTS /

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 www.iSkyTracker.com



Skolkovo Participant

**WAY RAY**

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## **AUGMENTED REALITY TECHNOLOGY FOR VEHICLES. UNIVERSAL WINDSHIELD COATING COMBINES THE FEATURES OF SMARTPHONE, NAVIGATION DEVICE AND HEAD-UP DISPLAY**

### **COMPETITIVE ADVANTAGES /**

First augmented reality technology for vehicles combining the features of smartphone, navigation device and HUD.

Versatility.

Relatively low cost and price.

Image covering 70% of the windshield (with analogues offering less than 2% coverage).

Drivers do not need to distract their attention from the road.

### **ESSENCE OF INNOVATIONS /**

HUD and navigation using augmented reality features.

Versatile mobile applications platform.

Integration in urban infrastructure.

Access to various mobile applications when the vehicle is stationary.

### **RESULTS ACHIEVED /**

Significant progress has been made in the development of device electronics and innovative optical design.

Prototype development is in full swing.

Samples of diffuse and specular reflection films have been developed in collaboration with Teijin Dupont.

### **MARKET POTENTIAL /**

WayRay expects successful market entry in United States, Western Europe, China, Japan and Russia, as well as markets of the CIS countries. The product launch in these countries is expected to follow the same sequence.



### **THE TEAM /**

**Vitaly Ponomarev**, founder and CEO.

**Sergey Dyakov**, design engineer, research officer, researcher at the Moscow State University and Trinity College Dublin.

**Michael Svarichevsky**, C++ developer and development manager.

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## INNOVATIVE SATELLITE SPACE SYSTEMS

# NEW TECHNOLOGIES REDUCE ASSEMBLY, LAUNCH AND COMMISSIONING PERIOD FOR SMALL SATELLITES AS WELL AS THE COST OF THEIR LAUNCH

### COMPETITIVE ADVANTAGES /

- Reduction of assembly and test period for the satellite.
- Reduction of launch costs by avoiding adaptation to launch vehicle.
- Guaranteed piggyback launch of ready satellite within a period of several weeks to several months.

### ESSENCE OF INNOVATIONS /

- Use of open specifications, standards for on-board micro-satellite interfaces.
- Use of Plug-and-Play architecture.
- Use of own developments in the field of on-board systems and micro-research platforms.
- Use of universal orbital deployment system.

### RESULTS ACHIEVED /

- Prototypes of on-board micro-satellite service systems have been developed, their testing has been performed.
- Preliminary design of Earth remote sensing technological demonstrator satellite, weight of 20 kg, is under development.

### MARKET POTENTIAL /

- Target segments for application of the technology:
- Earth remote sensing (ERS);
  - Packet communications;
  - Automatic identification of ships (AIS);
  - Scientific and technological experiments;
  - Organization of educational projects.



### THE TEAM /

**Andrey Potapov**, CEO.

**Stanislav Karpenko**, technical director; general technical concept, technical management, software development.

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Skolkovo Grantee

## ROBOCV

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# AUTONOMOUS NAVIGATION COMPLEX FOR ROBOTIC SYSTEMS OF ALL TYPES OF TRANSPORT, FROM GOLF-CARS TO DUMP TRUCKS

### COMPETITIVE ADVANTAGES /

Versatility of technology application (all transport types).  
Low-level security subsystem.  
Convenience of use and low cost of system implementation.  
Payback - 1.5 years.

### ESSENCE OF INNOVATIONS /

Use of budget sensors installed on the vehicle, fully replacing the expensive laser scanner, which reduces system cost by 2-3 times.  
Automation of equipment with the help of RoboCV autopilot system requires no changes in the customer's business processes.

### RESULTS ACHIEVED /

System of auto piloted vehicles has been developed.  
The prototype of autopilot system for open-air confined areas will be ready by September 2014.

