Sk Nuclear

SKOLKOVO
INNOVATION PROJECTS

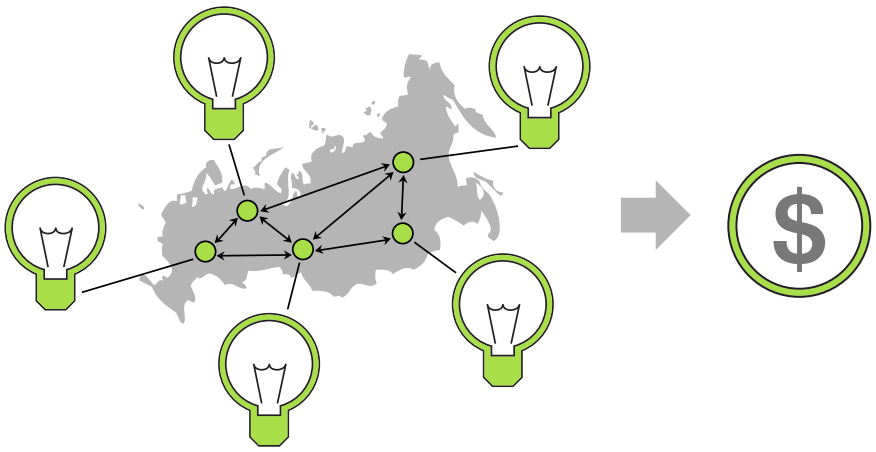
NUCLEAR&RADIATION TECHNOLOGIES CLUSTER

CONTENTS

ABOUT THE FOUNDATION

MISSION OF THE SKOLKOVO FOUNDATION

THE SKOLKOVO INNOVATION CENTER WAS ESTABLISHED BY FEDERAL LAW NO. 244 DATED SEPTEMBER 28, 2010 «ON THE SKOLKOVO INNOVATION CENTER» AS THE COUNTRY'S RESPONSE TO THE NEW CHALLENGES OF THE GLOBAL ECONOMY: ACCELERATING TECHNOLOGICAL PROGRESS AND RISING COMPETITION FOR KNOWLEDGE AND COMPETENCIES BETWEEN LEADING NATIONS.



Sk Space
Space Technology and Telecommunications

Sk Nuclear
Nuclear&Radiation Technologies

Sk IT
Information Technologies

Sk Energy
Energy Efficiency

Sk Biomed
Biomedical Technologies

The mission of the Skolkovo Innovation Center and the Skolkovo Foundation that established it, is to create an ecosystem in Russia conducive to the development of innovations to support cutting edge research and development and then to commercialize the results of such R&D in five priority fields of technological progress.

education and R&D

experimental design and research

commercialization of the results

The Skolkovo Foundation aims to ensure that the Innovation Center can provide facilities for the full cycle of the innovation process including education, R&D, experimental research and design, and commercialization of the results.

The Skolkovo Foundation is creating a model for the development of an innovation-based economy for all of Russia. The Innovation Center serves as proving grounds to test the mechanisms for promoting the practical application of cutting edge ideas proposed by Russian academic and applied research institutions.

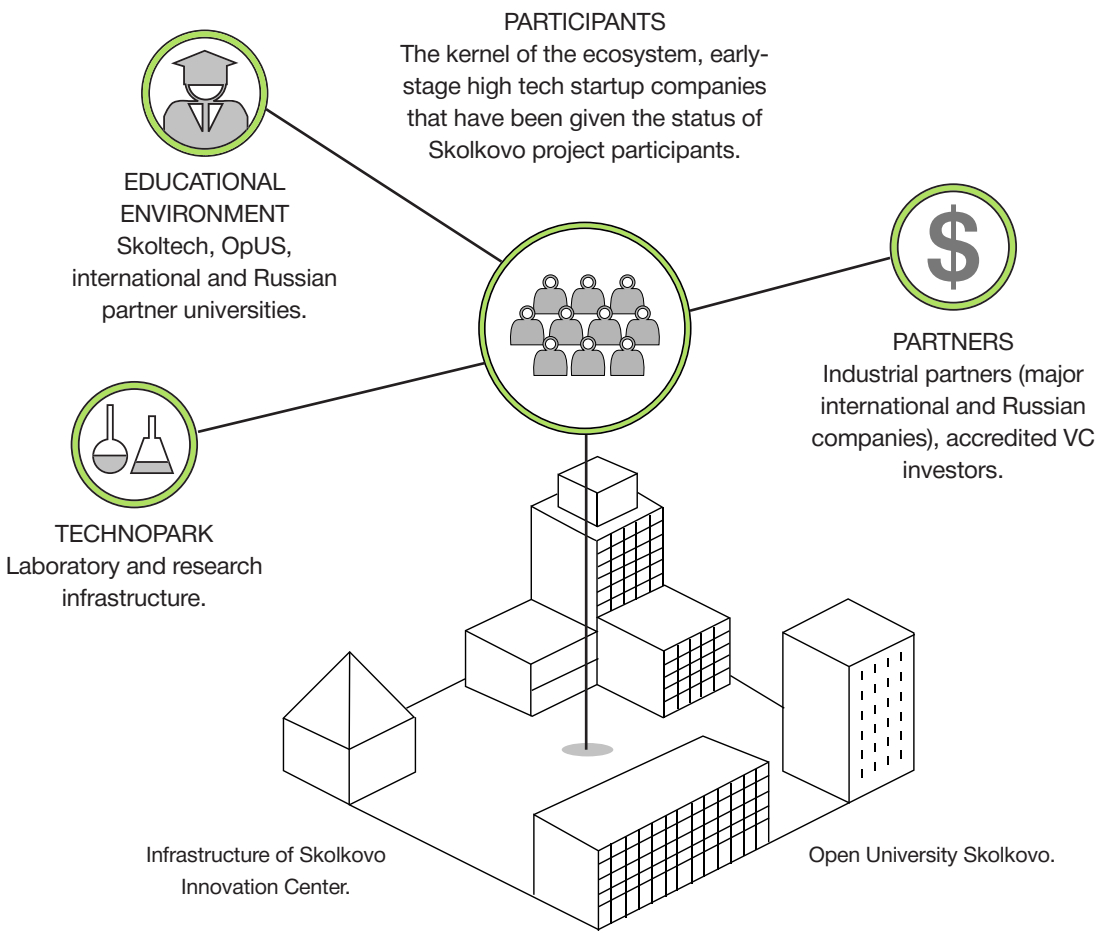
SKOLKOVO IS A KEY ELEMENT IN THE SYSTEM OF RUSSIAN DEVELOPMENT INSTITUTES that seeks to support innovation projects at every stage of development, from when it's just an idea all the way through sales and marketing, creating a system of continuous support that startups can draw upon as they work on their projects. The Skolkovo Foundation focuses on the pre-seed and seed stages of business development and some of the aspects of the launch stage. Subsequent stages such as business growth and development, IPO and financing are supported by RVC, RUSNANO and VEB, respectively.

SKOLKOVO'S GOAL IS TO CREATE AN INNOVATION ECO-SYSTEM CONDUCIVE TO RESEARCH AND ENTREPRENEURSHIP

ESTABLISHING AN INNOVATION ECOSYSTEM INCLUDES CREATING AND DEVELOPING EDUCATIONAL, RESEARCH AND ENTREPRENEURIAL ENVIRONMENTS, AS WELL AS THE PHYSICAL INFRASTRUCTURE OF THE SKOLKOVO INNOVATION CENTER.

The ecosystem consists of the following key elements: startups, R&D centers of the industrial partners, venture capital investors, the Technopark, the Skolkovo Institute of Science and Technology (Skoltech) and the infrastructure, i.e. the town of Skolkovo.

SKOLKOVO ECOSYSTEM



BENEFITS AND OPPORTUNITIES FOR PARTICIPANTS

TAX AND CUSTOMS BENEFITS:

- Social tax* - 14%
- Income tax - 0%
- VAT - 0%
- Property tax - 0%
- Customs tariffs on imported research equipment - 0 %

* Insurance premiums paid by the employer

GRANT SUPPORT

ACCESS TO INFRASTRUCTURE AND CONSULTING:

- R&D infrastructure and common use centers, consultations for applicants for Skolkovo participant status, office leases
- International and national events
- Education and mentoring (OpUS, Skoltech)

HELP WITH RAISING FINANCE AND ACCELERATION:

- VC and angel investors
- Infrastructure and technologies offered by industrial partners

HOW TO BECOME A PARTICIPANT:

CANDIDATES

APPLICANT

01

fills out the online form at www.sk.ru

SKOLKOVO FOUNDATION

02

assesses the application based on formal criteria:

a) Have all the necessary information and documents been provided?

b) Is the applicant a Russian legal entity?

c) Does the applicant meet the technology criteria of the Skolkovo Foundation?

EXPERT PANELS

03

assess the project in detail

a) Is it feasible in principle?

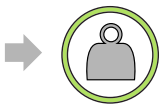
b) What significant advantages does it offer over foreign competitors?

c) What is its commercialization potential?

d) Does the project team have the requisite experience to successfully implement the project on the international level?

