International Science & Technology Center

Annual Report 2009

15 Years of Science Cooperation

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Governing Board Chairman Statement

Fifteen years ago, the International Science and Technology Center (ISTC) began its operations at a crucial moment for the scientific community worldwide and for Russia and other former republics of the Soviet Union in particular. Since that time, new networks of national and international scientific contacts have been built. Many new partnerships have been forged as an outcome of ISTC's work.

Membership has continued to grow as the value of the Center to all of the Parties has been demonstrated. Some 40 countries in Europe, Asia and North America are now engaged with the ISTC. An agile, transformed ISTC is as important to the peaceful application of science in a future characterized by the rapid advance and spread of technology as the original, innovative Center was in a period of transition.

In December 2009, I was privileged to open a conference to celebrate the 15th anniversary of the International Science and Technology Center. Five years before, I had raised the question as to whether the ISTC would simply be an organization to deal with the legacy of the past or whether it constituted a prototype of how we might deal with the challenges of the future. The focus is now clearly on the future. The Parties have underway a work program to ensure that the ISTC is effectively transformed to reflect the full partnership of the parties to address global S&T challenges that directly impact international security. Recommendations will be considered at the Governing Board meeting of July 2010. The transformation of the ISTC to provide wider partnership and greater flexibility will be more than a symbol of commitment and cooperation. It will provide an enhanced tool for multilateral science engagement on behalf of international security and prosperity

The ISTC offers many lessons learned to other geographical areas. The Center will have to continue to evolve and to develop new strategies and approaches. Effective partnership will have to continue to ensure that the work of the

Dr. Ronald F. Lehman II
Chairman of the ISTC Governing Board

Center is in line with new scientific problems and changing circumstances. At the same time, the ISTC continues its existing programs and reforms. The record is impressive. Over 73,000 scientists have been engaged. The ISTC is also working with international organizations. For example, the Center provided essential support to the development of nuclear physics and to revolutionary international projects such as the Large Hadron Collider at CERN, on the border of France and Switzerland. Early on, however, the ISTC also become a major catalyst for cooperation in biology, chemistry, aeronautics, information science, and many other disciplines.

The ISTC supported the creation and commercialization of new technologies, the development of nuclear medicines and nanotech production lines for new materials. The ISTC enhanced the development of biotechnology and promoted technologies designed to protect the environment and provide energy efficiency.

Innovation Support Programs have quantifiably benefited many of the research institutes and spin-off companies with whom we have worked The results of our work brings about real change to the societies in which we live, both through the practice of cooperation and in the technological advances and benefits that result from working together.

After the establishment of the ISTC, scientific challenges have drastically changed. Previously, scientific work had a rather local character; today the challenges have become more global and are broader in their potential consequence. Ideas, people, and investment move quickly and most do so to meet modern needs of the Parties.

For example, pandemic disease, such as new strains of flu, highlights the need to increase cross-border cooperation in monitoring and in the development of international solutions for control. In this area, the ISTC has funded many projects related to disease surveillance and to the development of anti-flu vaccines.

Understanding the effects of climate change and measures to mitigate its consequences has become more urgent. The ISTC has funded projects to monitor the effects of climate change, particularly in the Arctic Circle. To help ensure that the nuclear energy renaissance is safe, secure, and cost-effective, the ISTC has funded projects to develop novel nuclear energy techniques and to promote the safe storage of nuclear waste.

The International Science and Technology Center has responded to the rapid development of new scientific challenges by developing its focused initiatives. These have included projects in the area of counter bioterrorism, the development of new medicines and work on promising medical diagnostics. In this context, I would like to pay a special tribute to the members of the Scientific Advisory Committee. Its members evaluate a vast number of projects on their scientific merit, guaranteeing that only high-quality projects are being funded.

Following various experts' reports, and recommendations from the G8, the Center will also have to strengthen the preventive approach in its work, to effectively enhance a culture of responsible science. All of these future developments are in line with the priorities of the ISTC Parties.

The ISTC has proven itself to be an effective instrument of international scientific cooperation dealing with global security concerns. Over its 15 years, ISTC has brought together many scientists and researchers from all over the world to engage in important and groundbreaking work. It also has made laboratories safer places to work and has taken new technological initiatives against the smuggling of proliferation related materials. The numerous projects, training courses, exchanges and scientific presentations have brought scientists together to their, and to our, mutual benefit.

I would like to express my personal appreciation to all those individuals who, with immense dedication, have been involved in the achievements of the ISTC. I also would like to pay a special tribute to all those pioneers who established the Center during its early days. Their foresight has enabled all of the Parties, large and small, to continue to reap the benefits from the work of the Center.

Dr. Ronald F. Lehman II
Chairman of the ISTC Governing Board

Executive Director Statement

2009 was a special year for ISTC with the Center celebrating its fifteenth anniversary.

Following a series of themed events throughout the year, in December an anniversary conference, attended by many of those closely associated with the past, present and the future of the Center took place in Moscow and covered both the work to date of ISTC and its way forward. The results during its 15 years of existence have proved impressive. I am very happy to explain why.

The work of the Center has contributed to many major scientific advances in the nuclear and bio sectors, and to the development of new products such as new vaccines and instruments. Russian and other CIS scientists and engineers have been integrated into the international scientific community. A substantial contribution has been, and continues to be made to objectives under the world-wide nonproliferation policy. Safety and security at various installations and laboratories has been significantly improved.

The 15 Year Anniversary Review announced at the conference shows that the main advantages of ISTC are:

- Its network of over 73,000 scientists in Russia and the CIS alone and its capacity to draw together the best expertise to contribute to the solution of challenges of global concern;
- Its capacity to handle effectively multilateral funds as well as its ability to prepare, decide and implement scientific and technology programs and projects, which include the payment of individual grants and the procurement of vital equipment and materials;
- Its ability to effectively carry out training courses for scientists that increase their skills and their awareness of the potential dual-use of their daily work activities; and
- Its role in carrying out the commercialization and innovation of research projects; bringing research results to the marketplace and contributing to job creation and competitiveness.

Adriaan van der Meer
ISTC Executive Director

ISTC also supports the work of other international organizations such as CERN in Switzerland and the International Atomic Energy Agency (IAEA). An initiative was taken to more closely cooperate with IAEA on the basis of a Memorandum of Understanding signed in July 2009. The unique features of ISTC provide an opportunity to better address IAEA's scientific and technical needs.

In 2009, ISTC accomplished new project funding for 63 projects in the amount of $19.1 million USD of which ISTC Partners provided $9.5 million USD for 34 projects. Direct grants were paid to 14,181 scientists and their team members, amounting to $31.8 million USD. ISTC welcomed 25 new partner organizations in 2009 bringing the total number of partners to 433 since the start of the ISTC partner program. Since 1994, ISTC has financed 2,702 Projects with a total volume of over $835 million USD.

New projects are being developed and funded in the Far East and East Siberia as a follow-up to a Russia-Japan Summit in February 2009.

The work of ISTC evolved during recent years to take into account changing needs. For example, a number of initiatives were developed to further focus the work of the

Center on those scientific challenges that require a global response. A number of Targeted Initiatives have been established to concentrate efforts on the development of new medicines such as probiotics, on providing scientific support to counter bio-terrorism and to deal with new prospects deriving from the work on ultra- High intensity light science and technologies.

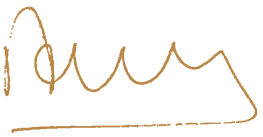
In order to further strengthen ISTC's contribution to Russia's capabilities with regard to innovation, a new initiative called Technology Outreach has been launched. It is aimed at accelerating the realization of the commercial benefits of projects funded by the ISTC to promote private investment in Russian technologies.

Work also started on assisting various research institutes to become more sustainable. Sustainability plans became operational for five institutes. Various projects started such as the reconstruction of production premises for radioisotopes for medical applications.

Numerous projects managers participated in ISTC training courses. An initiative was developed aimed at introducing new courses in various universities that promote responsible science management. A pilot project will start in 2010 in Moscow.

2009 was another strong year in the life of ISTC and has been a time for reinvigorating its mission.

I hope you enjoy reading the 2009 Annual Report and the overview of many of the exciting projects funded by the Parties and Partners of ISTC. Our renewed website is also an important source of information, and I would recommend a visit to the site at www.istc.ru.



Adriaan van der Meer
ISTC Executive Director

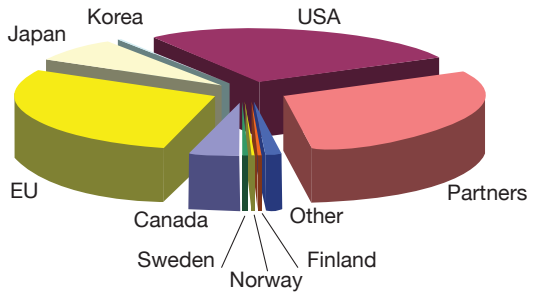
ISTC – Pursuing our Objectives

The ISTC coordinates the efforts of numerous governments, international organizations, and private sector industry, providing former weapons scientists from Russia, other CIS countries and Georgia new opportunities in carrying out research and technological development projects as well as forging international partnerships. The ISTC is central in the management of these science partnerships. Through its legal and financial frameworks, the ISTC contributes to fundamental and applied research followed by commercialization of results. ISTC also provides business training programs for scientists and engineers and supports the work of the International Atomic Energy Agency (IAEA), the European Organization for Nuclear Research (CERN), the World Health Organization (WHO) and many other international organizations.

Overview of ISTC Activities 1994-2009

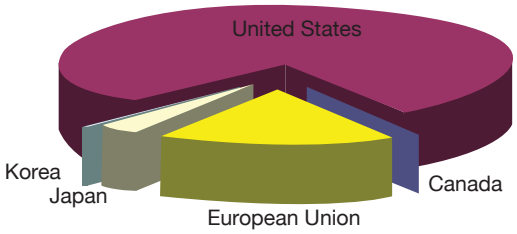
To fulfill ISTC's mission, the Parties, Partners and Project Collaborators contribute financial, in-kind, and human resources to the Center. These resources are used to engage former weapons scientists and technical team members in civilian science projects through ISTC.

Total Project Funding by Source, 1994-2009



Party	Allocated Funds ($)
Canada	34,486,158
EU	241,714,640
Japan	62,912,323
Republic of Korea	4,084,011
USA	220,399,567
Partners	254,544,960
Other	11,492,658
Finland	1,185,960
Norway	1,881,450
Sweden	3,831,906
Total	**836, 533, 633**

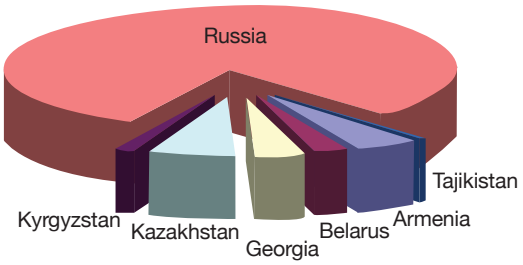
ISTC Partner Project Funding by Party, 1994-2009



Party		Total No. of projects	Total Amount ($)
United States		515	202,096,471
	G	483	196,124,937
	NG	32	5,971,534
Japan		62	7,303,614
	G	14	2,068,953
	NG	48	5,234,661
European Union		128	43,068,161
	G	67	32,013,018
	NG	61	11,055,143
Republic of Korea		9	1,791,714
	G	6	1,580,000
	NG	3	211,714
Canada		3	285,000
	G	2	100,000
	NG	1	185,000
Total		**717**	**254,544,960**
	G	**572**	**231,886,908**
	NG	**145**	**22,658,053**

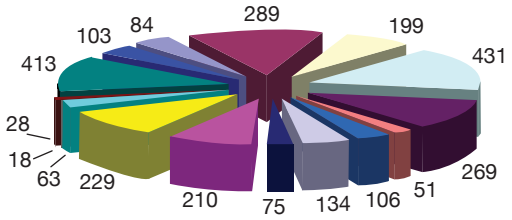
G = Government Organizations / NG = Non-Government Organizations

Grants Paid by the ISTC to CIS Beneficiary Scientists, 1994-2009



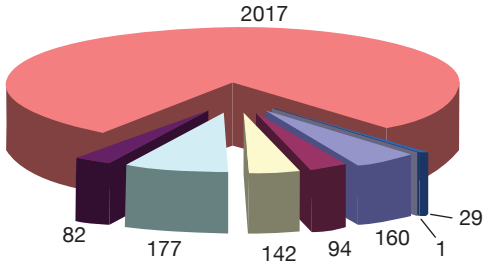
Country	No. of Scientists	Allocated Funds ($)
Armenia	3180	22,068,953
Belarus	1717	11,672,537
Georgia	2340	17,950,099
Kazakhstan	1195	30,609,078
Kyrgyzstan	4435	7,057,190
Russia	59,820	392,539,389
Tajikistan	465	2,690,435
Total	**73,152**	**484,587,681**

