ISTC — ACCOMPLISHING ITS OBJECTIVES

NONPROLIFERATION THROUGH SCIENCE COOPERATION

The International Science and Technology Center (ISTC) was established by an intergovernmental agreement in November 1992.

The objectives of the ISTC are to:

- Provide weapons scientists in the CIS the opportunity to redirect their talents to peaceful activities
- Support basic and applied research and technology development
- Contribute to the transition to market-based economies
- Foster the integration of scientists and engineers from CIS states into the global scientific community
- Contribute to solving national and international technical problems

The ISTC coordinates the efforts of numerous governments, international organizations, and private sector industries, providing weapons scientists from Russia and the Commonwealth of Independent States new opportunities in international partnership. The ISTC is central in the management of science partnerships. Through its political, legal, and financial frameworks, the ISTC contributes to fundamental research, international programs, and innovation and commercialization by linking the demands of international markets with the exceptional pool of scientific talent available in Russian and CIS institutes.

In 2004, the ISTC accomplished:

- New project funding for 193 projects in the amount of $56 million. Of this, $21.5 million for 63 projects was provided by ISTC Partners.
- Direct grant payments to 27,104 scientists and their team members, amounting to $47.3 million. Total redirection supported by the ISTC in 2004 is equivalent to 9,012 full-time person-years.
- Addition of 43 new Partner organizations, who have provided over $188.6 million in project funding since program inception.
- Expanded funding for seminars, workshops, and scientist travel, to strengthen international exchanges on ISTC projects and programs.

Canada acceded to the International Science and Technology Center

On March 1, 2004 Canada has become a full member of the ISTC, joining the European Union, Japan, Russia, and the United States as Governing Board member. With the inclusion of Canada, and the enlargement of the EU, 37 countries are now covered by the ISTC Agreement.

In its first year of contributing to ISTC activities and programs, Canada provided $ 8.8 million for 39 science and technology projects in the areas of biotechnology, environment, chemistry, and physics.

STATEMENT FROM THE GOVERNING BOARD CHAIR

Dr. Ronald F. Lehman II

The Chairman of the Governing Board of the ISTC, is the Director of the Center for Global Security Research at Lawrence Livermore National Laboratory. Previously he was the Director of the U.S.A Arms Control and Disarmament Agency, Assistant Secretary of Defense, Chief START Negotiator, and Deputy Assistant to the President of the USA. In 1995 he was named to the President's Advisory Board on Arms Proliferation Policy.

In October 2004, the International Science and Technology Center celebrated ten years of operations. The ISTC was deeply honored by the attendance of numerous distinguished officials and scientists at the anniversary seminar. Rather than simply celebrate the past, we focused primarily on the future. Important work remains to be done. That this institution re-examined its assumptions and was self-critical is a sign of the professionalism and maturity of the ISTC. A number of insights deserve mention.

The ISTC has always had a compelling mandate to make unique contributions to cooperative threat reduction and also to economic growth. Enhancing security and improvingliving conditions work together. Investment by Parties through the ISTC of more than $600M in 60,000 scientists over ten years translated into greater international security, more effective nonproliferation programs, significant advances in science and technology, and deeper cooperation among the Parties. Thus, the ISTC enables broader contributions by the Parties and participants to the prosperity, security and freedom of mankind.

To keep pace with the rapid changes of the past decade, the ISTC reevaluated priorities, streamlined management, promoted and developed international best practices, applied concrete measures of merit, and more precisely targeted its funding. Throughout all of these improvements and reforms, the ISTC never lost sight of its role as an innovative, intergovernmental organization on behalf of nonproliferation. In recognition of broader security challenges, the ISTC extended its work beyond just the nuclear field, engaging former weapons scientists in chemistry, biology, aeronautics, and other fields. To further strengthen its team, the Center empowered industrial and nonprofit Partners and engaged additional Partners from member governments. The ISTC also expanded the number of Parties, with Tajikistan and Canada being the newest members. About 40 countries on three continents are engaged through the ISTC. Significantly, the European Union represents its member states. The ISTC is an intergovernmental organization with a diverse membership stretching across Asia through Europe to North America,

STATEMENT FROM THE EXECUTIVE DIRECTOR

Mr. Jousten started his professional career in 1970 in the private industry. In 1980 he joined the European Commission. His successive assignments were in the Euratom Safeguards Directorate, the Euratom Supply Agency, the Commission Delegation in Vienna (IAEA, UN, Relations with Austria). In 1992 he joined the External Relations Directorate General in Brussels, to be in charge of important sectors of the EU's Tacis Program. From 2001 till 2004 he was Head of the Delegation of the European Commission to Ukraine, Belarus and Moldova in Kiev. Mr. Jousten joined the ISTC in April 2004.