10 randomly selected experts from a large pool of experts

PARTICIPANT STATUS IS GRANTED TO THE APPLICANT

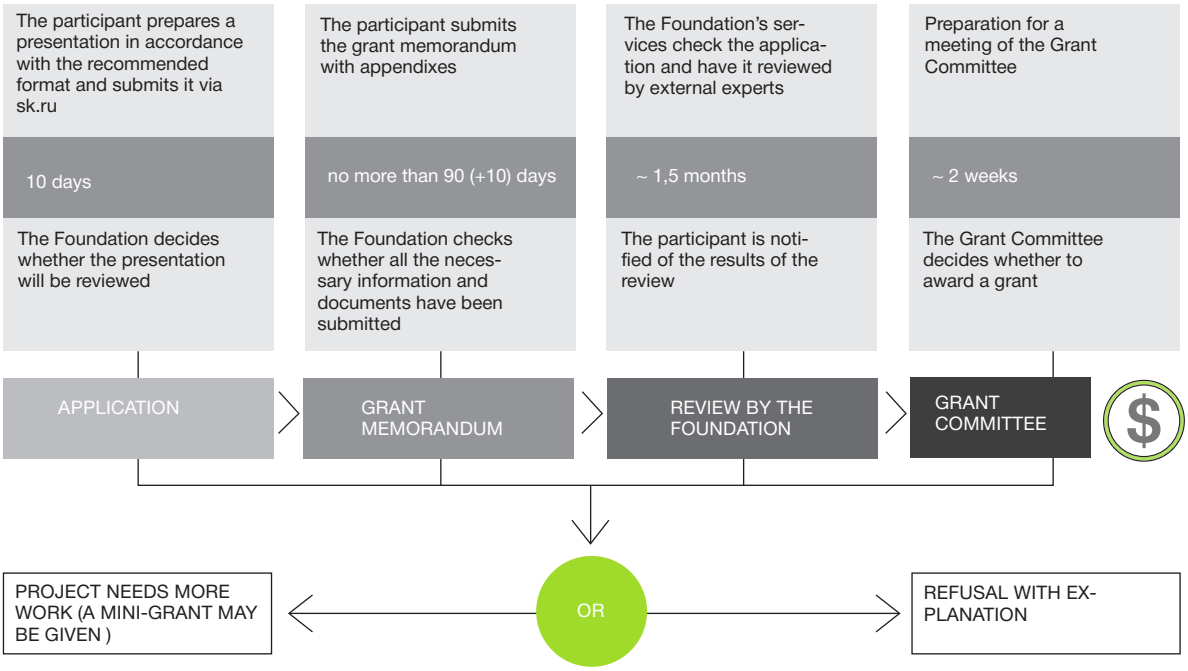


~ one month

KEY PRINCIPLES FOR GRANT FINANCING BY THE SKOLKOVO FOUNDATION

		Grant Amount	Co-Financing Terms
Idea	A business plan and an R&D program are developed, the market is researched and a search for investors is initiated	up to 150 $ K	Up to 100% Skolkovo
Seed	A working prototype is manufactured, a technical design is developed and the concept is tested	up to 850 $ K	Up to 75% Skolkovo; More than 25% Co-investor
Early stage	R&D is completed, an industrial prototype is developed and pre-clinical trials and phase I clinical trials are conducted	up to 4 $ M	Up to 50% Skolkovo; More than 50% Co-investor
Advanced stage	R&D and clinical trials are completed, pilot batches are manufactured and trialed	up to 9 $ M	Up to 25% Skolkovo; More than 75% Co-investor

HOW FINANCING IS ALLOCATED



STATISTICS AND FACTS

5540
applications from
2010 through 2013

1020
participating companies from
44 regions of the country
As of January 1, 2014

484
applications
to register
intellectual property
in 2013

$ 417 M
revenue earned by
participants
in 2012-2013

10000+
jobs
as of January 1, 2014

226
approved grants
in 2010-2013

$ 257 M
in approved
grants
in 2010-2013

$ 91 M
in financing from
external investors
in 2013

SKOLKOVO INDUSTRIAL PARTNERS: FIRST SUCCESS STORIES

Industrial partners site their R&D centers in Skolkovo and act as startups customers, thereby integrating the R&D and business environment in the Skolkovo ecosystem.

Key Benefits of Skolkovo for Industrial Partners

- Access to the best human resources and cutting edge Russian science: Skolkovo is a good place to work and thus is a magnet for the best specialists from all over Russia and Moscow.
- It is easy to carry out research and experiments thanks to the concentration of technology and human resources and cooperation with Skoltech, Russian research institutes, Skolkovo partners.
- Access to cutting edge technologies developed by Skolkovo resident startups, some of which are being developed with state support.
- Simplified administrative procedures, no bureaucracy or red tape.
- The same tax and customs benefits as those enjoyed by Skolkovo participants.

SKOLKOVO INDUSTRIAL PARTNERS TODAY

> 40 industrial partners

> 3 500 people estimated number of people to be employed by the R&D centers by 2015

> $ 943 M estimated total r&d budget through the end of 2015

ABOUT THE CLUSTER

ABOUT THE CLUSTER

The new developments by Russian engineers and researchers in nuclear, particle beam and plasma technologies, as well as new materials and coatings, can play a significant role in the international markets ofmechanical engineering, instrumentation control equipment, electronics, safety equipment and non-destructive testing. Despite the fact that in many fields it takes between 5 and 7 years to go from an idea to a product, our innovative companies have recently been quite successful in promoting their products and services in the international market.

The goal of the Nuclear&Radiation Technologies Cluster is to support the commercialization of a huge amount of research in the nuclear industry, back up new technological solutions and identify areas of breakthrough growth in order to focus the efforts of the R&D community on solving problems that the market is most interested in seeing solved.

Igor Karavaev
Vice-President,
Executive Director
Nuclear&Radiation Technologies Cluster
Skolkovo Foundaiton

The Nuclear&Radiation Technologies Cluster seeks new applications for technologies and solutions that were initially developed in the nuclear industry. These are used primarily to develop and modify new materials, in mechanical engineering and electronics, in nuclear medicine, in agriculture, and in design and engineering of complex technology systems. In nuclear industry Cluster focuses on nuclear waste disposal.

Key areas in which Cluster closely cooperates with Skolkovo participants are:

- Attracting new participants and helping existing Skolkovo residents to create new technologies and commercialize them within the innovation priorities of Cluster, creating new jobs and intellectual property.

- Supporting participants working on breakthrough technological solutions that have the most potential for commercialization, which includes raising of co-funding for investment projects.

- Creating and supporting an attractive and self-replicating innovative ecosystem that aims to boost the efficiency of cooperation between key elements: participants, industry partners, sources of finance and R&D centers. Potential partners of Cluster include hi-tech international industrial companies interested in R&D cooperation with Russia. Hi-tech engineering companies are also of great interest for Skolkovo. These are brought in to improve the efficiency of acceleration efforts and attract new international partners.

Key areas our work with partners focuses on are:

- Joint identification and development of innovation priorities for Cluster and efforts to improve foresight integration by means of partners creating market demand for the products and services being developed by the participants in order to include these products and services in the value creation chain or integrate them into the partners' existing products and services.

- Developing partner R&D centers in Skolkovo, establishing a research infrastructure, creating new jobs and attracting skilled laborers;

- Attracting new participants focusing on developing new businesses, based on the partners' technological developments.

As part of the efforts to develop an ecosystem, Cluster is actively cooperating with universities and Russian Academy of Sciences, from which 40% of Cluster's projects come. Cluster is also cooperating with Skoltech University on creating R&D centers, working closely with the Skolkovo Technopark to develop the infrastructure for future Skolkovo residents, holding contests for innovation projects in cooperation with industrial partners, and successfully implementing joint initiatives with other institutions for development such as Rosnano, RVK, VEB-Innovations and others.

The main mission of the Nuclear&Radiation Technologies Custer is to create and support an attractive and self-replicating innovative ecosystem that aims to boost the efficiency of cooperation between key elements: participants, industrial partners, sources of finance and R&D centers.

ACHIEVEMENTS

2013:

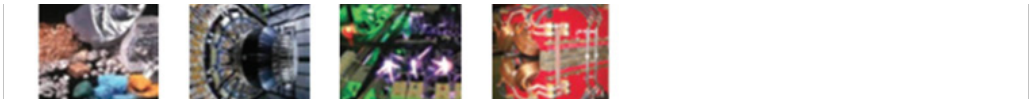
- Cluster had over 90 innovative startups, specializing in nuclear and radiation technologies
- With Cluster's active support, resident companies demonstrated phenomenal growth: the number of profitable startups doubled and total revenue increased three fold to $ 10 M.
- Over 80 patent applications for intellectual property were filed (only 40 were filed in 2012)
- Over 600 high tech jobs were created by the end of the year;
- A large amount of private co-financing was secured, bringing the running total to $ 20 M.
- The number of industry partners increased from 3 to 6 companies.

In 2014 Cluster plans to emphasize commercialization and acceleration of resident companies, including overseas, and intends to double total annual revenue.
The main mission of the Nuclear&Radiation Technologies Cluster will continue to create and supportan attractive and self-replicating innovative ecosystem to boost the efficiency of cooperation between its key elements: participants, industry partners, sources of finance and R&D centers.

INNOVATION PRIORITIES FOR THE NUCLEAR&RADIATION TECHNOLOGIES CLUSTER

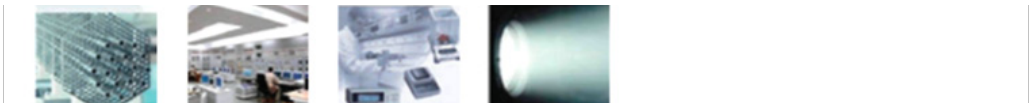
- Technologies utilizing discoveries in nuclear physics
  Processing and storage of nuclear wastes, plasma technologies and others.

- Radiation technologies
  Radiation technologies for industry, medicine, and security systems.
  Isotopes and radiopharmaceuticals.



- Creation, modification and characterization of materials. Nano-structure and nano-system for ming technologies.Rare earth metals. Equipment and technologies for gauging the structure, elements and properties of materials and compounds, etc.

- Mechanical engineering, instrumentation control and microelectronics.
  Automated monitoring, control and prevention systems. Automated monitoring and maintenance. Lasers, accelerators, detectors, sensors, dosimeters and their components, etc.



- Design, manufacture, modeling and engineering of complex systems
  Predictive modeling. Systems for managing the life cycle of complex engineering facilities. Data visualization systems etc.

PROJECTS OF PARTICIPATING COMPANIES

SKOLKOVO GRANTEE

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 /

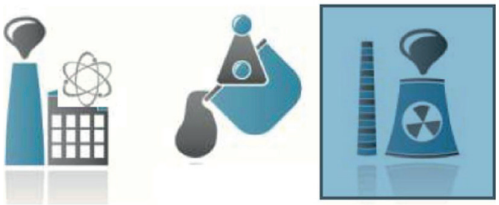
Adaptivity of basic polymer related to use in specific applications, enabling high selectivity and efficiency to be achieved. High-quality results are achieved as a result of the formation of specific macromolecular metal compounds with polymeric matrix.