Projects and Funding by Technology Area, 1994-2009



Tech area	No. of projects	Allocated funds ($)
Agriculture	84	29,837,925
Biotechnology	289	107,563,598
Chemistry	199	53,137,134
Environment	431	133,436,410
Fission Reactors	269	90,730,315
Fusion	51	15,516,396
Information and Communications	106	28,469,677
Instrumentation	134	36,863,832
Manufacturing Technology	75	20,671,974
Materials	210	68,038,791
Medicine	229	84,142,749
Non-Nuclear Energy	63	21,630,981
Other	18	2,798,135
Other Basic Sciences	28	6,323,230
Physics	413	107,965,303
Space, Aircraft and Surface Transportation	103	29,407,184
Total	**2702**	**836,533,633**

Projects and Funding by Beneficiary Country, 1994-2009



Country	No. of projects	Allocated Funds ($)
Armenia	160	37,635,920
Belarus	94	23,802,833
Georgia	142	29,157,258
Kazakhstan	177	62,713,718
Kyrgyzstan	82	20,770,139
Russia	2017	654,759,106
Tajikistan	29	7,630,364
Ukraine	1	64,296
Total	**2702**	**836,533,633**

Statement of the ISTC Governing Board on the Occasion of the 15th Anniversary Celebration

Fifteen years ago, the International Science and Technology Center (ISTC) was founded at a critical moment for the scientific communities of the Russian Federation and the other countries of the former Soviet Union. Since that time, these communities have regained much of their potential. New networks of national and international scientific contacts have been built and many new partnerships have been forged as an outcome of ISTC's projects and programs. Over US$ 800 million in funding provided through the Center has supported more than 2,600 research projects involving approximately 73,000 scientists and engineers. In the course of these activities, the ISTC has facilitated the advance of basic science, supported the creation and commercialization of new technologies, enhanced the development of biotechnology and medical advances and assisted in development of technologies designed to protect the environment and to provide safe energy solutions. International innovation has expanded as a result of the constructive engagement of partners in the programs of the ISTC. Today the ISTC remains a vital resource for the scientific community and an effective mechanism for facilitating cooperation on science and technology development.

Over these 15 years, challenges have become more global in character. The spread of pandemic disease, international terrorism, the effects of climate change, the evolution of weapons of mass destruction and the threat of their proliferation, and the need to guarantee a safe period for the renaissance of civilian nuclear power are just some of the problems, which would require science and technology support to be addressed. Similarly, the pace of scientific advance, particularly in biotechnology, has been matched by an ease of access to scientific know-how that carries both benefit and threat. The ISTC has responded throughout this period by developing new, focused science and technology initiatives that contribute to global well-being and proactively anticipate global challenges.

ISTC's success has been recognized by all Parties. In addition to its regular project funding and training programs, ISTC has complemented its initial mission by developing an array of tools to attract private sector Partners and to promote commercialization of research results.

The ISTC Governing Board considers that an effective scientist engagement and partnership approach, such as that undertaken by ISTC, needs a transformation process in order to address matters of global security concern. It therefore has decided to launch such a process to achieve these goals. The Governing Board expresses its willingness to play a role in forthcoming discussions on programs of international science and technology cooperation to incorporate the experience gained by ISTC over the past 15 years.

ISTC has proven to be an effective instrument of international scientific cooperation. Over its 15–year history, the ISTC has brought together many scientists and researchers to engage in important and groundbreaking work. The ISTC has become an increasingly valuable player in international nonproliferation and scientific cooperation and an excellent mechanism for implementing collaborative science and technology projects and initiatives.

The Governing Board of the ISTC takes this opportunity to express its special gratitude to all those individuals who brought the ISTC into existence and to all who have labored over the years to bring the vision of its creators to fruition. The Governing Board is thankful to Armenia, Belarus, Canada, the European Union, Georgia,

Japan, Kazakhstan, the Kyrgyz Republic, Norway, the Republic of Korea, the Russian Federation, Tajikistan and the United States of America for the support of the work of the ISTC. The Governing Board also wishes to record its grateful recognition of the dedicated personnel of the ISTC Secretariat and of the Russian Federation's contributions in hosting the Headquarters of the ISTC, and its assistance and support of the Secretariat's activity in Moscow.

The ISTC will continue to strive to ensure that the outcome of its work, and the commitment of the Parties it represents, will lead to further scientific progress to the benefit of all.

Russian Federation

"The Center is having an obvious positive impact on international policy in the fields of power engineering, health, ecology and high technologies. It is modifying the essence of scientific cooperation by adhering to the principle of public innovation that serves the welfare and prosperity of the people."

Academician V.A. Chereshnev
Chairman of the State Duma
Committee on Science and Technology

Statue of Dmitri Mendeleev, St Petersburg.

Assisting Pharmaceutical Labs to Reach International Standards

Russia has broad experience in the research and production of pharmaceuticals, but it has faced limitations in bringing them to foreign markets. Differences between Russia and other countries regarding requirements for preclinical and clinical trials and the lack of facilities to test compounds according to international standards have long been an issue.

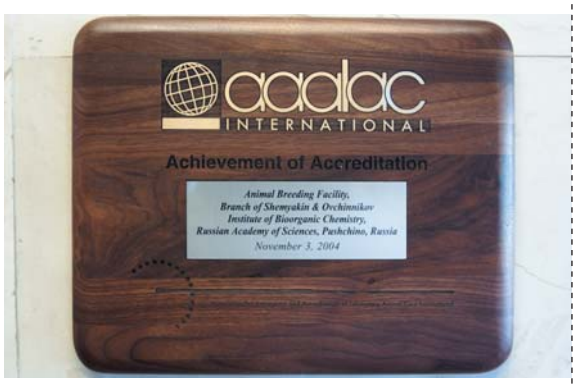
Lasting over 10 years, Project #0536 provided financial support and expertise to the Institute of Bioorganic Chemistry, namely facility upgrades, equipment and training in order to commercially produce and test pharmaceuticals according to international standards including Good Laboratory Practice (GLP) and Association for Assessment and Accreditation of Laboratory Animal Care – International (AAALAC).

In September 2004, AAALAC-International awarded full accreditation to the Institute's Animal Breeding Facility. Some of the benefits of accreditation include: international recognition; inclusion in the AAALAC Directory and other publications; and access to new markets and clients.

As a result of the project, the institute has been selected to carry out:

- Toxicity studies of COG1410 peptide, a novel anti-inflammatory compound, developed in the US in strict compliance with US Food and Drug Administration (FDA) GLP regulations;
- Toxicity studies of PGP peptide, a new gastro-protective agent, developed in Russia with GLP requirements of Russian Ministry of Health;
- Toxicity studies of Eli Lilly's reference compound, with work carried out in strict compliance with US FDA GLP regulations.

ISTC Partner and the main US sponsor of the project expressed great satisfaction with the results: "We would like to congratulate everybody involved for the successful implementation of the project. During the course of this project, the Animal Breeding Facility and the Biological Testing Laboratory have been transformed into world-class, AAALAC accredited institutions. Our Russian partners can build on these successes to provide high quality products and services to Russian and international clientele, and continue on the path to long-term sustainability."



Accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care – International

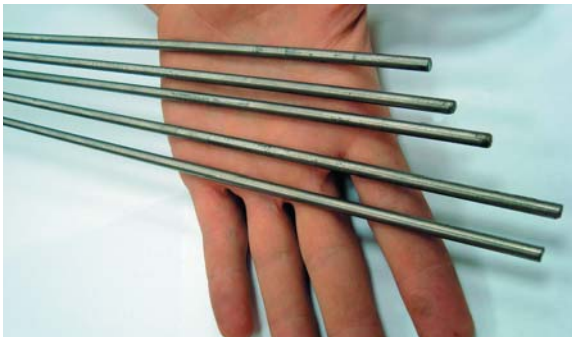
Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Bioorganic Chemistry (Branch), Puschino, Moscow reg., Russia	Charles River Laboratories, USA	$2,130,000 (Partner)	$631,988

Titanium Products for Medical Applications

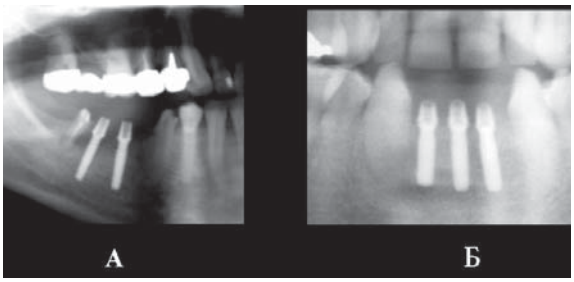
Because it is biocompatible (non-toxic and is not rejected by the body), titanium is used in a range of medical applications including surgical implements and implants. Titanium has the inherent property to osseointegrate, a direct structural and functional connection between living bone and the surface of a load-bearing artificial implant. Therefore, it is often used for dental implants as they can remain in place for over 30 years.

Titanium's properties can be improved, namely for dental implants, when its structure is shrunk to the nano level. Two joint Russian spin-off companies, NanoMet Ltd and Innovatsionnie Tekhnologii, Ltd., are producing a new generation of nanostructure titanium. These new titanium alloys are smaller, lighter, sturdier, non-toxic, have enhanced service life, and can be used in a variety of industries apart from medicine such as: machine building, automotive, aerospace, transport, sport equipment, and more.

ISTC Project #II-070 has been instrumental in bringing the spin-off from lab scale production to serial manufacturing. At the beginning of the project in 2008, the production was of 240 kilograms per year and is targeted to reach 2.5 tons per year at completion. The team of scientists is now equipped to provide a variety of different nano alloys to suit the needs of industry.



Nano titanium rods for medical implants



Leading institute	Total funds allocated	Total grants
NanoMet, LLC, Ufa, Bashkiria, Russia (BPE)	$582,000	$79,000

Using Robotic Elements for Safety and Security

Robots become ever more indispensable as their capacity to work in hazardous environments is constantly extended. The tasks for robotic devices are growing and the need for improved characteristics drives research in this field. Project #3711 is a multi-disciplinary research project based on technology integration of smart vision, sensitive control, and sensor systems. The robots can be used for the defense of critical infrastructure, in terrorist threat situations, natural disasters, or in bio and nuclear hazards.

The robot's flexible platform allows it to be operated in autonomous mode as well as manually to locate dangerous matter, map

Dr. Ivan Vasil'ev (left) and Kirill Stupin (right)

infrastructure/territory, and detect intruders or suspicious items. 3D maps of the premises can be created even when moving at high speed. When facing obstacles the robot bypasses them and returns to its given route. The automated vision system uses lasers, gamma rays, ultrasounds and infrared sensors depending on the environment and the task.

When explosives are involved in the work of the robot, an operator controls it manually. If necessary, the robot can destroy a highly explosive item on-site with its hydraulic pistol.

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Robotics and Technical Cybernetics, St Petersburg, Russia (APF)	CNRS, France EADS Space Transportatio, Germany European Commission, Italy Sapienza SL, Spain	$593,515	$418,836

ISTC and the Russian Government Collaborate to Build a Center for Nuclear Medicine Imaging in Snezhinsk

The construction of a building designed for Position Emission Tomography (PET) was recently completed in Snezhinsk. Collaboration between ISTC and the Russian Federation Government will enrich Chelyabinsk region with a state-of-the-art facility for cancer diagnostics and imaging of the human body. The US Party funded the design stage of the work and American scientists shared technical expertise and experience to facilitate the design. Their support has been instrumental to the success of the project. Russian research center RFNC-VNIITF was the leading institute on the project.

ISTC Project #3762 supported the final design stage, i.e. assessment of radiation risks and calculation of shielding needed, development of the working design documentation needed to build the PET Center and elaboration of the final equipment list for further operations. The Russian Federation Government provided the funds to construct and equip the building for radiopharmaceuticals production.

Positron emission tomography (PET) is a nuclear medicine imaging technique which produces a three-dimensional image or picture of functional processes in the body. PET is both a medical and research tool. It is used heavily in clinical oncology (medical imaging of tumors and the search for metastases) and cardiology, and for clinical diagnosis of certain brain diseases. PET is also an important research tool to map normal human brain and heart function.