Norbert Jousten

ISTC Executive Director

I had the honor and pleasure to begin my tenure as Executive Director of the International Science and Technology Center in 2004; a year that saw the ISTC celebrate the proud milestone of its 10 year anniversary of operations, and charge forward in developing new and innovative programs to meet the changing goals of the ISTC.

I am very grateful to the Governing Board, the representatives of the ISTC Parties, ISTC Partners as well as to my colleagues at the Moscow Secretariat and at the regional Branch Offices, for the patience and assistance they provided me as I began my duties this past spring. Scientific innovation moves at an ever-quickening pace; the staff of the ISTC works just as amazingly fast to stay ahead of the cutting-edge nature of our work.

but members as diverse as Armenia or Belarus or Norway or the Republic of Korea have found overlapping interests.

Building confidence between governments while dealing with potentially sensitive facilities, personnel, and subject matter has been one of the most important contributions of the ISTC. This intensely intergovernmental organization operating transparently and by consensus insures that the interests of all our citizens are served side-by-side with the advancement of science. Because member governments have developed confidence in the ISTC decision-making process and in day-to-day operations, the ISTC approach to cooperative science in the interest of nonproliferation has become a catalyst and model for other efforts. And the ISTC itself has become a vehicle for important nonproliferation initiatives such as those recently undertaken by the G-8, a development highlighted by Governing Board Members Japan and Canada.

Our proudest achievements will always be the contributions of former weapons scientists funded by the ISTC whose integration into peaceful science addresses the needs of their own countries and contributes to the well being of all. When Paolo Fasella chaired the first ISTC Governing Board meeting, he led an outstanding group of founders whose vision, talent and commitment insured success. The ISTC will continue to be successful solong as we set demanding goals, maintain clear focus, and keep our standards high. Toward that end, we consult Parties and Partners closely. We survey the opinions of scientists who have been recipients of ISTC funding, but we also survey scientists whose proposals were not funded or who have not applied. We have been willing to ask the tough questions.

The International Science and Technology Center offers important insights into science cooperation on behalf of international security, The ISTC has focused on its mission of nonproliferation, but its broad tools for advancing science contribute also to defense conversion, economic growth, mitigation of environmental damage, and other common objectives. New developments will determine whether the ISTC is a prototype for future international science cooperation on grand challenges or simply a tool for dealing with diminishing legacies of the Cold War. Even the primary nonproliferation mission of the ISTC is evolving. The questions before us are bigger than the ISTC, but only by addressing them can we shape the ISTC to best serve the interests of the Parties. Cooperation in science is a measure of international cooperation, but, as in the case of the ISTC, it is also a measure of international security concerns and the will of nations to work together to address those concerns. Toward that end, I commend the excellent work of the Parties, Partners, staff, and participating scientists.

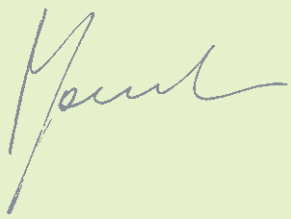
While remaining ever focused on our founding objectives, the Parties to the ISTC have provided our organization with a powerful mandate to continue to evolve into our role as an effective catalyst of innovative research and aloyal supporter of sustainable scientific structures throughout the CIS. Taking a theme raised at the ISTC Ten-Year Anniversary Conference held in Moscow in October, the ISTC cannot rest on its past achievements, we must continue to demonstrate our relevance and value through self-examination and ambitious goal setting.

In 2004 the ISTC moved forward in developing the Programmatic Approach, an effort to more effectively manage the wealth of scientific expertise at CIS institutes and match this talent with real international needs. This past year also saw the ISTC achieve significant progress in our efforts to develop Targeted Initiatives; ISTC project participants successfully demonstrated technology in the framework of the ISTC Fuel Cell Targeted Initiative, and the launch of a Targeted Initiative on Law Enforcement Technology was announced in cooperation with the Russian Federation Ministry of Internal Affairs. We have also heightened our attention to Intellectual Property issues and expanded our continuously growing network of Partners and collaborators spread across the globe. All this while remembering our founding commitment to nonproliferation and international security.

As the ISTC continues to evolve and expand, we must draw on our unique combination of mutual trust and unprecedented access to unique hi-tech talent, to the benefit of all involved. I witnessed the power of ISTC to bring together various scientific and governmental interests for mutual benefit notlong ago, at the opening of the International Science Laboratory in Minsk in June 2004, where Belarusian scientists at the Stepanov Institute will now work on joint projects of international significance with German colleagues from the Fraunhofer Institute for Nondestructive Testing.