### MARKET POTENTIAL /

Main market segments:  
- Warehouse transport;  
- Local transport platforms;  
- Quarry and heavy transports;  
- Driver Assistant Systems for cars.  
The market for the first 3 segments (excluding Driver Assistant Systems for cars) will amount to \$1.5 billion by 2017.



### THE TEAM/

**Sergey Maltsev**, formulation of research problems and its management, management of the general technical and algorithmic solutions development.

**Dmitry Smirnov**, management of user requirements for the product line of autopilot systems.

**Roman Likane**, coordination of activities of the group of developers of vehicle autonomous navigation algorithms.

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## **ADAPTIVE CONTROL SYSTEM FOR UNMANNED AERIAL VEHICLES (UAV) WITH ARTIFICIAL INTELLIGENCE ELEMENTS**

### **COMPETITIVE ADVANTAGES /**

Use of artificial intelligence elements in the Automatic Control Systems control algorithm.  
New approach to engineering of goal-directed behavior of UAV during flight missions.  
Ability to adapt to any UAV types.  
Small size (single-board solution).

### **ESSENCE OF INNOVATIONS /**

Algorithms of expert assessment of flight situations.  
Use of the «protective situation management» technology.  
Dynamic change of UAV control priorities.

### **RESULTS ACHIEVED /**

The prototype of UAV ACS has been developed.  
Full-scale table simulator has been developed.  
Tests have been performed.  
System demonstration has been performed for EMERCOM of Russia.  
UAV «Irkut» based testing of ACS Aerob is being performed.  
The contract has been signed with SOLON (France) -manufacturer of robots.  
Series launch – starting from 2014.

### **MARKET POTENTIAL /**

Development geography: European Union, North Africa, Asian-Pacific region.  
Dynamics rate:  
- Launch of mass production in 2014;  
- Planned amount of revenue - up to 200 million rubles for 2014.



### **THE TEAM /**

**Andrey Mamontov**, CEO.

**Alexander Gorbachev**, chief designer.

**Dmitry Telenkov**, leading expert.

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## SPIRIT NAVIGATION

# SET OF TECHNOLOGIES FOR HIGH PRECISION (UP TO 1 METER) POSITIONING OF MOBILE DEVICES

### COMPETITIVE ADVANTAGES /

Indoor accuracy - 1 meter.  
No need to install specialized emitters.

### ESSENCE OF INNOVATIONS/

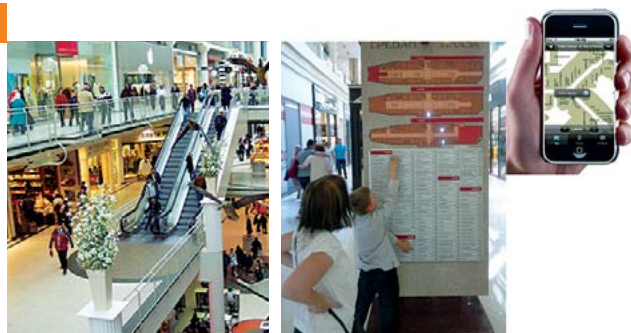
Set of technologies providing solution for high-precision indoors positioning.  
Mathematical tool allowing integration of measurements of smartphone's detectors and sensors.

### RESULTS ACHIEVED /

The prototype of the product has been developed, operated partially by phone and in post-processing.  
The prototype demonstrates the required accuracy.

### MARKET POTENTIAL /

The global market potential that remains untapped due to a lack of product for high-precision indoors positioning of mobile devices, location Based Services and Location Based Advertising, is estimated at \$13 billion per year.



### THE TEAM /

**Vladimir Sviridenkov**, Technical Director.

**Ruslan Budnik**, CEO.

**Gennady Berkovich**, Ph. D., Science Advisor.

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**DAURIA – SATELLITE TECHNOLOGY****FIRST RUSSIAN PRIVATE  
AEROSPACE COMPANY.  
SMALL NEXT GENERATION LOW-  
COST SATELLITES****COMPETITIVE ADVANTAGES /**

Low-cost components.  
Patented thermal control and radiation protection technologies.  
Mass electronic components.