Leading institute	Science collaborators	Total funds allocated	Grants
VNIITF, Snezhinsk, Chelyabinsk reg., Russia (AAB)	Biomedical Foundation of Northwest Louisiana positron Emission Tomography Imaging Center, USA Lawrence Livermore National Laboratory, USA	$281,000	$179,522

Detection of Newcastle Disease and Avian Influenza Viruses

Highly pathogenic avian influenza (HPAI) is an extremely infectious systemic viral disease of poultry that produces high mortality and necrobiotic, hemorrhagic or inflammatory lesions in multiple visceral organs, namely the brain and skin. The Type A influenza viruses can infect a wide variety of animals including wild ducks, chickens, turkeys, pigs, horses, mink, seals and humans. The virulence of AI viruses varies and should be tracked and analyzed in order to develop prevention, control and eradication strategies.

Project #3005 is studying isolates of Newcastle disease and avian influenza viruses over the territory of Russia using up-to-date diagnostic facilities as well as improved methods of isolation, identification, strain differentiation, serological diagnostics and typing.

The assessment of the pathogenicity of a newly isolated AI virus is critical to develop appropriate control strategies and to assess its potential impact on human and animal health as well as international trade. Highly pathogenic avian influenza has been used as a legitimate trade barrier to protect countries or regions from exotic or foreign poultry disease, therefore monitoring and prevention of these diseases are important for the national economy.

Alexander Kassianov (right), Project Participant

Leading institute	Science collaborators	Total funds allocated	Grants
Federal Centre for Animal Health, Vladimir, Russia (BBK)	US Department of Agriculture, USA	$650,000 (Partner)	$337,100

Influenza Surveillance in Russia - A Key to Global Influenza Pandemic Preparedness

Influenza is a growing threat to public health for many countries, with yearly winter epidemics associated with a considerable rise in morbidity and mortality. In line with global concerns related to the emergence of novel influenza strains comes the need for the further development of national surveillance networks for the early recognition of future pandemic events. Associated research is also needed into the identification of new viruses and pandemic spread modeling within and across geographical borders.

Human infections with both highly pathogenic strains of avian influenza A(H5N1) and A(H7N7) viruses in 1997-2008 as well as newly emerging swine influenza A(H1N1)sw1 may be considered as signs of possible new pandemics in the near future. An increasing understanding of the impact of influenza during the last few decades led to strengthened surveillance on the global level, which is one of the main objectives of the “the World Health Organization’s Global Agenda on Influenza Surveillance and Control”. Russia has an important role to play in this regard due to the extent of its territory and location.

Thus, strengthening of regional laboratory activities including an increase of virus isolates’ numbers, integration of influenza rapid testing and standardized laboratory procedures will constitute a significant improvement in the

current surveillance system. As an example of ISTC's contribution to fight flu, a US Partner has funded Project #3070 at the St Petersburg Institute of Influenza and at the Ivanovsky Institute of Virology. In the framework of the project, ISTC increased the Institutes' capacity to perform antigenic and genetic analysis of more isolates sampled from the Regional Base Laboratories, to conduct new tests such as Polymerase Chain Reaction (PCR), to carry out microneutralization assays, to develop new reagents for the Russian surveillance system, to monitor resistance of circulating viruses, to license antiviral drugs and to conduct training of medical staff. This project contributed to a substantial and quantifiable improvement of the surveillance system in Russia.

Improved analysis and the integration of epidemiological and virological data is an essential component for understanding the timing and impact of epidemics and ongoing global influenza pandemic. These improvements become critically important both for strengthening the global influenza surveillance system and for early recognition of any new pathogenic virus with pandemic potential.

The high level of influenza surveillance led to early and precise Real Time PCR detection and isolation of the influenza A(H1N1)sw1 strains in Russia in May-September, 2009.

Leading institute	Total funds allocated	Grants
Research Institute of Influenza, St Peterburg, Russia	$1,702,922	$394,810

Discovering a New Generation of Biopesticides

After over 6 years of research, Project # 2338, Studies and Evaluation of Entomopathogenic Fungi as new Biopesticides Producers, was completed in 2009. The project, funded by a US Partner, enabled the gathering of the largest collection in Russia and other countries of the Former Soviet Union of entomopathogenic fungi, with over 1200 different strains, opening up new possibilities for creating novel drugs and biopesticides.

The type of fungi collected during the project usually attach to the external body surface of insects in the form of microscopic spores. Under permissive conditions of temperature and moisture, the spores germinate, grow and colonize the insect. Then, the fungal cells proliferate in the host body cavity. After some time the insect usually dies.

Since they are considered natural mortality agents and environmentally safe, there is worldwide interest in the utilization and manipulation of entomopathogenic fungi for the biological control of insects and other pests.

In the course the project, 205 strains from 83 species of micromycets were tested for their pesticide and pharmacological properties. Strains with mosquitocidal activity, strains active against phytopathogenic and microorganisms inducing hospital infections were found.

Fungus Hirsutella gigantea on a caterpillar of Lepidoptera

Between 2002 and 2009, twelve scientific expeditions were organized to isolate entomopathogenic fungi. Mycological investigations were performed in different native-climatic zones of Russia, Ukraine and Belarus.

To date, two Russian Federation patent applications have been prepared on the mosquitocidalactivity of two fungal strains. In addition, 12 papers were published in scientific journals and Conference proceedings and 4 presentations were made at 5 international conferences or workshops during the course of the project.

Leading institute	Science collaborators	Total funds allocated	Grants
State Research Center for Applied Microbiology and Biotechnology, Obolensk, Moscow reg., Russia	US Department of Agriculture / Agricultural Research Service, USA	$600,000 (Partner)	$341,800

Protecting Biological Material and Implementing Physical Upgrades

The All Russian Research Institute of Phytopathology is the leading Russian research institute conducting agricultural research on plant diseases and is actively researching solutions to various problems affecting crop production and growth. Although important research is being carried out at the Institute, infrastructure such as the physical protection of the site, greenhouses where experiments were carried out and research equipment had come near the end of their useful lives and needed significant upgrades.

Project #2685 provided a modern, reliable, and efficient integrated system of physical security and biosafety equipment, as well as a set of safety procedures for handling bio material. The institute is now equipped with a real time protection and monitoring system in the protected areas. The new infrastructure allows accurate record keeping and rapid response to unauthorized events. These enhancements reduce the possibility of a loss of biological materials that would represent biohazard risks.

These renovations and upgrades align the Institute with international safety requirements. ISTC Executive Director, Adriaan van der Meer, while visiting the Institute in 2009 commented “These activities have only been made possible through international scientific cooperation between a number of Partners.”

In 2005, the Institute was visited by a delegation of senior US representatives,

Greenhouse before ISTC project

Greenhouse at completion of ISTC project

including the current President Barack Obama and Senator Richard G. Lugar. The delegation later monitored some weapons destruction sites in Russia and other former Soviet Republics to review the status and expand the scope of the Cooperative Threat Reduction (CTR) Program.

Leading institute	Total funds allocated	Total grants
Phytopathology Research Institute (VNIIF), Bolshie Vyazemy, Moscow reg., Russia (ARC)	$2,179,404 (Partner)	$226,010

Monitoring the Spread of Radionuclides in the Irtysh-Ob' River-Basin

Mayak is one of the biggest nuclear facilities in the Russian Federation, located 150 km south-east of Ekaterinburg. It is also known as the source of radionuclide contamination in the Ural region through the activities of the nuclear facilities. To this day, radionuclides continue to enter the river basin mainly through the Techa river. One of the major concerns is the possible contamination of the river system up to the Kara Sea if the security system put in place was to fail.

Up to now, no integrated radioecological survey and radioecological monitoring in the basin of the Irtysh-Ob' river system had been performed in depth. Preliminary results of Project #2558 show that radioecological studies should be enhanced as well as the monitoring of the river system. The coordination with the emergency response system should be improved based on the analysis and data on radiation risks for the public and living organisms collected.

ISTC Project #3547 is addressing many issues that had not previously been thoroughly investigated. In this project, scientists are creating a database mapping the transport and concentration of radionuclides in the Irtysh-Ob' river system. Radiation risks to both the population and animal species are being assessed. As a result of the project, a monitoring system to be integrated into the emergency response system will be proposed.

Specialists and scientists involved in the project have previously worked on the impact of nuclear weapons testing on the environment, as well as in investigating radioecological consequences of accidents at Mayak and Chernobyl. They have experience on various international research projects with the International Atomic Energy Agency (IAEA), the Commission for Environmental Cooperation and ISTC.

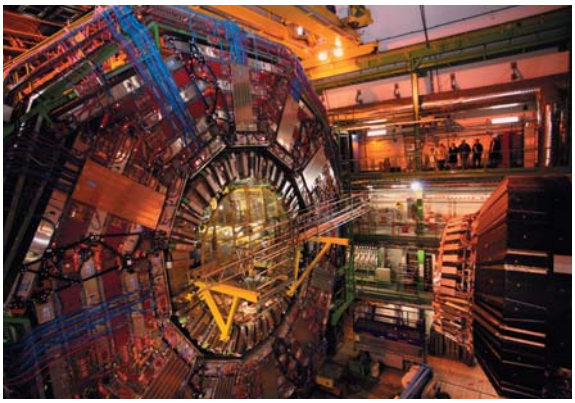
Leading institute	Science collaborators	Total funds allocated	Grants
Russian Academy of Sciences / Severtsov Institute of Ecology and Evolution, Moscow, Russia (ACF)	ENEA, Italy SENES Oak Ridge Inc., USA University of Georgia, USA	$300,780	$225,079

Scientists Come Together to Make Particles Collide

The Large Hadron Collider (LHC) is a gigantic scientific instrument built near Geneva, spanning the border between Switzerland and France about 100 meters underground. The LHC is a particle accelerator built to study the smallest known particles. Scientists are optimistic that this new ultra sophisticated tool will revolutionize our understanding of the Universe. Two beams of subatomic particles called 'hadrons' – either protons or lead ions – will travel in opposite directions inside the circular accelerator, gaining energy with every lap. Physicists will use the LHC to recreate the conditions just after the Big Bang, by colliding the two beams head-on at very high energy.

The empirical experiments that are to be carried out at the European Organization for Nuclear Research (CERN) will answer some of the most fundamental questions science has faced in the last century such as: Why do some particles have a mass and others don't? What are undetectable black matter and black energy, believed to form 96% of the universe? Why is there not more antimatter? What was the state of matter seconds after the Big Bang? Do dimensions other than the four already known exist?

In order to gather experimental data on these questions, six main sections were built, each with a specific function. There are two large main purpose detectors, ATLAS and CMS, that can analyze the particles created through collisions in the collider. And there are two medium size detectors, ALICE and LHCb, which have the task of analysing more specific phenomena. Thousands of scientists from countries all over the world put their knowledge together towards a common goal to create this huge machine. Scientists from the former Soviet Union have been long renowned for their theoretical and practical expertise in the areas of nuclear and high energy physics and ISTC provided the mechanism for them to participate in the project in the mid 1990's when collaborative work was almost nonexistent with Western countries.



The Compact Muon Solenoid (CMS) experiment is one of two large particle detectors built on the LHC

Over 600 Russian scientists have been involved in the modeling and building of almost all sections of the LHC through 33 projects representing close to $30 million USD. All the main Russian institutes in the field of physics i.e. JINR (Dubna), VNIIEF (Sarov), ITER (Moscow), CKBM, STRELA (Snezhinsk), AOOT BZTKHI, VNIITF (Snezhinsk), MEPhi (Moscow), IHEP (Protvino) and NPO Luch, have contributed their talents and infrastructure to the success of the enterprise.

Several ISTC-sponsored start-up projects have led to the signature of further independent commercial contracts, as well as expanded common work with CERN and other scientific centers. For example, the enterprise "Lutch" began collaboration with CERN through ISTC in 1996 to create scintillating tiles for the ATLAS detector. They subsequently built tiles for the LHCb detector as well as titanium parts for the ATLAS and CMS detectors through commercial contracts.

Another example was the development of scintillating crystals for the CMS detector. The initial ISTC project led to further commercial contracts reaching $36 million USD. In total, 70,000 crystals have been used in the CMS detector, and the crystal technology developed could now be transferred to building medical imaging equipment.

The two latest ISTC projects at the LHC, Projects #3888 and 3889p, are already working on upgrading the LHC by replacing the linear accelerator LINAC 2 with a new one, LINAC 4, that accelerates particles until they reach a certain amount of energy prior to being injected into the main accelerator. The project is carried out by Budker Institute of Nuclear Physics (BINP) and the Russian Federal Nuclear Center - Russian Scientific Research Institute of Technical Physics (VNIITF), in cooperation with the foreign collaborator/partner CERN.