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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BISANT RESEARCH LABORATORIES LLC

DEVELOPMENT OF UHF ANTENNA MICROMODULES OF ELECTRONICS BASED ON ANISOTROPIC COMPOSITE MATERIALS

COMPETITIVE ADVANTAGES /

50% reduction in dimensions of the antenna unit while maintaining or improving performance. Increase of stability and communication range by 20-30%. Combining multiple antennas in one device (up to 8 pcs) of different ranges.

ESSENCE OF INNOVATION /

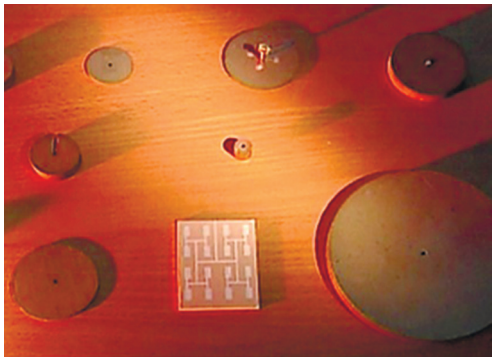
The solution implies ferroelectric ceramic materials with high reception efficiency and radio transmission.

RESULTS ACHIEVED /

There is a 6x3 cm TV antenna in the market to receive the signal from VHF and UHF channels. Test trials of small car antennas for FM, TV, DVB-T/T2, GSM, GPRS, GPS, WiFi, LTE were conducted.

MARKET POTENTIAL /

The world market amounts to $ 8.7 bln with a potential for growth to 6.9 bln (+26%). Potential consumers of project products: Samsung, LG, Apple, Nokia, HTC, Huawei, Pulse.



THE TEAM /

GENNADY KARPUNIN,
author and project applicant;
ALEKSANDR KORNEEV;
NIKOLAI ROSLIAKOV.

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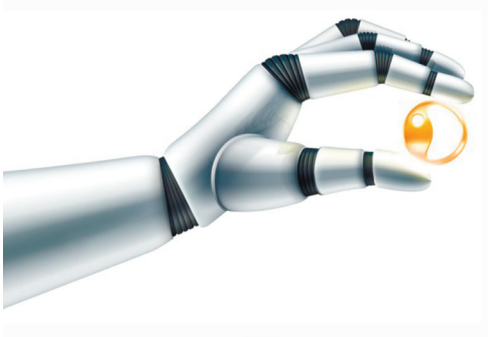
COMPUTER ROBOTICS LLC

MOTION CONTROL TECHNOLOGY FOR ROBOTIC SYSTEMS

COMPETITIVE ADVANTAGES /

The possibility to use existing robots (> 1 million units) in applications for materials processing with the required accuracy within 0.05-0.1 mm, allowing for turning and grinding of large-size parts with arbitrary geometry. The possibility of automatic assembly, which, in addition to accurate positioning, requires precise control of interaction forces arising when pressing, inserting and engaging. Most of these operations are manual due to the fragility of parts. The technology will automate many assembly processes.



ESSENCE OF INNOVATION /

The company developed original methods of searching, representing and controlling motion and interaction forces within the constraints.

RESULTS ACHIEVED /

A prototype robotic complex was designed and developed (with an open control system) for debugging, testing and bringing the technology to the product and accessible illustration of the complexity of the problem and the know-how of the company for the solution of the problem. A prototype software package to specify motion libraries for some common models of industrial manipulators was developed. A prototype software package for high accuracy control over industrial manipulators was developed.

MARKET POTENTIAL /

The project addresses the basic problems of the robotics market associated with an increase in the accuracy of robot operation and bringing its characteristics to the precision and the closest imitation of human motion. The common market of the product exceeds 1 mln units of robots installed worldwide.

THE TEAM /

A.S. SHIRYAEV,
PhD in Phys. and Math. Sc., Prof., automation of industrial processes, management of complex mechatronic complexes;
S.V. GUSEV,
PhD in Phys. and Math. Sc., Assoc. Prof., management of nonlinear mechanical systems, optimization, numerical mathematics and software development;
L.B. FREYDOVICH,
PhD in Phys. and Math. Sc., Assoc. Prof., modeling, planning, management and analysis of motion of nonlinear mechanical systems.

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SKOLKOVO GRANTEE

CORPORATION OF NUCLEAR CONTAINERS LLC

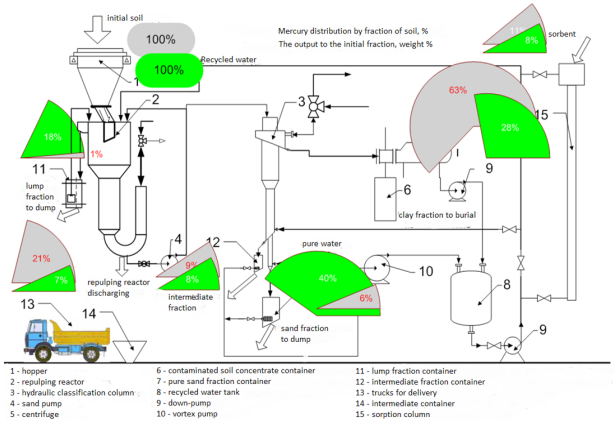
MOBILE FACILITY FOR DECONTAMINATION TERRITORIES FROM RADIONUCLIDES, MERCURY AND OTHER HEAVY METALS. USING THE SYSTEM REDUCE THE DISPOSAL VOLUME OF SOIL UP TO 5 TIMES

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.

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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SKOLKOVO GRANTEE

CVD. SPARK LTD

COMMERCIALIZATION OF CVD-DIAMOND FILM PRODUCTION TECHNOLOGIES

COMPETITIVE ADVANTAGES /

High speed of growing high quality plates. Significant cost advantage in the Russian market. Availability of technology to create diamond-based nanostructures.

ESSENCE OF INNOVATION /

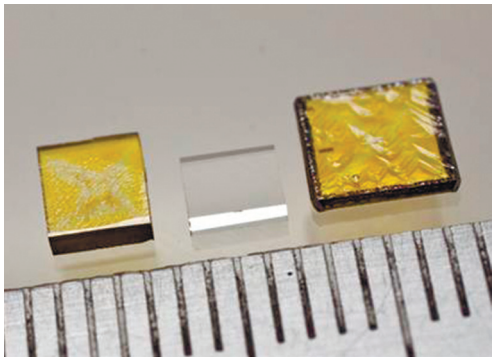
The use of the microwave plasma chemical vapor deposition (MPCVD) method allows obtaining diamond films of a size previously unattainable, higher purity and having unique properties.

RESULTS ACHIEVED /

Potential buyers obtained and tested primary samples of diamond plates of varying quality. We attracted investments for the next stage of project development.

MARKET POTENTIAL /

The world market of diamond and diamond-like coatings will have reached $ 1.7 bln by 2015. Potentially, project components can be used in the laser market ($ 8.8 bln), the medical equipment market – drills, surgical instruments, medical implants (over 17 bln), drilling tools ($ 700 mil.2010).



THE TEAM /

LYUDMILA PODDUBNAYA, CEO, investment officer of SC TehnoSpark;
VIKTOR RALCHENKO, head of the Laboratory of diamond materials at NSC GPI, an internationally renowned expert in the field of CVD-diamond growth, 250 publications, 9 patents;
GENNARO CONTE, head of the laboratory of diamond electronics at the Third University of Rome (Roma Tre), opinion leader in the field of detectors.

CONTACTS /

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SKOLKOVO GRANTEE

DELTA -SAPPHIRE LLC

THE ENERGY EFFICIENT «M500 MACHINE» GROWS PARTICULARLY LARGE (UP TO 500 KG) SAPPHIRE MONOCRYSTALS OF HIGH OPTICAL QUALITY USING THE GOI METHOD

COMPETITIVE ADVANTAGES /

It allows for the growth of particularly large leucosapphires (up to 500 kg) of high optical quality. The maximum weight of mass-produced crystals in the world is 85 kg. The prime cost of one kg of a crystal is cheaper by more than 45% in comparison with similar facilities.

ESSENCE OF INNOVATION /

Composite ceramic crucibles allow for the growing of particularly large crystals that have a high optical quality. Increasing the size will reduce the specific energy consumption by 4-5 times and bring up the plant efficiency by 6 times.

RESULTS ACHIEVED /

The R&D stage is complete, samples have been obtained. The plant model is being prepared and tested. The patents were obtained for the feeding device and the method of growing sapphire crystals with a device to feed raw materials.

MARKET POTENTIAL /

The world market for leucosapphires is 14,400 tons/ year, $ 4.32 bln/year. The market growth is 30% per year. The global market for the product of the project is $ 128 mln/year. The target share of the project for the market in 2017 exceeds 12%.

THE TEAM /

VLADIMIR TYUTIN,
management and development of integrated solutions;
VIKTOR TIKHONOV, scientific and technical developments in engineering,
strength of structural materials, new technology equipment.

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SKOLKOVO GRANTEE

EUV LABS LLC

INDUSTRIAL EXTREME ULTRAVIOLET (EUV, λ=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 /

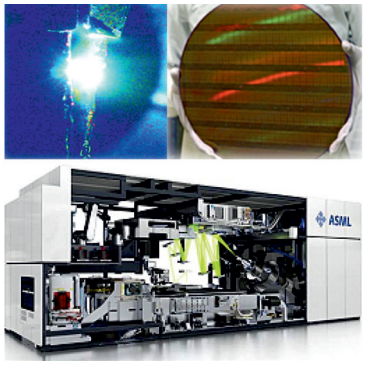
Use of liquid metal jets as discharge electrodes for the generation of EUV radiation. Use of individual spectra of chromophoric molecules implemented in the medium under examination as probes for the purposes of monitoring system operation. Use for cleaning of optics and mirrors, surfaces of plasma induced 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 nanoprobes 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 RUSNANO signed an investment agreement to establish a technological engineering company «EUV Labs» in Troitsk (project budget - 200 million RUR).