**ESSENCE OF INNOVATIONS /**

The cost of the new satellite is 10 times less than that of traditional designs.  
Operational lifetime is 3-5 times greater.  
Enabling deployment of large satellite constellations, due to possibility to increase a number of launched satellites by a factor of 10-100.

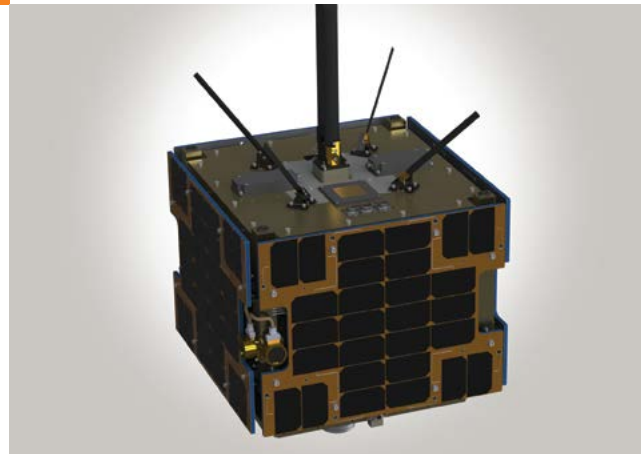
**RESULTS ACHIEVED /**

The head company of the «Dauria Aerospace» group won the Roskosmos tender in 2012 for the construction of two Earth remote sensing space crafts (315 million rubles).  
«Dauria Aerospace» plans to build R & D Center in Skolkovo with an area of 10,000 m<sup>2</sup>.

**MARKET POTENTIAL /**

Major customers:

- Global commercial entities or companies implementing projects as part of public-private partnership;
- Public institutions and private companies in Russia.

**THE TEAM /**

**Sergey Ivanov**, CEO.

Has extensive experience in managing large industrial enterprises, development of long-term company development strategy, implementation of investment projects and effective team-building for business management.

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Skolkovo Participant

**ASF**

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## **ADAPTIVE LIGHT-SHIELDING FILTERS ATTENUATE INTERFERING LIGHT BY A FACTOR OF 10,000. SPECIALIZED GLASSES-FREE 3D-SYSTEMS**

### **COMPETITIVE ADVANTAGES /**

Local attenuation of the interfering light by a factor of 300-10,000 with a speed of 0.1 m/s without affecting the perception of space with normal lighting. Development of specialized glasses-free 3D-systems. Stereoscopic features for screens.

### **ESSENCE OF INNOVATIONS /**

Innovative architecture, optimized LCD structures with their perspective implementation on ultra-fine (including flexible) optical substrates to minimize weight and achieve desired configuration

### **RESULTS ACHIEVED /**

Positive feedback for use in perspective space suits (NPP «ZVEZDA») and by pilots (OKB Sukhoi).  
Experimental model of stereo glasses  
- Adapted to 5 different protocols of stereo clock signal,  
- Equipped with LCD shutter with contrast of 470: 1 and relaxation time of 2 m/s

### **MARKET POTENTIAL /**

Factors and justification of demand: the price of light-protective glasses and universal stereo glasses on a par with regular glasses and stereo glasses, with no other offers with the same functionality available in the market.  
Geography: Russia, Europe, the United States – sales; Russia, China, Taiwan –production



### **THE TEAM /**

**Vasily Ezhov**, Ph. D., Project Manager and Chief Designer, author of 30 inventions and 45 scientific articles.

**Sergey Studentsov**, Chief Technologist of the project, author of 12 inventions and 22 scientific articles.

**Vladimir Maslov**, Ph. D., Chief Engineer, author of about 100 printed publications.

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## NOTES



## NOTES



[www.sk.ru](http://www.sk.ru)