On March 30, 2010, beams successfully collided for the first time, marking the start of the research program. With the assistance of ISTC, Russian scientists have been able to participate in one of the most ambitious science projects ever undertaken by mankind.

Russian made scintillating crystals used in the CMS detectors

Republic of Armenia

"The funds provided by the ISTC played a positive role for Armenia and we managed to preserve a major part of our scientific potential thanks to it. Progressive ideas and technologies came to the Republic thanks to the assistance of international partners and collaborators."

Tigran Sarkisyan
Prime Minister
Republic of Armenia

Karahunj – Ancient Observatory, second millennium, B.C.

Creating a Natural Hazards Prevention System for the Southern Caucasus and Central Asia

The social, political and economic changes that have taken place since 1991 in countries of the Former Soviet Union (FSU) significantly hindered their capacity to collaborate on a regional level to prevent or mitigate the consequences of natural catastrophes such as earthquakes or volcanoes. Damages to facilities and infrastructure could be hazardous for all countries of the region. Of special concern are the oil-fields in the Caspian Sea (Azerbaijan), trans-regional oil pipelines (Azerbaijan, Armenia, Georgia), nuclear power plants (Armenia), large chemical plants, dams and water reservoirs (Azerbaijan, Armenia, Georgia, Kyrgyz Republic, Tajikistan) and depositories of radioactive wastes or wastes with a high content of heavy metals (Armenia, Tajikistan, Kyrgyz Republic).

Seismic and volcanic threats along with most other natural hazards are trans-border phenomena that call for trans-border cooperation to assess risks and limit their impact on infrastructure, population safety and public health. There is a strong need to create voluntary open networks of non-governmental scientific centers in different countries of the FSU but until recently the exchange of information and cooperation between scientific organizations has been very limited.

Project #A-1418 is bringing together institutes from Armenia (leading institute), Georgia, Kyrgyzstan and Tajikistan to deal with areas of common interest, such as:

- Creation of a database on natural hazards and risks and open exchange of data;
- Monitoring of geodynamic and seismic processes and their interaction with other natural hazards;
- Assistance to governmental and non-governmental organizations in emergency situations and natural disasters; and
- Assessment of hazard/risk of natural disasters in the regions of the Southern Caucasus and Central Asia to support trans-regional international projects aimed at providing national safety and energy security.

The project enables scientific and practical information to be delivered to governmental and private organizations concerned with the management and reduction of natural disaster risks.

Eric Doerfingler (left), French collaborator from University Montpellier II
Raffi Durgaryan (right), project participant

Leading institute	Science collaborators	Total funds allocated	Grants
Scientific Foundation «International Center Garni», Yerevan, Armenia (BLY)	Ecole et Observatoire des Sciences de la Terre, France Lawrence Livermore National Laboratory, USA Massachusetts Institute of Technology (MIT) Cambridge, USA National Observatory of Athens, Greece New England Research Inc., USA Universita Degli Studi di Bari, Italy Universite Montpellier II, France	$615,000	$325,720

Using Amino Acids in the Search for More Effective Drugs

In the search for new and effective medicines, non-protein amino acids have generated great interest due to their particular properties that can be used in medicine, pharmacology and bacteriology. For example, it is now known that the introduction of non-protein amino acids, as opposed to their protein analogues, increases the efficiency of medical preparations against cancer. Also, non-protein amino acid isotopes can be applied in nuclear medicine imaging, or positron emission tomography, for the rapid and effective diagnosis of Parkinson's and Alzheimer's disease, as well as to detect tumor cells at an early stage.

ISTC's Innovation Initiative II-073 continues the work of earlier ISTC projects that developed a unique process to rapidly achieve asymmetric synthesis of optically active amino acid. More than 80 entirely new non-protein amino acids have been synthesized using the novel method. Having established the efficacy of the technique, ISTC provided financial support to create a pilot plant and to further research and commercialize amino acids for use in the medical field.

The Armenian institute has already sold its products to a major Belgian company and other international customers have shown interest in the novel product.

ISTC assisted the Institute to further protect the international property rights (IPR) on all new groups of substances to be developed by the Institute. ISTC's Innovation Support Initiative has upgraded the production from laboratory-scale to small-scale, thereby enabling the Institute to expand to new markets. Forty-two permanent civilian workplaces have been created at the Institute.

Leading institute	Allocated
Institute of Biotechnology, Yerevan, Armenia	$424,459

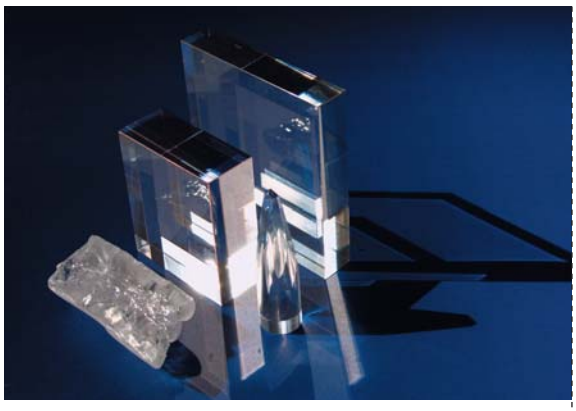
Supplying Sapphire Crystals to Meet Industrial Demands

The global demand for larger optical quality sapphire crystals is growing, with crystals being used in the fields of optoelectronics, microelectronics, and spectroscopy. The Armenian company, LT-PYRKAL CJSC, with the support of ISTC, has developed a range of techniques for crystal production known as Horizontally Directed Crystallization (HDC). The company has built and tested new machinery that could grow large crystals at 20-25% cost-price cheaper than average market prices.

Sapphire crystals have a broad range of characteristics including a high resistance to mechanical corrosion, a resistance to acids, corrosive liquids or jets of water, good insulation and dielectric properties. These qualities make the crystals suitable for use in various equipment and materials.

The Armenian team had the know-how to meet the need for bigger and better quality sapphire crystals, but the equipment and facilities needed important upgrades. Project

#II-101 provided financial and logistical support to modernize thermal units, to create containers where the crystals are grown, to upgrade crystal growth equipment chambers and to develop an automatic equipment controlling system and software for growing bigger-sized sapphire crystals. The project was completed in the beginning of 2010 and customers from the US and Canada have already placed orders. Thirty-five former weapons scientists found permanent working places in LT-PYRKAL CJSC.



Leading institute	Allocated	Total grants
LT-Pyrkal, Yerevan, Armenia (AWU)	$419,000	$90,000

Republic of Belarus

"During the last 15 years, ISTC has funded more than 100 projects representing an investment of over $37 million USD in Belarus. The Center contributes to the socioeconomic development of its member countries through multifaceted cooperation."

M.V. Myasnikovich
Chairman of the Presidium of the National Academy of Sciences of Belarus

Upgrade of Nuclear Material Protection and Control Systems

Mechanisms of control and security of fissile materials at nuclear institutes should follow tight procedures and regulations to avoid any loss or theft that could have unfortunate consequences if it were to fall into the wrong hands. ISTC has been active since its foundation to improve the physical security of nuclear facilities and to create modern systems of accountability of materials that meet international rules and regulations. Project #B-1177 is providing an upgrade of all the needed material-control systems at the Joint Institute of Energy and Nuclear Research in Belarus.

The existing physical protection (PPS) and nuclear material control and accountancy (MCA) systems of the Joint Institute had been installed in 1996 with the assistance of the US, Sweden and Japan under the auspices of the International Atomic Energy Agency (IAEA). Since 1996, MCA experts have performed a number of works on creating and maintaining the system in compliance with IAEA guidelines and the requirements of the State Regulatory Body. Work included: the creation of a single material balance area, the sorting of nuclear materials into batches, organization of a tracking and reporting inventory system, the creation of a computer-based nuclear materials database and activation of equipment for performing non-destructive assay of nuclear materials.

However, since 1996, some subsystems, devices and equipment have worn out and the stock of spare parts has been exhausted in some cases. Further, the changing profile of the Institute's laboratories called for a strengthened control over the transfer of nuclear materials and requirements for security systems have become more stringent in view of the growing need to counteract international terrorism. With ISTC support, The Joint Institute of Energy and Nuclear Research in Belarus will shortly possess a state-of-the-art security system that will make it safe and impervious to any theft or loss of nuclear material.

Leading institute	Science collaborators	Total funds allocated	Grants
Joint Institute of Energy and Nuclear Research - Sosny, Minsk, Sosny, Belarus (BAG)	Pacific Northwest National Laboratory, USA Sandia National Laboratories, USA	$2,288,536	$346,860

The Development of New and Effective Antiviral Drugs

The development of effective antiviral drugs is one of the important biomedical scientific accomplishment of the late 20th century. Highly potent drugs are now available against herpes viruses, HIV, hepatitis B virus, and influenza virus. But this bright picture is overshadowed by a phenomenon that threatens many of these achievements: antiviral drug resistance. The capability of viruses to acquire resistance to drugs calls for research to discover new and effective antiviral agents with a specific and non-conventional way of working.

Using free-radicals as antiviral agents is a new direction of research in the field of drug discovery that showed promising results. The team of scientists working on the project synthesized different compounds with anticipated antiviral properties.

The goal is to find compounds with the capacity to inhibit virus replication without following modifications of the host cell's genetic code.

Project #B-1206 develops new viral infection inhibitors based on the regulation of free-radical processes in biosystems. Compounds synthesized in the frame of the project have proven to have the desired effect against HIV, Herpes and Influenza viruses.

Prof. Oleg Shadyro, Project Manager

Leading institute	Science collaborators	Total funds allocated	Grants
Belarussian State University, Minsk, Belarus	Robert-Koch-Institute, Germany Universitat Leipzig, Germany	$256,525	$152,520

Diagnosing Tumors in Children

Malignant tumors are rare in childhood. However, it is the second most common cause of non-accidental death among Belarusian children. The retroperitoneal space (in the abdominal cavity) is the most frequent site of primary solid tumors in children under 10 years old, whereas the mediastinal tumor (lungs area) is more common in adolescents. Considerable therapeutic improvements have been achieved in the last 20 years in the management of child cancer due to new diagnostic and therapeutic approaches. In spite of this there are still problems in improving the diagnosis and treatment of children with advanced cancer.

Child with grandmother at the Belarusian Research Center for Pediatric Oncology and Hematology

Accurate assessment of tumor size and spread, its structure and the response to treatment is critical information to define the most adequate treatment and prognosis. Choice of a treatment's intensity and duration varies widely depending on the volume and spread of the tumor and its biological characteristics. The most important factor for effective treatment is the volume and vitality of residual disease. The lack of modern computer systems for automated primary diagnostics and monitoring of neoplasm of retroperitoneal space and anterior mediastinum based on three-dimensional image analysis is currently an important problem in Belarus for pediatric oncology that may affect the results of the treatment and the survival of the child.

Project # B-1489 is now developing a methodological support and computer system for automatization of diagnostics and prognosis of mediastinal and retroperitoneal tumors in children based on the analysis of radiological images. At completion, the hospital will have equipment allowing:

- improved diagnosis;
- reduction of time for initial diagnosis of tumors;
- better reassessment of tumor bulk and structure;

- optimal timing of kidney salvage surgery in Wilms' tumor;
- use of objective methods for automated diagnostics and monitoring of tumors thanks to 2D and 3D imaging.

The new system will be used in other medical institutions and the developed algorithms and technologies can be applied to various commercial medical diagnostics products.

Leading institute	Science collaborators	Total funds allocated	Grants
National Academy of Sciences of the Republic of Belarus / Institute of Informatics Problems, Minsk, Belarus (AWW)	Technical University of Aachen, Germany University Hospital of Lille, France	$382,653	$263,770

Detecting Buried Land Mines

Antipersonnel landmines are explosive devices designed to injure or kill people. They can lie dormant for years and even decades under, on or near the ground until a person or animal triggers their detonating mechanism. The international organization Landmine Monitor has identified at least 73,000 casualties in 119 countries/areas in the past 10 years although these data are incomplete because of the lack of available statistics on the subject as many affected areas are in developing countries.

The high number of victims makes demining and the development of demining technologies a pressing issue for the international community. The main methods used for humanitarian demining on land are manual detection using metal detectors and prodders, detection by specially trained mine detection dogs and mechanical clearance using armored vehicles. The process is typically slow, expensive and dangerous.