THE TEAM /

KONSTANTIN KOSHELEV,
PhD, CEO of EUV Labs, LLC, 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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FEMTOTECH LLC

CREATION OF FIBER-OPTIC SENSOR SYSTEMS BASED ON FEMTOSECOND WRITING TECHNOLOGY

COMPETITIVE ADVANTAGES /

The possibility of using almost any transparent materials for manufacturing sensors, which reduces production costs. The possibility of writing without removing the protective coating provides multiple increase of the sensor's tensile strength.

ESSENCE OF INNOVATION /

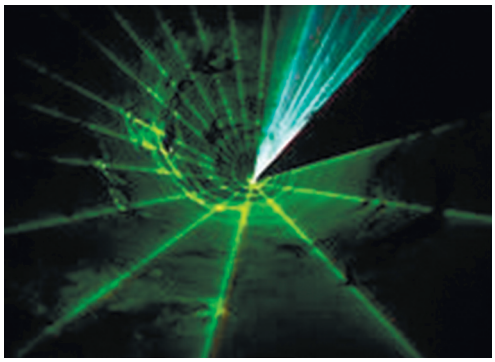
Application of the fs modification technology of transparent materials for writing optical fiber sensors' data.

RESULTS ACHIEVED /

An experimental setup for writing of sensors by the fs modification method in standard nonphotosensitive fibers was created. A prototype of the sensor was created, without removing the protective sheath with multiply increased strength as compared with the standard one.

MARKET POTENTIAL /

In 2008, the world market of fiber-optic sensors reached $ 400 mln and it keeps growing by at least 30% a year. In Russia, promising segments for the developed systems are the electric power industry, systems used in thermometry of wells and monitoring of facilities.



THE TEAM /

ALEKSANDR ZELENIN,
an extensive experience in R&D management and implementation of developments in production;
ALEKSANDR DOSTOVALOV,
CTO, an extensive experience in R&D management and implementation of developments in production.

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FOURIER PHOTONICS LLC

UV-VIS-NIR FOURIER TRANSFORM SPECTROPHOTOMETER

COMPETITIVE ADVANTAGES /

High speed, sensitivity and accuracy of the Fourier transform (FT) spectrophotometer at the price for the product several times less than the closest analog.
Wide spectral range – 200-2500 nm (50,000-4,000 cm^{-1})
High dynamic range – 120 dB.
The spectral resolution – 5 cm^{-1}.

ESSENCE OF INNOVATION /

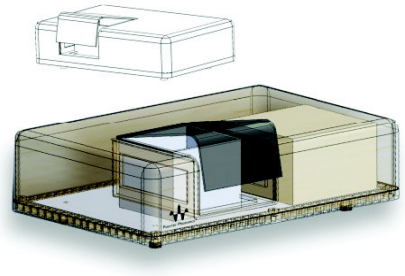
New modulation principle of the optical path difference according to the harmonical law in the interferometer provided the possibility to create FT spectrometers, which operate not only in the near infrared, but also in the visible and ultraviolet ranges.

RESULTS ACHIEVED /

An experimental prototype of the FT spectrometer is created (see picture). The stated operation principle was confirmed and theeffectiveness of the method used in a wide spectral range was proved.

MARKET POTENTIAL /

In 2020, in monetary terms the global market for spectroscopy is expected to be $2.5B. The average growth is around 5-10% per year. The estimated market of the project product (UV-Vis-NIR range, colorimetrics) is $1.5B.



THE TEAM /

ARTUR R. GEIVANDOV,
Ph.D, Phys.-Math.Sci., CEO, leadership experience in research team;
SERGUEI P. PALTO,
Dr. Phys.-Math.Sci., scientific consultant, inventor of new FT spectrophotometer.

CONTACTS /

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GEOMERA LLC

SYSTEMS AND SOFTWARE FOR THE MEASUREMENT OF THREE-DIMENSIONAL OBJECTS

COMPETITIVE ADVANTAGES /

Our measurement systems are automatic and have few requirements for implementation; our software will reduce costs nearly 2-fold.

MAIN POINTS OF INNOVATION /

We are developing a method for the automatic selection of optimum measurement algorithms. We are able to measure complex geometric designs. As a result we are able to use cheaper sensors, owing primarily to the precision achieved by the algorithms we have developed.

ACHIEVED RESULTS /

We have already prepared a prototype system and an alpha version of the program. OMZ Group has shown interest in the development of this product. We plan to implement a system of measurement at Uralmashplant for 6 months. Dozens of systems are in demand by such giants as UGMK and TMK.

MARKET POTENTIAL /

Our clients in the CIS are enterprises wishing to acquire productive and high-precision dimensional control systems (OMZ, UGMK, OAO AvtoVAZ).
3D scanning system manufacturers abroad (ABB, Riftek, KUKA) are also interested in the «3Dcisio» software.

THE TEAM /

Dmitry Lavrinov- Project Founder, Director.
Sergey Komarov- Designer Planner.
Ruslan Acadullin - Manager of Marketing and Product Promotion.
Larissa Lavrinova- Legal Consultant for the Project.
In addition, a number of students have been added to the project as a form of training.

CONTACTS /

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HANDYPOWER LLC

PORTABLE BATTERY CHARGERSBASED ON ALUMINUM WATER GENERATORS OF HYDROGEN AND ON HYDROGEN-AIR FUEL CELLS

COMPETITIVE ADVANTAGES /

High specific characteristics:
10 recharges – more than 180 Wh/kg.
Size and weight: the device - 100 g,
the cartridge – 20 g. When off the grid,
the energy cost of the project sources
is lower than that of lithium-ion
batteriesstarting with the second/
third recharge. Ecologically friendly –
the products of the reaction are: water
and aluminum powder.

ESSENCE OF INNOVATION /

Aluminum-water portable battery
chargers based on fuel cells.
Device consists of two parts: replaceable
cartridge with activated aluminum
and recharger with hydrogen-air fuel cells
battery. Reaction begins when device
is filled with water; aluminum powder
reacts with water evolving hydrogen easily
and quickly even at room temperature.
Then hydrogen transforms into electrical
energy by hydrogen-air fuel cells battery.

RESULTS ACHIEVED /

Laboratory models of up to 2-5 W.
The draft design model of a new design
current source has a capacity
of up to 10 W. CO-INVESTORS:
International Innovative Center
of Nanotechnology CJSC
and Sigma. Novosibirsk LLC.

MARKET POTENTIAL /

Alternative portable battery chargers
are expected to rise at CAGR 87%
reaching $34B in 2015 from $1,5B in
2010 (according to ABI Research. Large-
scale commercialization of fuel cells for
portable applications will start in 2015
and fuel cells portable battery chargers
is expected to account for 9 M units in
2015. Main drivers of portable battery
chargers market: Higher amount of
smartphones with big displays and high
performance, Power demanding apps
and services for smartphones, Widening
gap between power demand and
limited battery capacity, Higher mobility.
According to J'son & Partners Consulting,
Russian smartphones market will reach
22 M units in 2015. Respectively, Russian
market for portable battery chargers is
estimated at 220 000 devices.

THE TEAM /

YEVGENY SHKOLNIKOV,
Doctor of Engineering Sciences, Director
of research, Headof department Scientific
Association For High Temperatures
Russian Academy of Sciences.
MARIA SHCHERBAK,
PhD in Physico-mathematical Sciences,
CEO, Investment manager at TTO RAS
and RUSNANO.

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SKOLKOVO GRANTEE

INTERSOFT EURASIA LLC

MOBILE DOSIMETER-RADIOMETER BASED ON A MOBILE PHONE AND A SMARTPHONE

COMPETITIVE ADVANTAGES /

Reducing the cost of the sensor by more than 5 times. Reducing the size down to 10 cm^2 as compared to 70-110 cm^2 of competitors' products. Lower power consumption. Cross-platform solution.

ESSENCE OF INNOVATION /

The use of a semiconductor radiation sensor.

RESULTS ACHIEVED /

The design is fully developed and ready for production based on Geiger-Muller devices. 7 patents in Russia and 12 international patents have been obtained.

MARKET POTENTIAL /

The target is the market for quality control and human safety, radiation in the environment, the quality of products, building materials, liquids. The market is estimated in millions of units per year in the long term, given the trend to maximize the introduction of functions into modern means of communication (phones, smartphones) provided by various sensors, and given the threat of radioactive contamination in certain areas (Asia).

THE TEAM /

VLADIMIR YELIN,
PhD, founder, serial entrepreneur;
MIKHAIL MERKIN,
world expert in semiconductor sensors.

CONTACTS /

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SKOLKOVO GRANTEE

LAZERSPARK LLC

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 /

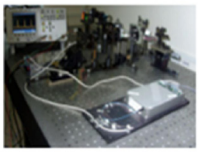
Fiber master oscillator of laser system was created:

- 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 - ± 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.



THE TEAM /

KONSTANTIN POPOV,
CEO, founder and member of several technology start-ups;
SERGEY VARTAPETOV,
research manager, Director of PIC GPI RAS, experience in project management for the development and production of excimer lasers for ophthalmology.

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LUMINESCENT INNOVATION TECHNOLOGIES LLC / LUMINNOTECH LLC

NANOSTRUCTURED ORGANOSILICON LUMINOPHORES FOR IONIZING RADIATION DETECTORS

COMPETITIVE ADVANTAGES /

High light output and low response time. Ability to use different types of detectors. Improved consumer properties:
- 50% sensitivity increase;
- Twofold increase in operation life;
- 30% reduction in materials onsumption.

ESSENCE OF INNOVATION /

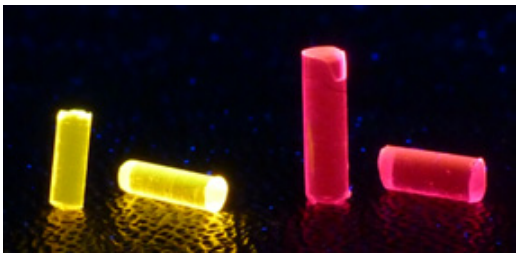
Organosilicon nanostructured luminophors (NOL, where activator and spectrum shifter are merged into a single nanoscale structure) is a new, first-of-its-kind luminescent material proposed for use in plastic scintillators.