Within detectors, ground penetrating radar (GPR) has been one of the most promising techniques in the last decade for recognition and detection of buried mines. A problem often encountered is that mines at shallow depths are difficult to detect by GPR due to the strong clutter caused by the soil's lack of homogeneity and crosstalk between antennas and ground surface.

Project #B-922 worked on recreating positions and shapes of underground objects and obtaining reliable data about their dielectric properties. Software was created that could compare data detected with modeled date to enhance probability and reliability of mine detection. The radar system has been tested in the Botanic Garden of the National Academy of Sciences of Belarus on anti-tank and anti-personnel sham mines that had been buried in real-life conditions. The results were very positive as metallic mines and even non-metallic ones were detected. The new device has proven superior to other available technologies in many technical aspects.

The methods and algorithms developed in the frame of the project could also be used in biomedicine for early detection of breast tumors, which is another important technical challenge nowadays.

Leading institute	Science collaborators	Total funds allocated	Grants
National Academy of Sciences of the Republic of Belarus / Institute of Applied Physics, Minsk, Belarus	Helsinki University of Technology, Finland RST Raumfahrt Systemtechnik GmbH, Germany	$193,000	$70,495

Georgia

"ISTC has funded in Georgia projects in the fields of Biotechnology, Material Science, Applied Medicine, Chemistry; moreover it helped equip the Georgian scientific Institutes that are involved in the ISTC program with modern scientific instruments and devices. With such support, the scientists of our country are granted the chance of solving important scientific and industrial problems for peaceful applications."

Thomas V. Gamkrelidze
President of the Georgian National Academy of Sciences

Phage Therapy: Finding an Alternative to Antibiotics

The broad use of antibiotics for decades has resulted in a multitude of bacteria with natural and/or acquired antibiotic resistance. The risk of the spread of antibiotic resistant pathogenic bacteria may lead to a major health crisis in the foreseeable future. A fundamentally different approach to preventing, controlling or curing diseases caused by pathogenic bacteria is now a necessity in order not to lose a war that was practically considered won over many diseases like tuberculosis or Clostridium difficile-C causing up to 30,000 deaths annually in the US alone.

Phage therapy, an approach that has been researched and utilized as a therapeutic agent for over 60 years, especially in the Soviet Union, provides hope as an alternative to fight resistant bacteria. Phage therapy was widely used in the United States until the discovery of antibiotics in the early 1940s.

A bacteriophage (from 'bacteria' and Greek 'to eat') is a virus that infects bacteria. Bacteriophages are among the most common biological entities on Earth. Phages are ubiquitous and can be found in all reservoirs populated by bacterial hosts, such as soil or the intestines of animals. One of the densest natural sources of phages and other viruses is sea water where up to 70% of marine bacteria may be infected by phages.

In the past few years, the scientific community in the West has begun to re-evaluate the use of lytic bacteriophages as therapeutic agents. However, the efficiency of phage therapy to fight bacterial diseases is not universally recognized, and results of existing studies have not been subject to critical evaluation and publication in peer-reviewed publications. The goal of this project is to validate the claims made over a period of more than 50 years by Eastern European countries and the former Soviet Union that bacteriophages present an effective therapeutic treatment for bacterial diseases.

Project #G-1009, carried out by the Eliava Bacteriophage Institute (Georgia), has been successful in this area. The bacteriophage experimental treatment against bovine mastitis has brought complete recovery of 94% of contaminated animals. No significant difference has been recorded between the groups treated with phage and antibiotics, and taking into consideration problems of antibiotic resistance and negative effects on milk, bacteriophage therapy could be considered as a valid alternative for treatment of bovine mastitis, according to the results of the research.

Kakha Didebulidze, project participant

Leading institute	Science collaborators	Total funds allocated	Grants
Georgian Academy of Sciences / Institute of Bacteriophage, Microbiology and Virology, Tbilisi, Georgia	Rutgers University, USA University of Texas at Austin, USA	$181,452 (Partner)	$94,365

Surveillance System and Control Strategy for Leishmaniasis in Georgia

Visceral leishmaniasis (VL), also known as black fever and Dumdum fever, is the most severe form of leishmaniasis. Responsible for an estimated 500,000 deaths worldwide each year, it is the second-largest parasitic killer in the world after malaria. The parasite migrates to the internal organs such as liver, spleen and bone marrow and if left untreated will almost always result in the death of the host. Signs and symptoms include fever, weight loss, mucosal ulcers, fatigue, anemia and substantial swelling of the liver and spleen.

In the past several years, the situation developing in Georgia has become fairly critical. Since 1990, the number of cases recorded annually has increased 10 fold, a majority of which have occurred in the capital Tbilisi. According to the World Health Organization, the main solution for the problem of leishmaniasis is early diagnosis and control of animal reservoirs. Implementation of appropriate control strategies for a given country depends on an understanding of the main epidemiologic parameters of the disease.

But there has been an almost complete lack of surveillance during the last 12 years and the prevalence of the disease is now unknown. The parasite species have not been confirmed, and animal reservoirs and vector species have not been identified. Consequently an appropriate control strategy had not been formulated.

Project #G-1081 is re-establishing a surveillance system of visceral leishmaniasis in Georgia. The improvement of the surveillance system will rely on the adoption of modern laboratory methods for early diagnosis, for parasite species and zymodeme identification, and for determining the prevalence of Leishmania infection in humans and canine reservoirs.

Mosquito being analysed

Leading institute	Science collaborators	Total funds allocated	Grants
National Center for Diseases Control, Tbilisi, Georgia (ASA)	US Department of Health & Human Services, USA	$442,009 (Partner)	$263,644

Turning Ammunition into Industrial Explosives

In warehouses of the former Soviet Union military bases, including Georgian ones, large amounts of expired ammunition remain. This ammunition is a problem for many countries of the former Soviet Union. Dismantling and sale of parts by non official businesses have led to serious injuries and deaths of people handling the equipment.

In the case of massive destruction of expired ammunition, hazard risks for the environment and surrounding populations are rather high as heavy metals are released in the process. Meanwhile, ammunition with expired working life still has a certain value as it contains various amounts of stocked energy.

Recycling is an effective way to use this ammunition. The OSCE program "Processing of fighting materials and shells on former military bases of the Soviet Union in Georgia", has been developed by the Georgian state military scientific and technical center "Delta". It determined that the best way to use ballistic and pyroxylin gunpowder contained in the ammunition is through commercial explosives. Although questions remained regarding rocket firm fuel and fighting parts that have to be disposed or transformed to avoid negative ecological consequences.

Project #G-1096 provided practical solutions to the encountered problems by developing:

- an assortment of industrial explosives taking into consideration their hydrodynamical characteristics, technological properties and damage to the environment;
- a computer program that determines the optimal amount of explosives related to a specific task; and
- an investment program to create an enterprise able to commercialize results of the project.

The new technology is a stimulus to the mining industry of Caucasus countries because there is a lack of factories and raw material to manufacture industrial explosives. The needs for such explosives are estimated at 2.0-2.5 thousand tons a year. The current project is a good example of ISTC providing answers to the environmental, social, economical and technical problems of today's world.

Storage of explosives

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Mining Mechanics, Tbilisi, Georgia	MAXAM CORP S.A.U., Spain Technische Universitat Clausthal, Germany	$303,750	$183,528

Republic of Kazakhstan

"Since ISTC was created 15 years ago, the Republic of Kazakhstan received more than $60 million USD for over 340 projects, which allowed us to carry out a broad range of high level research."

V. S. Shkolnik
Deputy Director
Presidential Executive Office
of the Republic of Kazakhstan

Kazakh National University named after Al-Farabi, philosopher and scientist

Cheaper Catalysts to Clean Exhaust Gases

Carbon monoxide, hydrocarbons and nitric oxides from exhaust gases are contributing to diverse environmental and health problems such as greenhouse effect, acid rain and different diseases. Nitric oxides and other pollutants are released into the atmosphere in part because of fuel engine combustion. The question of cleaning exhaust gases is one yet to be solved. With the growth of the automotive industry and the increased use of other industrial engines, better and cheaper methods for the purification of waste gases from toxic components are in greater demand.

Project #K-1266 focuses on increasing the effectiveness while reducing the price of catalysts. This technology, while similar to those already in use in the European and American markets, could in the near future be applied to all of the Kazakh automotive industry to bring the level of exhaust emissions closer to European standards. This locally engineered catalyst is a viable alternative to the import of more expensive catalysts and would enhance national economic output.

Neutralizers for cleaning CO, hydrocarbons and nitric oxides from exhaust gas of big freight vehicles have been created in the laboratory of the Institute of Organic Catalysis and Electrochemistry and they are now in use at the quarry «Yakutalmaz», at the Norilsk mine-chemical plant, at the plants «East-Gormash» plant, at the «Dzhezkazganzvetmet» plant, in the diesel generators at the Kazakh banknote plant, at the tobacco plant «Phillips Morris-Kazakhstan» and on the truck loaders at the company «Coca-Cola Bottlers-Almaty».

Svetlana Tungatarova, project participan

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Organic Catalysis and Electrochemistry, Almaty, Kazakhstan (AJR)	Engelhard Corporation, USA	$250,000	$150,000

Developing New Forms of Energy

Solar energy has been harnessed by humans since ancient times using a range of ever-evolving technologies. Solar radiation, along with secondary solar-powered resources such as wind and wave power, hydroelectricity and biomass, account for most of the available renewable energy on earth. Currently, only a minuscule fraction of the available solar energy is being used.

The total solar energy absorbed by Earth's atmosphere, oceans and land masses is approximately 3,850,000 exajoules (EJ) per year. This represents more energy in one hour than the world uses in one year. The amount of solar energy reaching the surface of the planet is so vast that in one year it is about twice as much as will ever be obtained from all of the Earth's non-renewable resources of coal, oil, natural gas, and mined uranium combined.

However, capturing solar energy remains a big challenge for scientists and for an industry that would like to develop and sell the technology on a larger scale. The level of efficiency of solar panels remains fairly low and the production price per unit is

still relatively high. The Kazakh team at the laboratory of Electrochemistry of Metals and Semiconductors of the IOCE, working on Project #K-1342 has taken up the challenge to increase radiation conversion while finding cheaper materials to produce solar panels.

The institute has created a method of electro-deposition of semiconductor thin films that should allow at completion a conversion rate of up to 13-14%, which is currently considered very effective, while reducing production costs by about 300%. For the moment, they target the national market of small farms and enterprises in need of mini power stations using wind and solar energy. There is also a need in Kazakhstan for self-contained power sources to be used for TV and radio communication lines.

An agreement has been signed with the Kazakh Institute of Agriculture Mechanization to produce integrated mini power stations. The southern regions of Kazakhstan enjoy a long sunlight period favorable to this technology while at the same time many individual and small farms, especially in remote areas, lack energy resources.

Vitali Andreevich Malakhov, Project Participant

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Organic Catalysis and Electrochemistry, Almaty, Kazakhstan (AJR)	Florida Solar Energy Center, USA Sheffield Hallam University, UK	$257,723	$150,360

Measuring the Impact of Radiation from Former Test Sites

Following World War II, the steppes of Kazakhstan became the first center for nuclear weapons testing within the Soviet Union. During the period of 1949-89, a total of about 460 nuclear weapons were tested in Semipalatinsk. The site was officially closed on August 29, 1991, and Kazakhstan became a nuclear weapons free country.

While the testing was fairly intensive in Semipalatinsk, the work to assess the level of remaining radioactivity and its consequences on settlements and workers in the area has not been extensive.

Child's tooth from the Cold War being analyzed

Electron paramagnetic resonance testing of tooth enamel provides sufficiently accurate data on the cumulative dose of external irradiation, but it does not completely account for internal dose from ingestion and inhalation of radionuclides. Therefore, the team of

Kazakh scientists proposed to add data coming from peripheral blood lymphocytes of subjects who donated teeth. The combination of these two methods more accurately reflects the overall dose of radionuclides absorbed by people in the region.

The main goal of projects #K-465 and #K-465.2 was a complex inspection of the population and the soil, water and food supply near to the Semipalatinsk testing site. The data compiled showed that a prolonged stay on the testing site resulted in significantly higher accumulation of radionuclides in the body. This fact is of particular importance when considering that many companies have workers on this territory on a regular basis.

Leading institute	Science collaborators	Total funds allocated	Grants
National Nuclear Center of the Republic of Kazakhstan / Institute of Nuclear Physics, Almaty, Kazakhstan	Baylor College of Medicine, USA Forschungszentrum Julich GmbH, Germany SENES Oak Ridge Inc., USA	$510,000	$241,139

Recycling Oil Refining Wastes to Create Novel Catalysts for Mining Industry

The mining industry currently uses specific chemicals to separate useful minerals and metals from the original ore. The compounds themselves are relatively harmless. However, the processes used to create and dispose of these compounds are complicated, costly, and usually involve highly reactive and caustic raw materials or intermediate compounds that could represent a hazard for the environment at various stages if strict handling is not respected.

Currently, the Kazakhstan mining industry needs to import from Europe expensive compounds for use in the separation process, which increases the price of the end product. But scientists at the Institute of Organic Catalysis and Electrochemistry in Almaty are now working on a new original catalytic process under mild reaction conditions that is more environmentally friendly, less costly, and moreover that could be produced locally. Additionally, these new catalytic processes would allow recycling waste sulfur by-products of the Kazakh oil refining industry. The current lack of disposal method of waste sulfur in Western Kazakhstan has been cause of great concern to the Ministry of Environment.

The process being developed under project #K-1284.2 will be scaled up to industrial production capacity by the participant institute, Kaustik, in Pavlodar. This new catalytic method using locally-produced phosphorus will at the same time be beneficial to national mining, chemical and oil industries. This novel simplified and cleaner catalytic method has potential for international markets as well.

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Organic Catalysis and Electrochemistry, Almaty, Kazakhstan	Natural Resources Canada, Canada	$200,000	$132,000

Kyrgyz Republic

"Scientific collaboration with ISTC has helped to bring the Kyrgyz Republic to the attention of the global scientific community. This achievement has a positive and increasingly significant influence on the high quality and diversity of research and development taking place in the Kyrgyz Republic."

Jorobekova Sharipa
Academician
President of the Academy of Sciences of the Kyrgyz Republic

Tectonics and Natural Disasters in Central Asia

The 700 km long Talas-Fergana fault in Kyrgyzstan is similar to the San-Andreas fault in the USA and geologists believe the area is highly vulnerable to earthquakes. The fault sits under the largest hydroelectric power and irrigation scheme in Central Asia. The hydroelectric power plant generates 1200 megawatts of electricity annually and incorporates a reservoir containing 20 cubic kilometers of water behind a 230 meter high dam. It provides power and irrigation water to Kyrgyzstan, Uzbekistan, Tajikistan, Kazakhstan and Russia, thus vital for the region's economic, social and agricultural stability.

There also are radioactive and toxic waste dumps in the area and if the dam were to be damaged, floods would represent a further threat of contamination to irrigated land in the Fergana Valley, which provides food and livelihoods for 10 million people.

The geodynamics of the Talas-Fergana Fault and the consequences of natural disasters have not been systematically studied as yet. Periodic strong earthquakes, landslides, rock falls and mud flows within the fault zone underline the urgency of this ISTC project. Project #KR-1281 develops a complex geological/geophysical model of the fault's deep structure and estimates the risks of natural/technogenic disasters.

One of the most important tasks of the Project is the modeling of fault zones on the basis of complex interpretation of seismic/tectonic, seismological, seismotomographic, geothermic, geoelectrical and magnetometric data. The other important problem is to study the correlation of deep tectonic/physical processes with exogenic phenomena, such as landslides, rock falls and mud flows. In addition to the interpretation of complex data, the team of scientists from the Institute of Seismology is developing practical guidelines for the protection of populations and various constructions from possible catastrophes.

Jekshen Jetimyshov - Head of the Seismic Observatory

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Seismology, NAS, Bishkek, Kyrgyzstan (AXO)	Instituto Nazionale di Geofisica e Vulcanologia, Italy Stanford University, USA Universita degli studi di Milano-Bicocca, Italy	$285,711	$277,510

Investigation of Atmospheric Brown Cloud in Central Asia

The Asian brown cloud is a layer of air pollution that covers parts of South Asia. Viewed from satellite photos, the cloud appears as a giant brown stain hanging in the air over much of South Asia and the Indian Ocean every year between January and March. In some humidity conditions it forms a haze created by a range of airborne particles and pollutants from combustion, e.g. woodfires, cars, factories, biomass burning and industrial processes with incomplete burning. The cloud is associated with the winter monsoon (November to April) when there is no rain to wash pollutants from the air.

According to a 2002 United Nations study, The Asian Brown Cloud: Climate and other Environmental Impacts, the cloud's effects on

health and on the environment are very serious, with thousands of people dying every year from direct and indirect causes linked to it. It affects the climate as well, provoking changes in rainfall patterns, leading to droughts or floods and melting of glaciers in the Himalayan Mountains because of amplified greenhouse effects in the region.

Through Project #KR-1522, a scientific team from the Kyrgyz-Russian Slavonic University is studying the phenomenon. They are gathering objective data on optical and microphysical characteristics of the Atmospheric Brown Cloud in Central Asia and they are analyzing its impacts on the region.

The data is collected using LIDAR (light detection and ranging) technology consisting of laser pulses gathering information on the atmosphere's composition. The laser of the LIDAR station was built to shoot down enemy satellites during the Soviet Union, but was converted to civilian applications, in part thanks to ISTC project funding.

The creation of a LIDAR station on the Central Asian territory now allows systematic measurements of the atmospheric brown cloud and contributes to the South Asia United Nation Environmental Program, allowing the extension of its geographical monitoring to the Central Asian region.

Leonid Sverdlik, Project Participant

Leading institute	Science collaborators	Total funds allocated	Grants
Kyrgyz-Russian Slavonic University, Bishkek, Kyrgyzstan (AWP)	Forschungszentrum Karlsruhe in der Helmholtz-Gemeinschaft, Germany Universite des Sciences et Technologies de Lille, France	$285,711	$277,510

Creating a Genetic Database of Kyrgyz Wild Flora

In the mountains of Kyrgyzstan, one can find very unique biodiversity and wild flora. This is due to a distributed landscape, a significant mixture of altitudes, and afternating mountain ridges and hollows formed between mountains that are variously isolated. Over 4000 species of plants can be accounted for in the relatively small country, although an increasing number of those are now in danger of extinction. The wealth of the Kyrgyz flora resides not only in a variety of species, but also in the amount of useful plants that it contains. According to available data, 550 species would have various beneficial properties. The global market of raw plant material used in the composition of

Kyrgyz plants analysed

various drugs is worth billions of dollars and Kyrgyzstan could benefit from it.

Project #KR-973 is developing methods to use plants in a sustainable way in order to preserve biodiversity. In order to achieve this goal, the team of Kyrgyz scientists is creating a genetic databank (germplasm) and a collection of a seeds and tissue culture. The information will be stored in a computer database created for this purpose.

As an outcome of the project, an inventory will be created with an extensive list of endemic, rare, and disappearing species with a description of their therapeutic properties or potential ones. Novel preservation technologies for genetic material will be developed as well.

The results of the project will be beneficial to the fields of pharmacology, medicine, cosmetic and other branches of science and industry.

Leading institute	Science collaborators	Total funds allocated	Grants
National Academy of Sciences of Kyrgyzstan / Biotechnology Institution, Bishkek, Kyrgyzstan	Ornamental Plant Germplasm Center, USA Royal Botanic Gardens Kew, UK The State University of New Jersey RUTGERS, USA	$325,850	$157,210

Countering Hazards of Ageing Pesticide Stockpiles

Storage and destruction of ageing pesticide stockpiles represent a serious problem for the Kyrgyz Republic. After recognition of the environmental hazard posed by these pesticides, prohibition was enacted. The Kyrgyz Republic signed international agreements such as the Stockholm Convention, but the surplus was not destroyed due to lack of environmentally-friendly technology. Over time, records became lost or separated, and the stockpiles became degraded, with containers deteriorating, and chemical compositions changing. The resulting products are toxic, undergoing decomposition, possess bioaccumulative properties, and present threats of transborder transfer. They are accumulated in the ecosystems of soil and water and, finally, affect human health, resulting in new diseases and congenital anomalies.

Recognizing the need to apply to International aid for carrying out destruction in state-of-the-art facilities, and further realizing that the first step solving the problem is to describe the extent of the problem, the Ministry of Agriculture Department of Chemicalization conducted Project #KR-886. The original purposes of the Project were: to conduct an inventory of the prohibited and deteriorated pesticides at the storage sites and develop a database; to determine their chemical and physical state and toxicity category; to determine methods of their destruction; and then develop technology of burial and technological documentation and conduct an economical evaluation of the expenditures associated with utilization of such pesticides.

Having been recently completed, the inventory compiled by the Institutes has been used by a team of consultants from the World Bank, in the first step to evaluation of the problem in Central Asia, and estimating the cost and effort to an ultimate destruction method that may be used throughout Central Asia. Personnel from the Department of Chemicalization have also been employed under the World Bank Project as consultants.

Leading institute	Science collaborators	Total funds allocated	Grants
Department of Chemicalization, Protection and Quarantine of Plant, Bishkek, Kyrgyzstan	Tauw Umvelt GmbH, Germany United Nations Environment Program, Switzerland US Environmental Protection Agency, USA	$608,625	$407,352

Republic of Tajikistan

"I express confidence that partnership relations, constructive science and technology ties between the scientists from Tajikistan and the ISTC will continue developing and deepening."

Akil Akilov
Prime Minister
Republic of Tajikistan

Sculptural composition on the theme "The Universe" in front of the International airport of Dushanbe

The Influence of Climate Change on Wheat in Tajikistan

Tajikistan is a highly agrarian country, with its rural population at more than 70% and agriculture accounting for 60% of employment and around 30% of GDP. After a 55% drop in agricultural output following the civil war of 1992-1997, production has shown remarkable recovery since 1997 and today the output is almost back to the 1991 level, after more than doubling from the lowest point in 1997.

Cotton and wheat are the two main cash crops (as opposed to subsistence crops) in Tajikistan, cultivated on nearly 70% of the cropped area (36% under wheat). With an important proportion of GDP directly and indirectly depending on agriculture, the effects of climate changes on crops could have important effects on the economy and on society as a whole if severe droughts were to afflict the country.

Project #T-1635 studies different scenarios of climate modification (increase of temperature, water deficiency, atmospheric and soil drought) and the effect on growth, development and productivity of different genotypes of wheat in order to understand the wheat's ability to adapt. Project participants are creating a mathematical model describing the growth of various strains of wheat in a range of conditions. Previously, research of physiological-biochemical parameters of wheat plants has been limited in Tajikistan and this project is valuable to agriculture planning in upcoming years.

Abdullaev Abdumanon (right), Project Manager

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Plant Physiology and Genetics, Dushanbe, Tajikistan (BGR)	Consiglio Nazionale delle Ricerche, Italy	$222,050	$170,220

Isolation of Mercury Ores

Tajikistan has a limited amount of raw mineral resources and their effective use is vital to the future prosperity of the country. The gold that is available in the Republic is generally mixed with antimony and mercury ore, which makes the extraction of the metal more difficult. The efficient use of these ores is a complex task. Project # T-1598 aims to discover new techniques to separate the antimony oxide, antimony metal, and mercury from gold in an ecological and economically sustainable way. The search for new and improved separation agents for antimony ores is of utmost importance. The discovery and use of an improved flotation (separation) agent would reduce the harm to health and to the environment while increasing the potential revenues from gold mining.

Mercury poses a particular health hazard, especially when in gas form. To remove it, various available processes cause health and environmental problems due to its release (volatilization) during smelting. Current technologies in the ore processing industry release a vast amount of mercury (and heat) into the atmosphere. This factor causes various problems in Tajikistan because surrounding mountains don't allow the needed air circulation to remove polluted air. One possible method of ecologically

benign removal of mercury is vacuum distillation at low temperatures. To date, there is little information available regarding this method for industrial applications and only some experimental data can be found in the literature.

The Tajik Institute of Chemistry has more than 40 years experience in the flotation field and metallurgical processing of auriferous antimony-mercury ores including: new reagents for auriferous antimony-mercury ores flotation, opportunities for rare metals extraction in metallurgical processing of antimony- mercury concentrates and many new antimony compounds with rare-earth metals. Their project seeks to employ their vast experience to discover new and safe methods for the extraction of valuable metals.

Rakhmatov Ozar, Project Manager

Leading institute	Science collaborators	Total funds allocated	Grants
Institute of Chemistry named after V.I.Nikitin, Academy of Sciences, Republic of Tajikistan, Dushanbe, Tajikistan (BGD)	University of British Columbia, Canada	$258,550	$156,550

Anthrax Containment in Tajikistan

Anthrax is an acute disease caused by Bacillus anthracis. It affects both humans and animals and most forms of the disease are lethal. Vaccines exist and treatments can be undertaken but only at very early stages of infection. Bacillus anthracis can form dormant spores that are able to survive in harsh conditions for extremely long periods of time up to decades or centuries. Therefore it is very difficult to eradicate it if widespread.