RESULTS ACHIEVED /

A wide line of NOL compositions with different absorption (160-400 nm) and luminescence (370-700 nm) ranges has been developed and laboratory tested. Laboratory scintillator samples were obtained containing NOL with performance surpassing the analogs.

MARKET POTENTIAL /

Scintillator-based detectors now account for more than 70% of the radiation detector market. In the foreseeable future this share will be stable as this type of detectors will be the most cost-effective. Growth in markets of internal safety systems, medical imaging, nuclear energy, construction of new megaunits for experiments in high-energy physics. Main scintillator-based detector market trend: search of technologies with increased scintillation efficiency and energy resolution. Average world market of luminophores for plastic scintillators volume has shown stable growth (CAGR - 17%). Market volume of luminophores for scintillator-based detectors will reach $1,2 bn in 2016.



THE TEAM /

SERGEI PONOMARENKO,
Corresponding member of the Russian Academy of Sciences, Doctor of chemical sciences, Science director, Head of the Laboratory of Functional Materials for organic electronics and photonics at Russian Academy of Sciences Institute of Synthetic Polymeric Materials;
OLEG BORSHCHEV,
PhD in Chemical Sciences, CEO, Leading researcher at Russian Academy of Sciences Institute of Synthetic Polymeric Materials;
MARIA SHCHERBAK,
PhD in Physico-mathematical Sciences, Business development manager, investment manager at TTO RAS and RUSNANO. PhD in Physics and Mathematics, leading research associate of the Institute for Social and Preventive Medicine of the Russian Academy of Sciences.

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LYUMINESTSENTNAYA DOZIMETRIYA LLC

AUTOMATED DOSE DETECTION SYSTEM «GRAY» FOR THE MANUFACTURING INDUSTRY, ENVIRONMENT PROTECTION AND MEDICINE

COMPETITIVE ADVANTAGES /

Using a simple and effective method for the detection of high radiation doses - thermophotoluminescence of irradiated detectors. Detectors have exceptionally high sensitivity and stability.

ESSENCE OF INNOVATION /

The system innovation lies in the unique materials and technologies for the high dose detectors production and new methods of dose recording.

RESULTS ACHIEVED /

The technology of low-dose TL detectors manufacturing was developed based on - Al2O3:C. The technique of thermoradion modification of the detectors was developed based on anion-defective single crystals of Al2O3: C for their application in the technological dose metering.

MARKET POTENTIAL /

The device shall ensure the safety of the personnel working with ionizing radiation and of the population living in the contaminated areas. The world market (2020) is $ 180 million.

THE TEAM /

VSEVOLOD KORTOV,
the project manager, the author of 750 scientific papers, 17 patents and 30 certificates of authorship of the Russian Federation, head of more than 200 research and development projects;
SERGEY ZVONAREV,
commercialization and investment.

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Yekaterinburg

MEMBRANE NANOTECHNOLOGY LLC

DEVELOPMENT OF A MULTI -LAYER METAL -CERAMIC NANOSTRUCTURED MEMBRANES AND MEMBRANE MODULES BASED ON THEM

COMPETITIVE ADVANTAGES /

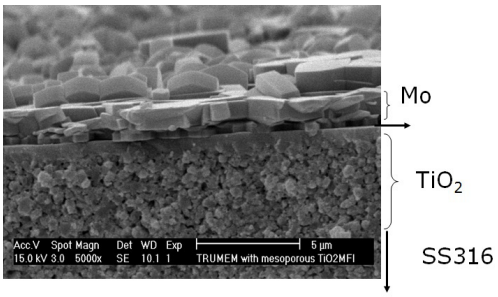
The membranes not only have structural flexibility(ability to take any specified shapes), but are also able toretain high mechanical, chemical, and corrosion resistanceand to withstand temperatures up to 600°C. It is possible to use the membranes as electrodes, to vary the pore size by applying the third layer. These membranes are cheaper than ceramic membranes. They possess bactericidal properties. It is possible to use the membranes inmobile (including vibratory)filter systems,implement them as catalysts, and to apply the third layer of zeolite.

MARKET POTENTIAL /

Promising market sectors: treatment of liquid wastes (including radioactive), sewage waters; separation and purification of gases in chemical, nuclear, oil and gas industries. Usage as electrodes in medical devices, in equipment for manufacturingof pharmaceutical products, andfor filtering and condensing of products in food industry.
Decontamination and desalination of water.

RESULTS ACHIEVED /

The R&D stage is completed. Experimental three-layer membranes for various applications are being developed and tested. R&D completion is scheduled for 2014-2015.



THE TEAM /

ALEKSEY SVITSOV,
PhD in Technical Sciences, Prof. of MUCTR, scientific management. Research interests – the use of membrane technology in energy, biotechnology and nuclear industries;
VIKTOR NOVIKOV,
designed an MCM production technology, patents for nanotechnology materials and equipment for the use of MCM.

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MICROSENSOR TECHNOLOGY LLC

CREATING OPTICAL SENSORS BASED ON LED MATRI X OF MID-INFRARED BAND TO CONTROL THE CHEMICAL COMPOSITION OF GAS, LIQUID AND SOLID MEDIA

COMPETITIVE ADVANTAGES /

Low power consumption - 1 mW.
Long service life, no frequent recalibration required - up to 10 years. High speed - 10-30 ns (5 orders of magnitude better than the analogs).
Compact size - (0.3 x 0.3 mm).

ESSENCE OF INNOVATION /

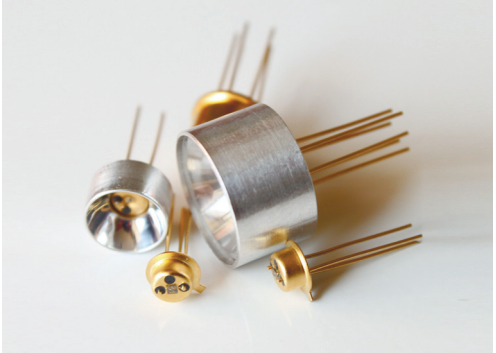
Based on solid solutions of GaSb-InAs, LED chips are developed, the emission of which overlaps the medium IR range from 1,600 to 5,000 nm, allows analyzing the concentration of up to 50 chemicals, including CO_2, H_2O, hydrocarbons (CxHy).

RESULTS ACHIEVED /

The production technology of LEDs and photodiodes in the mid-IR region is developed. A pilot production of individual LEDs of IR band is organized.

MARKET POTENTIAL /

The target market of the project is the world market sensors and the systems for analysis of the chemical composition of gas, liquid and solid substances; by 2015, the market of chemical analyzers will be $ 17 billion.



THE TEAM /

NIKOLAI STOYANOV,
Dr. Phys.-Math.Sci., CEO, MBA, the author of over 40 scientific publications, leadership experience in many Russian and international research grants;
SERGEY KIZHAEV,
chief production engineer of LPE. More than 25 years deals with the developing of cultivation the technology for narrow-bandgap heterostructures in GaSb-InAs systems by liquid phase epitaxy (LPE).

CONTACTS /

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MIKROTRINO LLC

MAGNETIC SYSTEMS BASED ON RAREEARTH PERMANENT MAGNETS FOR APPLIED ELECTRON ACCELERATORS

COMPETITIVE ADVANTAGES /

Magnetic systems based on rare earth magnets require no power supply; hysteresis phenomena are not inherent; they are highly reuseable and provide stability of the parameters of the accelerator beam in the process.

ESSENCE OF INNOVATION /

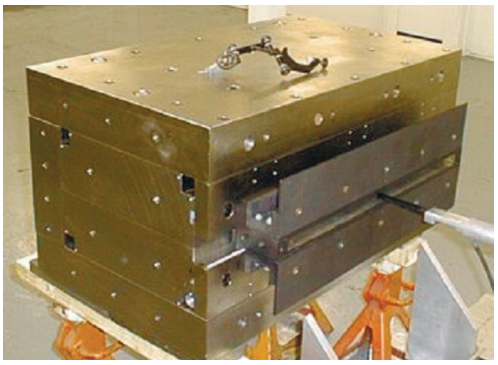
Magnetic systems based on rare-earth magnets. The designing technology, measurements and settings allow making them at a labor costs that does not exceed those for the manufacture of electromagnets.

RESULTS ACHIEVED /

This technology was the basis for accelerators of split microtron type at 35, 55 and 70 MeV. A split microtron design for intraoperative radiotherapy is under development. Calculations for an industrial linear accelerator have been made.

MARKET POTENTIAL /

Worldwide, there are approximately 30,000 accelerators engaged in industry, medicine, etc. Replacing electromagnets with permanent magnetic systems provides improved performance in approx. 10% of those accelerators.



THE TEAM /

NIKOLAI PAKHOMOV,
CEO, experience in the development of accelerators at 35 MeV and 70 MeV;
VASILY SHVEDUNOV,
scientific director, experience in building various accelerator systems and electrical installations;
ANDREY YERMAKOV,
research physicist, experience in development of microcontrollers and adjustment of accelerator systems.

CONTACTS /

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MR TOMOGRAPHICS LLC

DESIGN AND CREATION OF A SUPERCONDUCTING MAGNETIC RESONANCE TOMOGRAPH PROTOTYPE WITH HELIUM-FREE COOLING

COMPETITIVE ADVANTAGES /

Creating superconducting MR tomograph with a field of 1.5 T with helium-free cooling is the main ambitious task of the magnetic and cryogenic technologies development. In the case of helium-free MRI the picture cost (scan, tomography) falls 1.5-2 times.

ESSENCE OF INNOVATION /

Helium-free cooling based on the use of special materials and techniques of the magnet manufacturing and its cooling by conductive (through the heat transfer line) method.

RESULTS ACHIEVED /

A prototype of a compact scanner was created (magnetic field is 1.5 T, the working area is 160 mm). Helium-free cooling principle is implemented by using laboratory magnets with the field of up to 8 T.