The anthrax pathogen is particularly troublesome in Tajikistan, since the disease rate for humans and animals, including the death rate, is about 10 times higher than in neighboring countries in the region. After the dissollution of the USSR and the weakening of the ties that Pollowed between the republics and especially with Russia, the epidemiological situation became more severe.

Thousands of cattle graves are located on the territory of Tajikistan. Sanitation is lacking and farmers and cattle breeders don't have the appropriate knowledge to deal with the problem of containing potential disease spread. Also, the absence of a modern rapid detection system is problematic.

Participants of Project #T-1175 are working to create and/or put in place various effective vaccines, diagnostics and treatment methods for both natural and potentially genetically modified strains of Anthrax. The second part of the work covers the development of measures for improving sanitary and epidemiological surveying actions against Anthrax, with results planned to be made available to the international medical community.

Tajik scientist

Leading institute	Science collaborators	Total funds allocated	Grants
Institute «Biological preparations» of Academy of agricultural sciences RT, Dushanbe, Tajikistan (BJG)	Lawrence Berkeley National Laboratory / Center for Environmental Biotechnology, Berkeley, CA, USA (Torok T)	$252,800	$151,800

ISTC Project Map


ISTC PROJECT LOCATION
CIS CAPITALS WITH ISTC PROJECTS
ISTC PROJECTS LOCATED IN MOSCOW REGION
Bolshie Vyazemy
Chernogolovka
Dubna
Dolgoprudny
Elektrostal
Fryazino
Khimki
Korolev
Lyubertsy
Lytkarino
Lyubuchany
Nemchinovka-1
Obolensk
Podolsk
Protvino
Puschino
Ramenskoye
Serpukhov
Shatura
Shcherbinka
Troitsk
Zelenograd
Zhukovsky
Yakutsk
leznogorsk
rasnoyarsk
Irkutsk
Khabarovsk
MONGOLIA
Vladivostok
DEM. PEOPLES REP. OF KOREA
REPUBLIC OF KOREA
JAPAN
CHINA

Overview of ISTC Activities in 2009

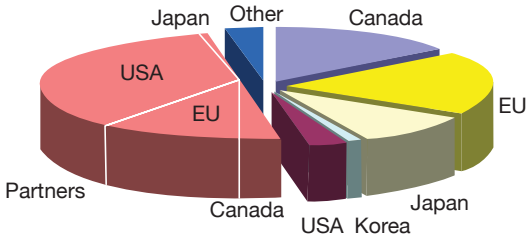
In 2009, the ISTC accomplished:

- New project funding for 63 projects in the amount of $19.1 million USD, of which ISTC Partners provided $9.5 million USD for 34 projects
- Addition of 25 new Partners to the existing 409 Partners, who have provided 254.5 million USD in project funding since program inception

2009 Highlights

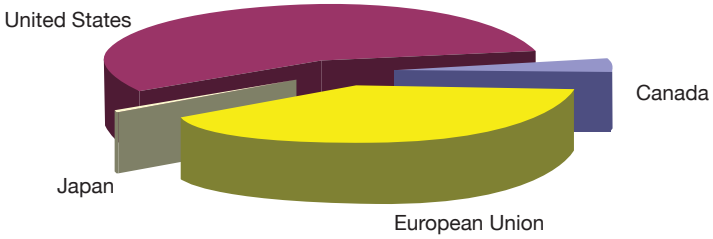
- Celebration of ISTC 15 year anniversary; International Conference ISTC – The Way Forward
- Creation of a working group composed of ISTC member Parties to propose options on ISTC future activities including a possible review of the ISTC Agreement
- New Targeted Initiative on Probiotics and Health
- New Targeted Initiative on Science and Technology in the Prevention of Biological Threats
- New Targeted Initiative on Ultra-High Intensity Light Science and Technologies
- Adoption of a Sustainability Plan for the Siberian Group of Chemical Enterprises, Seversk, Tomsk region, Russia

Total New Project Funding in 2009 by Source



Party	Allocated Funds ($)
Canada	2,848,425
EU	3,630,827
Japan	1,786,140
Korea	205,000
USA	584,600
Partners	9,543,149
Other	583,518
Total	**19,181,659**

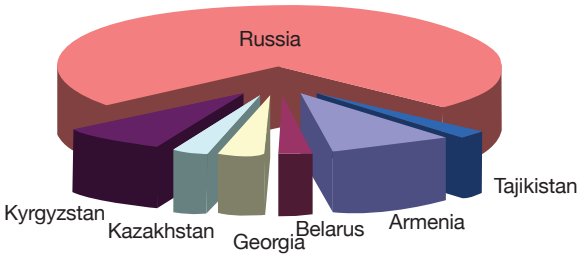
ISTC Partner Project Funding by Party in 2009



Party	No. of projects	Amount ($)
United States	13	5,386,527
G	13	5,386,527
NG	0	0
Japan	1	49,619
G	0	0
NG	1	49,619
European Union	17	3,822,003
G	15	3,534,166
NG	2	287,837
Canada	3	285,000
G	2	100,000
NG	1	185,000
Total	**34**	**9,543,149**
G	**30**	**9,020,693**
NG	**4**	**522,456**

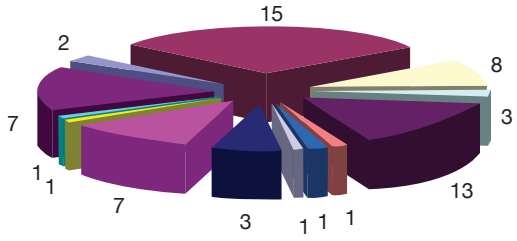
G = Government Organizations / NG = Non-Government Organizations

Grants Paid in 2009 by the ISTC to CIS Beneficiary Scientists



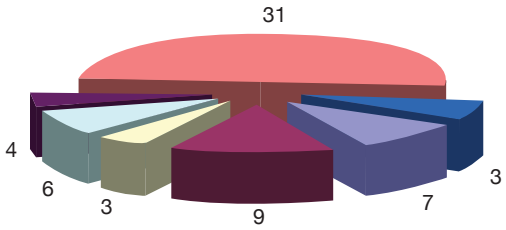
Country	No. of Scientists	Allocated Funds ($)
Armenia	1,136	2,774,540
Belarus	326	746,824
Georgia	503	1,135,722
Kazakhstan	398	735,775
Kyrgyzstan	1,165	2,309,770
Russia	10,315	22,534,035
Tajikistan	326	600,287
Total	**14,181**	**30,858,971**

2009 Projects and Funding by Technology Area



Tech area	No. of projects	Allocated funds ($)
Agriculture	2	550,000
Biotechnology	15	5,514,549
Chemistry	8	1,830,881
Environment	3	495,808
Fission Reactors	13	3,225,551
Fusion	1	288,908
Information and Communications	1	350,000
Instrumentation	1	167,102
Materials	3	1,221,625
Medicine	7	2,301,674
Other	1	129,623
Other Basic Sciences	1	240,980
Physics	7	2,864,956
Total	**63**	**19,181,658**

2009 Projects and Funding by Beneficiary Country



Country	No. of projects	Allocated funds ($)
Armenia	7	1,874,016
Belarus	9	2,795,434
Georgia	3	905,657
Kazakhstan	6	1,641,262
Kyrgyzstan	4	880,397
Russia	31	9,761,894
Tajikistan	3	1,323,000
Total	**63**	**19,181,658**

Scientific Advisory Committee (SAC)

The SAC, created in 1994, is an ISTC body that provides expert scientific evaluation on project proposals and determines new directions for project activity. SAC recommendations are considered further by the Governing Board in their project funding decisions.

Starting from 2008, the SAC took on new responsibilities to assess and evaluate a selection of completed regular projects to ensure better dissemination and exploitation of results.

In 2009, three SAC Meetings were held and 170 project proposals were evaluated.

As part of its mandate, the SAC organizes a yearly seminar covering different technical areas of ISTC activity and promoting international cooperation between scientists. The 12th ISTC SAC Seminar «Combating Global Infections» took place in Irkutsk on September 21-24, 2009. The event contributed to decisions taken at the 2006 G8 summit, held in St Petersburg, that proposed a global counter epidemic strategy.

ISTC Contact Expert Groups

The ISTC Secretariat has developed a network of Contact Expert Groups (CEG) in the nuclear field.

Contact Expert Groups are informal groups of experts from ISTC Governing Board Parties that assist with the coordination of ongoing ISTC projects to form programs corresponding to international priorities in the nuclear field.

The following CEGs are actively working with ISTC:

1. Contact Expert Group on ISTC projects, related to 'Partitioning and Transmutation of Radio-Active Wastes', (P&T CEG). This CEG meets annually and also holds topical workshops and meetings. The key interest of this CEG is transmutation of nuclear wastes with a special focus on Accelerator Driven Systems and fast reactors together with general aspects of safety and security of the nuclear fuel cycle. In October 2009 ISTC organized a meeting of P&T experts in order to coordinate international and ISTC cooperation in this field.

2. CEG SAM – 'Severe Accident Management'. CEG SAM meets twice a year (in 2009 at PSI, Switzerland, and in IBRAE, Moscow), and has usually one or two additional workshops or meetings per year (in 2009 - in St-Petersburg and Nizhni Novgorod, and also in FZK, Karlsruhe, Germany). This CEG focuses on selected topics of Nuclear Safety, mostly accompanied by complicated experiments and validation of relevant codes and data.

3. CEG PLIM - the Contact Expert Group on ISTC projects related to Plant Life Management. CEG PLIM has two annual meetings. The main focus is a coordinated research program supporting safe extension of the life-time of existing nuclear reactors.

4. CEG 'Fusion' - for the ISTC-STCU contact expert group coordinating efforts related to thermo-nuclear fusion problems with a special focus on 2 large facilities – JET and ITER. The CEG meetings are an occasion not only to examine ISTC/STCU projects but also to make an update on the agreements on Euratom Fusion, which is an outstanding result of this group.

Promoting Science & Technology

The ISTC carries out a range of promotional activities to inform the international private and public science and technology sector on R&D or late stage technology opportunities that are available through working with the ISTC and scientists in Russia and the CIS. These activities include participation at major international trade shows, scientific and technological exhibitions or conferences, the organization and funding of sector specific science exchange workshops and targeted company visits. The ISTC also undertakes media advertising and the promotion of its services via the ISTC website, Quarterly Newsletter and the creation of sector or event specific general promotional materials, such as CD-Roms, brochures and this Annual Report.

ISTC's Science Workshops and Seminars Program, together with parallel Supplementary Budget focused activities, assist the integration of scientists into the international S&T community and to engender sustainable cooperation both during the lifetime of an ISTC project and beyond. Canada, the European Union, the United States, and Japan fund these activities and in 2009, ISTC supported or organized over 50 events in Russia and other ISTC- member states of the CIS and Georgia, as well as in Canada, the European Union, Japan, Republic of Korea and the United States.

ISTC Involvement in Promotional Events and Science Workshops / Seminars in 2009

23 Feb. – 01 March	VIII International Ural seminar Radiation Physics of Metals and Alloys	Snezhinsk, Russia
01 – 06 March	XXIV International Conference on Interaction of Intense Energy Fluxes	Elbrus, Kabardino-Balkaria, Russia
16-20 March	XI Khariton's International Topical Scientific Readings Extreme States of Substance. Detonation Shock Waves	Sarov, Russia
17-22 May	Russian-French-German Laser Symposium 2009	Nizhny Novgorod, Russia
18-22 May	International Conference on Environmental Remediation of Radioactive Contamination	Astana, Kazakhstan
24-29 May	Scientific Workshop «Practical Cytometry»	Moscow, Russia
26-29 May	Safety Assurance of Nuclear Power Plants with WWER	Podol'sk, Russia
1-4 June	Third Working Meeting of CBM-MPD STS Consortium Technical challenges of the CBM and MPD Silicon Tracking Systems 2009	Sortavala, Karelia, Russia
7-12 June	Special Session. 9th International Conference on Mercury as a Global Pollutant	Guiyang City, Guizhou, China
15-18 June	Development of new methods to evaluate the level of environment technogenic contamination and predict its consequences for biota and human being with the example of Semipalatinsk test site	Austria, Vienna
15-17 June	Advanced X-ray Imaging	Erevan, Armenia
16-18 June	German-Russian Forum on Biotechnology Institute of Cytology and Genetics, RAS, Novosibirsk and East-West-Science Center, University of Kassel, Germany	Novosibirsk, Russia
29 June – 02 July	The 9th International Symposium on Measurement Technology and Intelligent Instruments	Saint Petersburg, Russia
29 June – 03 July	The 5-th International Congress Low and Super Low Fields and Radiations in Biology and Medicine	Saint Petersburg, Russia
June	Probiotics-mutual interest for East-West science cooperation	Germany
06-09 July	EUCASS 2009	France
27-31 July	22nd International Colloquium on the Dynamics of Explosions and Reactive Systems	Minsk, Belarus,

21 September	ISTC Days in Irkutsk	Irkutsk, Russia
21-24 September	12th SAC Seminar Combating Global Infections	Irkutsk, Russia
23-25 September	The VI-th International Conference Beam Technologies and Laser Application	St-Peterburg, Russia
25-27 September	Conference on Biosafety	London, UK
29 Sep. – 2 October	International Conference on Nuclear Power Safety and Education	Obninsk, Russia
28 Sep. – 2 October	IX Russian Conference on Semiconductor Physics	Novosibirsk - Tomsk
9 Sep. – 2 October	International Workshop on Non-Proliferation of Nuclear Materials	Obninsk, Russia
6-10 October	14th International Conference on Radiation Physics and Chemistry of Inorganic Materials	Astana, Kazakhstan
7-8 October	Russia-Canada Innovation Forum	Toronto, Canada
7-9 October	Bio Japan 2009	Yokohama, Japan
12 October	Round Table Necessary conditions and prerequisites for Venture Funding in Russia	Moscow, ISTC
13-16 October	Seminar New Policy in the Sphere of Commercialization of the Scientific Investigations under Modern Conditions	Yerevan, Armenia
15-17 October	Modern Problems of Laser Metrology	Lerici Italy. Institute of Laser Physics of Siberian Branch RAS
19 October	Nano, Bio, Environment Workshop	Japan
23 – 27 November	MCCI Workshop	Sarov, Russia
26 October	G8 Workshop	Rome, Italy
27-29 October	Defense, Security, Innovation Conference	Quebec City, Canada
29-30 October	EU-Russia Working Meeting: Microbial Ecology in Health and Diseases	Saint Petersburg, Russia
October	Russian Far East Workshop in Tohoku University, Japan	Sendai, Japan
28 Oct. – 1 November	14th International Industry Forum The United Russia	Nizhny Novgorod, Russia
2-5 November	Possible WMD Sabotage in Central Asia: on the Lookout	Dushanbe, Tajikistan
6-8 November	Armenian Technology Congress	California, USA
7-8 November	Russian Far East Workshop in Hokkaido University	Hokkaido, Japan
9-13 November	Practical Seminar on Innovation Technologies Ways of Application	Riga, Latvia
10-11 November	2nd Energy Forum between Japan and Russia	Irkutsk, Russia
13-14 November	Primorsky Venture Fair Primorye – Innovative Terminal of Russia in APEC"	Vladivostok, Russia
16-17 November	International Workshop on the Innovations in Zooanthropomorphic and Metabolic Disease Prevention, Diagnosis and Treatment in the Saratov Region	Saratov, Moscow
22-27 November	21st ISTC - Korea Workshop	Pusan, Korea
23-27 November	ENVIRONET	Vienna, Austria
November	ISTC –State Duma Forum on Renewable energy	Moscow, Russia
8 December	ISTC Japan workshop	Obihiro, Hokkaido, Japan
10 December	ISTC 15 Year Anniversary	Moscow, Russia
3 July 2009 - 31 January 2010	Organization of the BSC Certification Training Center in KSCQZD	Almaty, Kazakhstan
1 November 2009 – 30 March 2010	Transportation of Infectious Substances, Animal Biosafety and Facilities, Serological Methods of Investigation	Almaty, Kazakhstan
October 2009-April 2010	Organization of the BSC Certification Training Center in the Biological Preparations Institute	Dushanbe, Tajikistan
4 September 2009 31 March 2010	Organization of the BSC Certification Training Center in KSRIV – Kyrgyz Scientific Research Institute Veterinary	Bishkek, Kyrgyzstan
14 August 2009 – 28 February 2010	Organization of the BSC Certification Training Center in NCDCPH – National Center for Disease Control and Public Health	Tbilisi, Georgia
November 2009 – April 2010	Biosecurity and Biosafety: Principles and Practices	Bishkek, Kyrgyz Republic

Competency Building Program

The program aims to support scientists and experts to improve their skills needed to develop and implement commercialization projects. The following courses and seminars were provided by ISTC in 2009.

Multimedia Training Courses, Remote Education and Seminars

January –December	Long term training for managers of ISTC beneficiary institutes	Moscow, Russia
March-April	Distance training Business Plan Development	Saint Petersburg, Russia
10 March – 20 April	Business Plan Development for Rosatom specialists	Moscow, Russia
11 March – 24 April	Project Management for Rosatom specialists	Moscow, Russia
19-20 March	ISTC session Foundations of Commercialization at the international conference TOP 2009	Moscow reg., Russia
April-June	Knowledge and Technology Management	Moscow, Russia
June	Conference on Preparation of Experts of Advisory Councils	Dushanbe, Tajikistan
July	Long term trainings Business Plan Development, Introduction to commercialization, Project Management, Strategic Management	Dushanbe, Tajikistan
19-23 October	Strategic Management	Moscow, Russia
September - October	IPR Assessment	Bishkek, Kyrgyz Republic
15 November – 29 December	Business Communication and Presentation Skills	Tbilisi, Georgia

ISTC Structure

Permanent Governing Board Parties


Canada


European Union


Japan


Russian Federation


United States

Other Parties

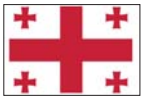

Norway


Republic of Korea

CIS Parties


Armenia


Belarus


Georgia


Kazakhstan


Kyrgyz Republic (Board Member in 2009)


Tajikistan

The Governing Board includes representatives of Canada, the European Union, Japan, the Russian Federation, and the United States, plus one rotating seat for a CIS member country, held by the Kyrgyz Republic in 2009 and Tajikistan in 2010.

The Coordination Committee representatives are appointed by the Parties and meet prior to Governing Board meetings to review details of proposals to be considered by the Board, discuss coordination of project funding, and exchange views on policy and other issues to be brought before the Governing Board.

The Scientific Advisory Committee provides expert scientific evaluation of project proposals and evaluates ongoing projects, as directed by the Governing Board.

Members of the Governing Board:

Chair
Ronald F. Lehman II
Canada
Andrew Shore
European Union
Marcus Cornaro
Japan
Manabu Miyagawa, Jun Yanagi
Russian Federation
Lev Ryabev
United States of America
Victor Alessi

Members of the Scientific Advisory Committee:

Japan
Jun Sugimoto
Canada
Konstantin Volchek, Henry Mantsch
European Union
Jean-Pierre Contzen, André Syrota
Russian Federation
Evgeny Avrorin, Yuri Trutnev
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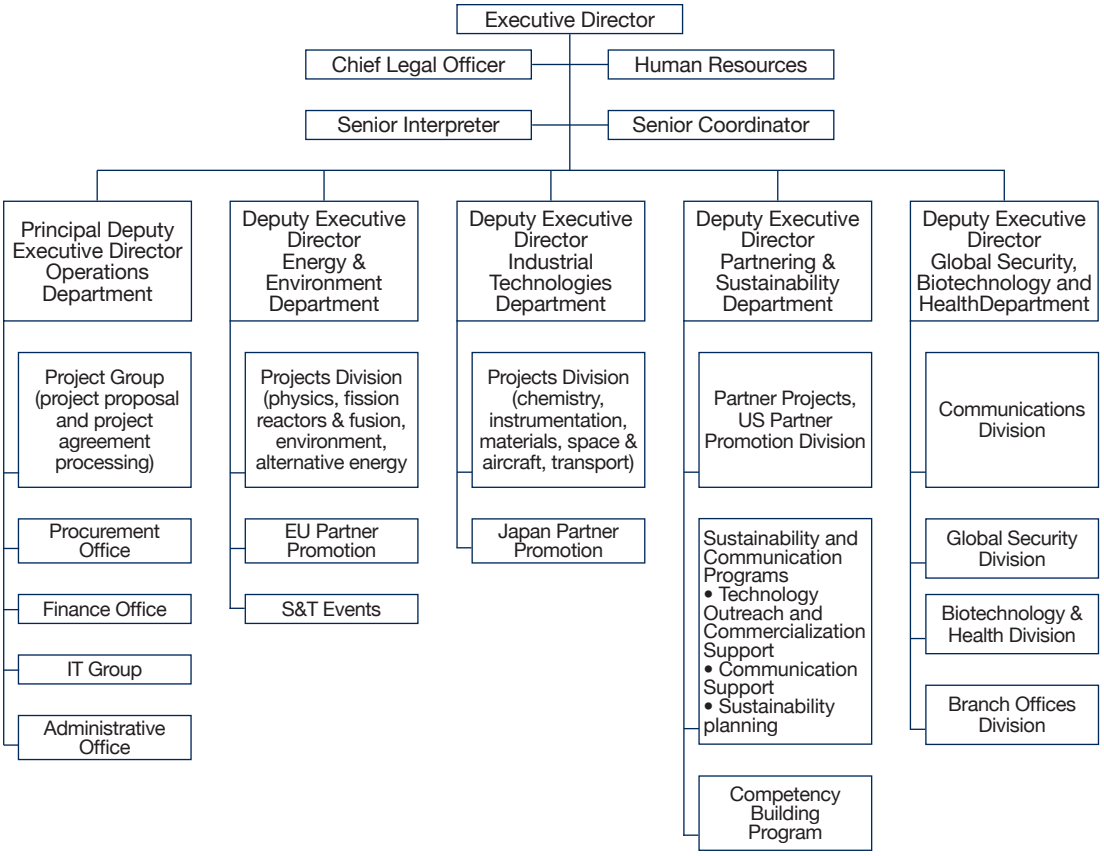
ISTC Secretariat



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Glossary of Main ISTC Terms and Programs

Bio-safety/Bio-security Program is aimed at providing additional resources to support various Bio-safety and Bio-security initiatives.

Commercialization Support Program is aimed to facilitate and strengthen long-term commercial self-sustainability efforts by ISTC beneficiaries through promoting marketable products and services.

Communication Support Program (CSP) is aimed to support eligible CIS institutes and organizations for building IT infrastructure where existing capabilities inhibit the accomplishment of ISTC projects and the development of commercial opportunities.

Competency Building Program is aimed to support scientists, engineers and their organizations to improve basic skills needed to create, maintain and develop self-sustainable business and commercialization of technologies.

Counter-Terrorism Program aims to provide scientific and technological support for counter-terrorism and law enforcement.

Governing Board is the primary ISTC decision-making body, which is made up of representatives from Canada, the European Union, Japan, the Russian Federation and the United States, with one yearly rotating seat for representation of one of the other countries of the CIS member states.

Mobility Program is aimed at providing additional possibilities of direct communication of the Russian and other CIS scientists with their colleagues from abroad through financing international travels related to ISTC projects and activities.

Partner Promotion Program is aimed to attract, initiate and develop projects between the private sector and institutes in Russia and other CIS member countries.

Patenting Support Program is aimed to provide assistance and support in appropriate protection of intellectual property created under ISTC regular projects for its effective exploitation.

Science Workshop and Seminar Program is aimed at promoting the integration of ISTC beneficiary institutions and scientists and engineers into the international S&T community through supporting of various science events.

Scientific Advisory Committee (SAC) is an ISTC body that provides expert scientific evaluation of project proposals, proposes new directions for project activity, and evaluates ongoing projects on behalf of the ISTC Governing Board.

Targeted Initiatives

A number of targeted initiatives were created to provide a focused approach and technical solutions to a number of topical problems of global interest.

- Drug Design and Development
- Fuel Cells
- Law Enforcement Technology
- Probiotics and Health
- Science and Technology in the Prevention of Biological Threats
- Ultra-High Intensity Light Science and Technology

Sustainability Planning Program

Sustainability Planning Program aims to engage ISTC beneficiary institutes in a process that would strengthen their capabilities to develop alternative sources of revenue to generate long-term stability and sustainable outcomes for the institutes.

- Khlopin Radium Institute, St Petersburg, Russia
- Institute of Physics and Power Engineering, Obninsk, Russia
- Institute of Nuclear Physics in National Nuclear Center, Almaty, Kazakhstan
- Research Institute of Pulse Technique (NIIIT) Moscow, Russia

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