MARKET POTENTIAL /

MR imaging is one of the most often used methods in medical imaging diagnostics. By 2016, the global market for diagnostic imaging will grow to$ 26.6 billion.

THE TEAM /

MARIA PETROVA,
CEO. Experience in project management for the development and patenting of cryogenic equipment, the author of five publications, 1 patent;
EVGENY DEMIKHOV,
CTO, Dr. Phys.-Math.Sci., prof., Head of cryogenic department of LPI, the author of over 100 publications, 12 patents. Cryogenic equipment and the magnetic fields devices.

CONTACTS /

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SKOLKOVO GRANTEE

NANOOPTIKA LLC

APPLICATION OF DIGITAL PLANAR HOLOGRAPHY IN INTEGRAL OPTICS

COMPETITIVE ADVANTAGES /

DPG G replaces the conventional optics (mirrors, lenses, diffusion lattices).
DPG reduces the size and weight of the spectrometer (resolution up to 0.02 nm).
Optical part is manufactured by nano-imprint - exceptional cheapness in the production.

ESSENCE OF INNOVATION /

Programmable miniature digital integrated optics based on the holograms allows controlling the distribution and changing the characteristics of a light wave in the plane of the optical waveguide.

RESULTS ACHIEVED /

Completion of the R&D stage.
Manufacturing and testing of a miniature spectrometer prototype (the smallest in the world). Completion of R&D stage, testing and commercialization is planned in 2014-2015.

MARKET POTENTIAL /

The target market for the spectrometer for laser light monitoring is $250-500 million (tunable and femtosecond lasers).
In the long term - the production of absorption, emission and Raman spectrometers - up to half of the market spectrometry.

THE TEAM /

VASILY NIKOLAEV,
CEO, MBA;
VLADIMIR YANKOV (USA),
Dr. Phys.-Math.Sci., the research manager of the project, the creator of the theory of the digital planar holography;
ALEKSANDR GOLTZOV (Russia),
Dr. Phys.-Math.Sci., prof., technical director of the project, recognized experimental physicist.

CONTACTS /

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SKOLKOVO GRANTEE

NANOTECHNOLOGIES OF MEDICAL METALS LLC

NANOSTRUCTURED METALS AND ALLOYS FOR MEDICAL IMPLANTS

COMPETITIVE ADVANTAGES /

The nanostructuring technology increases the strength of pure titanium Grade4 by 2 times, the titanium alloy Ti-6Al-4V (Grade23, Grade 5 ELI) by 1.5 times and relative elongation of the hardened material by 10% and more.

ESSENCE OF INNOVATION /

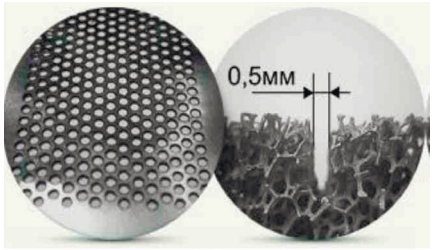
The use of intense plastic deformation permits changing the grain size of the material; additional heat treatment relieves stress and increases the plasticity of the material.

RESULTS ACHIEVED /

Experimental technology for nanostructured titanium and titanium alloys was developed.Successful negotiations were conducted with two foreign custumers for the supply of pilot batches of the material.

MARKET POTENTIAL /

Annual demand for nanostructured titanium and alloys is 30 tons (approx. $ 50 million). Producer of medical devices (Basic Dental) have officially expressed his interest in acquiring the technology.



Structure of plate for cranio-maxillofacial surgery manufactured using electrochemical machining (ECM)

THE TEAM /

RUSLAN VALIEV, Doctor of Physical and Mathematical Sciences. He researched the principles of creating nanostructured states in bulk metallic materials, which allows modifying the properties of structural and functional metals and alloys of virtually any chemical composition;
RUSLAN KHISAMUTDINOV, Ph.D in Technical Sciences, 15 years of management experience in science and business.

CONTACTS /

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NEW CHEMICAL PRODUCTS LLC

INDUSTRIAL TECHNOLOGY OF PRODUCTION OF ANHYDROUS HYDROGEN FLUORIDE FROM FLUORINATED TECHNOGENIC RAW MATERIALS

COMPETITIVE ADVANTAGES /

Production costs of AHF obtained on the basis of the developed technology will be approx. 20-30 rub/ kg, while the production cost of the conventional technology based on natural raw materials imported is approx. 55 rub/kg.

ESSENCE OF INNOVATION /

Using fluorine-containing waste of nuclear fuel productions, phosphate fertilizers and aluminum as raw materials that are currently accumulated and stored at enterprises and that represent an environmental threat rather than expensive natural fluorite.

RESULTS ACHIEVED /

A laboratory installation has been manufactured and the efficiency of the technology was tested. RF Patent Pending.

THE TEAM /

A.V. MAMAEV,
CEO, expert on venture capital investment;
D.S. PASHKEVICH,
Dr. Sc. Eng., Deputy Director of Science;
D.A. MUKHORTOV,
PhD Eng., chief technologist;
YU.I. ALEKSEEV,
PhD Eng., chief designer.

CONTACTS /

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OPTOGARD NANOTECH LLC

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 /

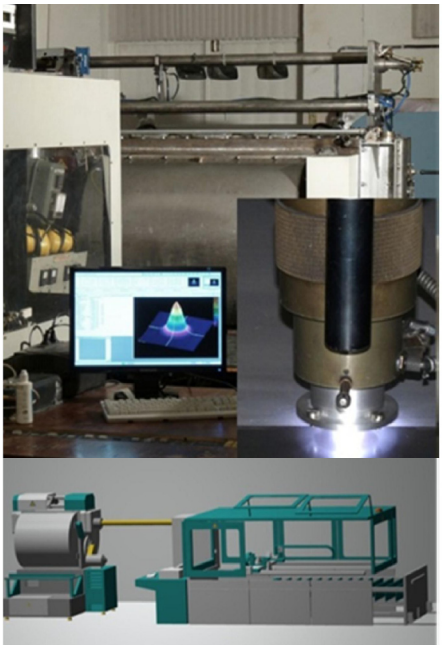
Method of ignition of laser plasma in a high-speed flow of gas at atmospheric pressure. Consumer value of the technology is determined by the ability to extend service life, obtaining new properties and characteristics for the products processed.

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 SMIRNOV, of JSC Optogard-Nanotech, developer, co-author of inventions, has successful experience in the implementation of innovative technologies.
SERGEY 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 SMIRNOVA, doctor of chemistry, chief researcher, leading expert in materials science.
Total number of employees – 42 people.

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SKOLKOVO GRANTEE

PHOTONIC NANO-META TECHNOLOGIES LLC

NAME OF THE PROJECT PRODUCT - SINGLE-PHOTON GENERATOR

COMPETITIVE ADVANTAGES /

Operation stability at room temperature. Implementation mode «on demand»: one pulse - a single photon. Theoretically achievable generation rate is 10 GHz. Broadband (600-750 nm). Photon polarization control.

ESSENCE OF INNOVATION /

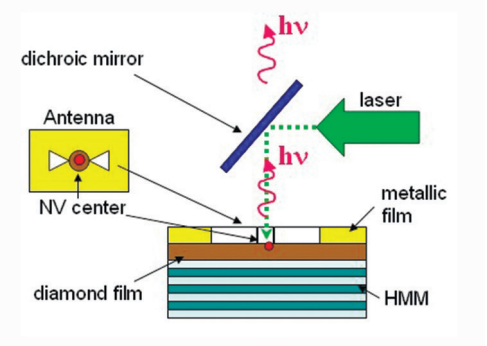
The novelty lies in the use of the patented technology of the single-photon generator in the «chip» structure with the use of nitrogen-vacancy centers in diamond, hyperbolic metamaterials and anoantennas.

RESULTS ACHIEVED /

The project is at the R&D stage. The research and experiments are conducted to create nitrogenvacancy centers in nanoscale diamond films, optimization of hyperbolic metamaterials and nanoantennas' calculations.

MARKET POTENTIAL /

Consumers - manufacturers of integrated optical circuits, the developers of quantum and optical computers. World market: the total amount of potential markets in 2016 is $19.3 billion. The average annual growth rate will be 9.6%.



THE TEAM /

VLADIMIR SHALAEV, Scientific Director of Nanophotonics Bob and Anne Burnett Distinguished Professor of Electrical and Computer Engineering, scientific director of the project;
ANDREY SMOLYANINOV, organizational and operational management of the company to implement the project.

CONTACTS /

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PLASMACHEMICAL TECHNOLOGY LLC
PLASMA GASIFICATION OF WASTE

COMPETITIVE ADVANTAGES /
The maximum (compared to other methods) percentage of processing – up to 98% of feedstock. No persistent toxic volatile substances due to high processing temperatures – more than 1,300 °C. The level of energy dependence of the plant – the technology uses part of the generated energy. Absolutely environment-friendly slag. Mobility and possibility to make a modular container design plant.

ESSENCE OF INNOVATION /
The dense low-temperature plasma generator (plasmatron) uses an AC power source to achieve the highest efficiency. Replacement of electrodes does not require stopping production processes.

RESULTS ACHIEVED /
The R&D stage is accomplished.
A series of practical experiments is ccomplished.

MARKET POTENTIAL /
The Russian market for the processing of municipal solid waste (MSW) is about $ 2 bln. The significant growth potential is determined by the low percentage of MSW processing at 5-6% only, as well as by the growing environmental requirements for owners of such waste.

THE TEAM /
DMITRY ARONIN,
CEO;
FILIP RUTBERG,
Dr. Sc. Eng., author and inventor, Prof. at SPBSTU, RAS Academician;
ALEKSANDR BRATSEV,
PhD in Eng. Sc., employee of IEA RAS, head of the laboratory plasma technology.

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RADIATION TECHNOLOGY LLC

INTELLIGENT DOSIMETER - SMART SPECTRUM

COMPETITIVE ADVANTAGES /

Spectrometric analysis
Measurement accuracy unattainable for state-of-the-art dosimeters
Miniature size. Wide range of recording
Online-measurements.

MAIN POINTS OF INNOVATION /

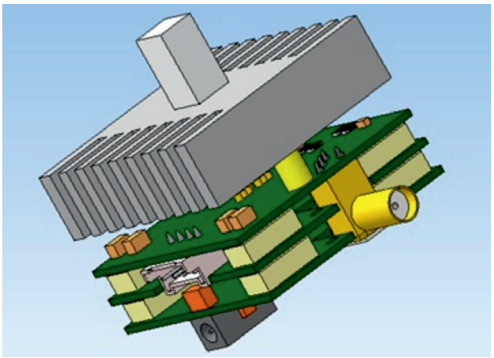
A portable smart dosimeter and spectrometer. This device is innovative because gamma-ray spectrometry methods are used for personalmonitoring of radiation exposureof personnel engaged in nuclear, chemical, and oil refining industries.

ACHIEVED RESULTS /

A prototype ofa miniature dosimeter-spectrometer has been developed; research and engineering survey arein progress. It has been confirmed that it is possibleto identify radionuclides throughout the entireenergy range; the range ofgamma dosage rate measurement has been obtained.
An application for a patent has been filed.
In 2013, the project made it to the finalround of the innovative projects competition (Zworykin Award);
in 2012 and 2013, the project was declared the winner of a projects competition conducted by theFederal Agency for Youth Affairs.

MARKET POTENTIAL /

In 2013, the Russian marketwas worth120 million dollars.
Growth dynamics – 10 % per year.
In 2013, the world market was worth 1,300 milliondollars.
Growth dynamics – 8 % per year.
Promising market sectors: nuclear energy, medicine, oil and gas, and chemical industries.



THE TEAM /

PAVEL KUDRIN
CEO, Project Initiator
TIMOFEY V.ANDRIANOV
CTO, PhD (Physics and Mathematics)
EVGENIY A.KRAMER-AGEEV
Project Scientific Adviser, PhD (Physics and Mathematics).

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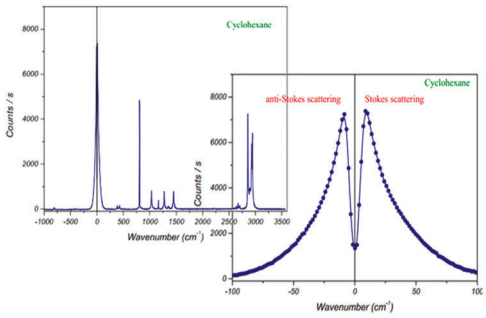
SKOLKOVO GRANTEE

RAMMIKS LLC

COMPACT RAMAN FLUORESCENCE MICROSCOPE FOR RAPID ANALYSIS OF SMALL AMOUNTS OF ORGANIC AND INORGANIC SUBSTANCES

COMPETITIVE ADVANTAGES /

The cost is 10 times less due to the original design of the spectral part of the instrument, while the sensitivity is the same as that of peers. It is possible to separate Raman and luminescence spectra within a single scan cycle of a multichannel detector. The reliability of determination of the chemical composition of complex chemical compounds is improved.



ESSENCE OF INNOVATION /

RamMix spectrometer integration into an optical microscope scheme allows analyzing matter on a surface with a high spatial resolution. Application of substrates made using SERS to achieve a multiple increase in the sensitivity of the instrument.

RESULTS ACHIEVED /

20 sets of RamMix were developed and submitted those to key users for test operation. Instruments are being designed as per Terms of Reference from pharmaceutical and chemical companies. 2 applications were submitted to Rospatent for an invention and 2 for a utility model.

MARKET POTENTIAL /

The market for analytical instruments is $ 9.1 bln in 2011; it will reach $ 10.5 bln in 2015. The share of Raman instruments grows fastest in the market – 10% a year, basically due to competition and substitution of infrared spectrometers.

THE TEAM /

ALEKSANDR VANKOV,
CEO of Rammiks LLC, PhD in Physical and Mathematical Sciences;
IGOR KUKUSHKIN,
director of research, Doctor of Chemical Sciences, RAS Corr.;
LEONID KULIK,
director of technology, Doctor of Physical and Mathematical Sciences at IFTT RAS.

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SKOLKOVO PARTICIPANT

RATEK LAB LLC

THE SYSTEM OF CARGO IDENTIFICATION BY THE ELEMENTAL COMPOSITION TO ENSURE ECONOMIC, TRANSPORT AND ENVIRONMENTAL SAFETY

COMPETITIVE ADVANTAGES /

Contactless and high-speed analysis method. Cargo control at speeds of up to 40 km/h Minimal restriction zone for personnel during the system operation and no hazards in a standby mode. Ability to control radiation background.

ESSENCE OF INNOVATION /

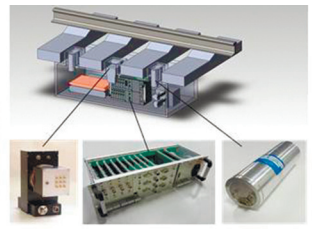
Technical implementation of tagged neutron method for substances identification by the elemental composition in high-speed diagnostics systems ensured by highly sensitive detectors, fast electronics and data processing systems.

RESULTS ACHIEVED /

Pilot system was developed, and laboratory tests were conducted. Successful negotiations were held on the creation of a prototype and conducting the trial operation at the site of «Russian Railways» JSC.

MARKET POTENTIAL /

Today, the costs of additional inspection of the containers are up to $20 billion for 50 largest ports. Using the proposed systems will result in savings of 95%. In 2017, the market for additional inspection of containers will be about $1 billion.



One option for placement of cargo chemical elements' identification system on railroad bed

THE TEAM /

YURI OLSHANSKY,
PhD in Technical Sciences, CEO and scientific director of the project, extensive practical experience in the development and production of advanced systems in the field of applied nuclear physics;
ANDREY VISHNEVKIN,
PhD in Technical Sciences, Director of development, has international experience in the implementation of new high-tech solutions.

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RUSTEK LLC

APPLICATION OF THE STRUCTURAL SUPERPLASTICITY PHENOMENON IN THE TECHNOLOGY OF SEMICONDUCTING MATERIALS

COMPETITIVE ADVANTAGES /

Cost-effective production technology is a key elements for thermoelectrics. The new cylindrical shaped TE-branches are in high demand in the industry. It is a heavy-duty material in comparison with its competitors. It provides the modules with complete protection against corrosion.

ESSENCE OF INNOVATION /

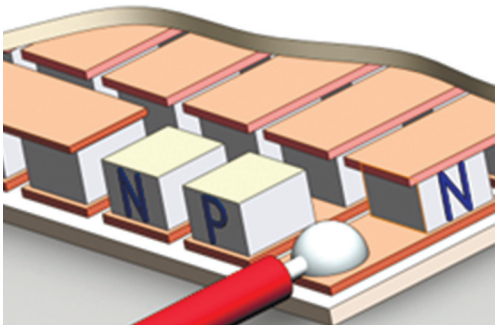
Managing the material properties through the grain boundaries allows choosing the thermoelectric material flow mode, thus allowing to "cast" optimal branches of modules.

RESULTS ACHIEVED /

Prototypes of rods, branches that operate in finished modules efficiently and reliably, were produced. Corrosion protection technology for side surfaces of branches were tested and approved for use. Applications were submitted to patent the technology.

MARKET POTENTIAL /

When the technology supporting TE-branches and saving TE enters the market of $ 360 million, consumers are expected to quickly abandon TE-materials produced by conventional methods.



THE TEAM /

SERGEY SKIPIDAROV, CEO, has been working in the field of thermoelectricity since 1972; he created a successful TE module production business; VLADIMIR CHUVILDEYEV, scientific director; NIKOLAI SIDORENKO, engineer and physicist. Other team members also have fundamental experience in the modification of the properties of semiconductor materials.

CONTACTS /

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SKOLKOVO GRANTEE

SIEMENS R&D CENTER LLC

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.

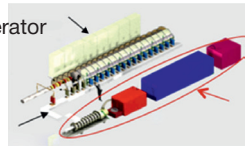
RESULTS ACHIEVED /

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).

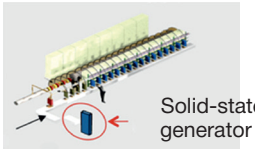
MARKET POTENTIAL /

Volume of the market of HFs 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.

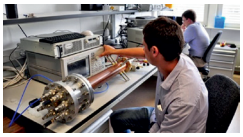
Traditional technology of RF power generators



Solid State Direct Drive™ — HF technology for the future



Siemens Research Laboratory in innovation center «Skolkovo»



THE TEAM /

STEPAN POLIKHOV, project manager, employee of department of CT Siemens Russia.
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™.
EVGENIY LEVICHEV, Doctor of Physical and Mathematical Sciences, prof. of G. I. Budker Institute of Nuclear Physics, (Novosibirsk); has developed a variety of accelerating installations.

CONTACTS /

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SPEKTR LLC

CREATING A PORTA BLE AND AUTOMATED SPECTROMETER ELECTRON PARAMAG-NETIC RESONANCE (EPR) TO STUDY MATTER AT THE NANOSCALE

COMPETITIVE ADVANTAGES /

A device with minimal weight and size, better power parameters, high precision and an optimal price. No need for any manual adjustments in the microwave channel during operation.

ESSENCE OF INNOVATION /

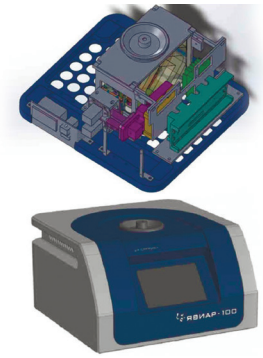
A source of polarized magnetic fields, a system of high-energy permanent magnets. The principle of coherent superheterodyne registration of an EPR signal.

RESULTS ACHIEVED /

A superheterodyne method of signal detection, based on coherence, was implemented. A microwave system was created and the basic units of the model sample were manufactured. The patent was approved. A plan for cooperation with manufacturers was formed.

MARKET POTENTIAL /

Promising market sectors: research, technological control of industrial processes, dosimetry control of population and high-dose dosimetry – estimated at $ 7 bln.



THE TEAM /

ANDREY TARARKOV,
CEO, experience in project management;
IGOR KRUZHAEV,
project manager, project coordination, experience in equipment development, NPO Avtomatika;
ALEKSANDR ROKEAKH,
project research advisor, experience in developing equipment and EPR/ENDR measurement techniques.

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SPLIT LLC

PROGRAM AND METHODICAL SYSTEM FOR PROCESSING AND INTERPRETATION OF DATA OF NUCLEAR LOGGING METHODS FOR «SPLIT» WELLS

COMPETITIVE ADVANTAGES /

Expert-automated quality assessment of geophysical data, processing and reliability of the results. The possibility of using the program-methodical system with all types of nuclear geophysical equipment. Geological and object orientation of the method.

ESSENCE OF INNOVATION /

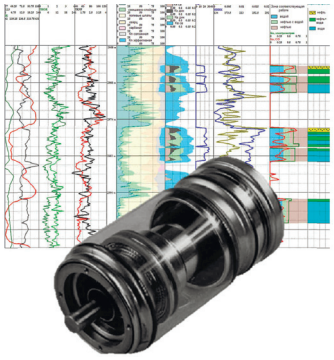
The use of techniques for simultaneous analysis of a number of approaches to data analysis of nuclear logging methods that allow dramatic improvement of the efficiency of predictive analysis.

RESULTS ACHIEVED /

A prototype of the program-methodical system “Split”, the techniques for processing and interpretation of data of nuclear logging methods were developed. They conducted experimental implementation and obtained results at the level of 80-85% in predictive analysis accuracy (50% according to standard procedures). The company owns four national and international patents.

MARKET POTENTIAL /

The world market for well data processing stands at to $ 100 mln. The largest consumers are oil and gas service companies as well as manufacturers of drilling equipment. One of the current trends related to the need to improve the precision and accuracy of well logging – the use of neutron logging which implies the need to develop appropriate analytical software solutions.



THE TEAM /

VASILY BELOKHIN,
CEO;
GEORGI KARMYKOV,
director of science and business development.

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SKOLKOVO GRANTEE

SUPEROKS-INNOVATION LLC

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.

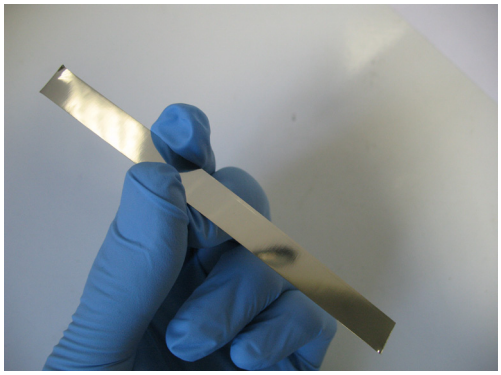
RESULTS ACHIEVED /

The main components of this hybrid technology were developed at the International superconductivity canter (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 advisor
VLADIMIR MATIAS,
technical expert;
SERGEY LI,
ISTEC technical expert.

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SKOLKOVO GRANTEE

TEKHNOSCAN-LAB LLC

LASER SYSTEMS FOR A NEW GENERATION OF INFO- , NANO- AND BIO- TECHNOLOGIES. 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 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 KUKARIN, development and tests of laser systems. More than 120 scientific publications and 2 patents.
ALEXEY IVANENKO, optimization of parameters of laser systems. Experience of working at the Institute for the technologies of photonics at Aston University (Birmingham, Great Britain).

CONTACTS /

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TERALIFE LLC

DEVELOPMENT OF A PROCESSING BASE FOR THE CREATION OF A FAMILY OF DEVICES BASED ON TERAHERTZ RADIATION FOR REMOTE SENSING AND IDENTIFICATION

COMPETITIVE ADVANTAGES /

The unique technology of terahertz intravizor will combine the approaches used in the competitive technologies, and lead to a significant increase in contrast and informative picture of the object and widen the range of applicability of THz systems.

ESSENCE OF INNOVATION /

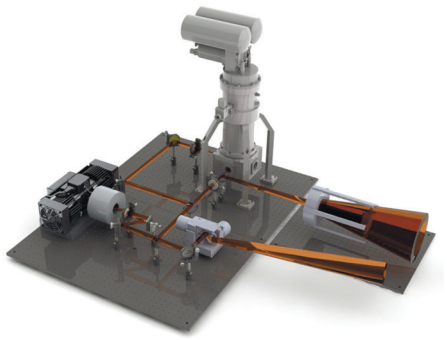
Multifrequency radiation generator provides the «color vision» function and is integrated into a single device with a hypersensitive detector. For spectrum control, the interference of traveling and localized plasmons are used on subwavelength structures.

RESULTS ACHIEVED /

Under laboratory conditions, the possibility of obtaining the THz imaging of biological tissues and chemicals was shown. The spectral analysis and new signal processing methods allow obtaining various data such as signs of the early stage of skin cancer development.

MARKET POTENTIAL /

For medical diagnostics market, it is an inexpensive device providing high reliability of the diagnosis thanks to high resolution in space and the type of tissue. THz devices for remote detection of objects are in demand in the market of security systems.



THE TEAM /

ALEKSANDR SHKURINOV,
Dr. Phys.-Math.Sci., professor,
Research Manager, experience in the devices development of terahertz band and technology development of their application:
ILYA OZHEREDOV,
leading researcher, experience in formulating and solving the problems in the field of terahertz nanophotonics;
ALEKSEY BALAKIN,
CEO, experience in company administration and management.

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TERRIKON LLC

RESEARCH AND DEVELOPMENT OF A TECHNOLOGY FOR THE RARE EARTH METALS (REM) EXTRACTION FROM RAW PHOSPHOGYPSUM

COMPETITIVE ADVANTAGES /

REM extraction rate is 15-20% higher compared to the conventional methods (<70%). The minimum amount of sulfuric acid (no more than 5 g/l) is used. Selective extraction of REM (collective concentrate with the amount of REM oxides of at least 95%).

ESSENCE OF INNOVATION /

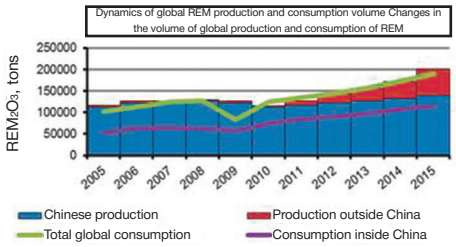
Innovation of the technology is in the sulfuric acid sorption leaching process using ion-exchange materials for concentrating REM.

RESULTS ACHIEVED /

The extraction degree of rare earth metals in the concentrate is 55-60%, the content of the REM2O3 in the concentrate is 70-75%, and standard gypsum with P2O5 content is no more than 0.3-0.4% and F content is less than 0.5%.

MARKET POTENTIAL /

The rate of production and consumption of rare earth products in the world will increase every 5 years by 70-80%, reaching the volume of 300-320 tons by 2020, in monetary terms (2020) it is $ 6.75 billion.



THE TEAM /

EVGENY KIRILLOV,
successful experience in conducting research and pilot projects at «Dalur» JSC, «EzOTsM» JSC
VLADIMIR RYCHKOV,
director of research and development, the author of 260 publications, 32 patents of the Russian Federation in the industry.

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SKOLKOVO GRANTEE

TOPSKAN LLC

A NEW GENERATION OF PROBES FOR SCANNING PROBE MICROSCOPY

COMPETITIVE ADVANTAGES /

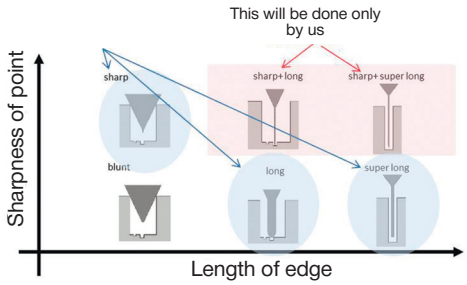
All existing technologies for probe creation are based on silicon crystal-orientation dependent etch. The project proposes the technology of controlled growth, allowing a better way to create what already exists and create what others cannot.

RESULTS ACHIEVED /

Technology efficiency was confirmed when using a classic material, i.e. silicon. The tests showed better results in comparison with the analogs used for the test demonstration of the equipment quality.

MARKET POTENTIAL /

The world market for SPM probes is approximately $105M per year with the prospect of rising to $200-250 M. Product of the project can expect the share of 30% of the market.



THE TEAM /

MIKHAIL GIVARGIZOV,
the developer and innovative entrepreneur, has assembled a team and organized a site for contemporary crystal production, has created a silicon probe with the best performance in the world;
EVGENY VLASENKO,
industrial production engineer with the experience in new technologies implementation (regulation).

CONTACTS /

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UNISCAN-RESEARCH LLC

RADIO-CHANNEL THERMAL-IMAGING COMPLEX

COMPETITIVE ADVANTAGES /

The system operates independently for up to 6 months at temperatures of -45 to +50 °C and can significantly accelerate the transmission of information via a coded radio-channel as compared to existing methods.

ESSENCE OF INNOVATION /

The digital video stream and thermal imager is subject to additional processing and video compression. It is then transmitted via a coded radio channel to the operator's station. A data ransmission system provides parallel transmission of information from four devices at a distance of up to 30 km.

RESULTS ACHIEVED /

The problems with the existing systems were defined; the original customer requirements for the product were established. Established cooperation to conduct the necessary research and development. The system layout was assembled and work began on fast video compression.

MARKET POTENTIAL /

Cooperation with specialized companies allows the product to claim up to 10% of the Russian market for perimeter protection systems (RUB 9 bln in 2016) and gives it a good chance to quickly enter the world market ($ 15 bln by 2016).

THE TEAM /

A team with successful experience in creating high-tech products (X-ray machine, alarm systems for the protection of critical facilities) is engaged in the development. Our list of partners includes the Institute of Semiconductor Physics and colleagues with experience in the markets of Europe and the U.S.

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SKOLKOVO GRANTEE

URAL INDUSTRIAL COMPANY LLC

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 manager; 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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