Providing CIS scientists and institutes with long-term sustainability remains one of our key tasks. We do this by constantly expanding the ISTC network, bringing new government organizations and private companies into the ISTC framework so they can better realize their scientific and technology goals. Assisting in this process is the Commercialization Support Program, which assists scientific teams bring their promising technology to the global market, with ISTC acting as the conduit to unite global market needs with real CIS expertise.

I am confident for the future of the ISTC. With the competence and the dedication of our staff and the continued commitment of our Parties, we will be able to cope with the challenges of the future to the satisfaction of all our stakeholders



Canada's Governing Board member Allan Poole addresses the audience

On October 28, 2004, the International Science and Technology Center celebrated its ten-year anniversary of operations with an all-day conference held in downtown Moscow.

The event brought together representatives from 13 Parties, representing 37 nations that are members of the ISTC; joining top-level representatives from government Ministries and legislative bodies, major scientific research centers, international organizations, and industrial concerns to reflect on ten years of successful ISTC activity and discuss the future development of the ISTC in a changing international context.

More than 300 top-level attendees at the anniversary conference listened to opening remarks from ISTC Party representatives, who noted that in a relatively short span of time the ISTC has emerged from a modest office with only a dozen staff members to its current day structure with a staff of 200 and branches in six countries, synchronizing the efforts of government structures, scientific institutions, and private businesses.

Distinguished government representatives joined global leaders in science and industry in panel discussions, devoted to examining the ISTC's contribution to international nonproliferation programs, scientific innovation, and economic development. In the framework of science panel discussions the conference participants exchanged ideas on the ISTC's future role in the context of modern science and noted that having already proven itself as a successful international instrument for promoting and developing nonproliferation programs and international cooperative science, the ISTC is far from exhausting its potential.

Local Ambassadors with EU Board Member Achilleas Mitsos.

Governing Board Chairman Ronald Lehman II speaks to the audience.

ISTC Governing Board member Lev Ryabev listens to conference proceedings.

Participants of the ISTC 10 Year Anniversary conference

US Governing Board member Victor Alessi listens to Russian Academy of Sciences member Yuri Gulyaev

The hall at Cathedral of Christ the Savior, venue for the ISTC 10 Year Conference.

SCIENCE PROJECT PROGRAM

The Science Project Program is the most comprehensive nonproliferation activity conducted by the ISTC. Through this program, the ISTC solicits scientific project proposals from institutes throughout the CIS and provides funding and logistic support to project teams. Project teams receive written concurrence from the host country on whose territory their research will be conducted, and then develop and execute their project with foreign collaborators. Foreign collaborators ensure that the project goals contribute to the state-of-the-art in the field. The ISTC has funded hundreds of project teams through this program and directed the efforts of over 60,000 CIS researchers to peaceful science.

Terms for participation in the ISTC Science Project Program are codified in binding Project Agreements signed by the ISTC and CIS institute management. Based on the ISTC Agreement, grant payments and equipment for project research are provided free of taxes and import duties to the CIS scientific teams. Project Agreements also stipulate terms for monitoring and auditing of the project and site, to ensure adherence to the financial and technical goals set out in the Agreement. The ISTC Secretariat and Parties' representatives regularly monitor project progress. The Science Project Program is managed in two Departments with the support of the Operations Department.

Activity in 2004

Projects were reviewed and approved at three funding sessions, allocating $56 million to 190 projects.

Financial audits were conducted on 322 projects (including 448 final audits and 58 annual audits) through on-site ISTC staff visits to 506 institutes (448 institutes for final audits and 58 institutes for annual audits).

27,104 scientists and their technical team members were paid for at least one day of activity on ISTC projects; average number of days team members worked on an ISTC project: 73.5.

ARMCLUSTER

Integral in the development and modernization of a country's scientific and technical base is the existence of a unified information network. Without such a shared system of information sources and databases, scientists and researchers would be unable to effectively process work results, share knowledge, and publicize findings. To ensure that the scientists in Armenia have such a system, the International Science and Technology Center funded the creation of ARMCLUSTER, a high-performance computation cluster and database networklocated in Yerevan, Armenia.

ARMCLUSTER, located on the premises of the Information and Automation Problems Institute, is comprised of 128 Intel Xeon processors working in tandem to form a supercomputer system. Not only did the ISTC project (# A-823) fund the purchase of the computer hardware, but also the development of complementary software technologies. Such advanced programs will assist Armenian scientists in performing complex calculations and analytical models in areas such as seismologic and environmental monitoring, technical areas in which the ISTC funds several projects in Armenia. In addition to facilitating work on ISTC-funded projects, the ARMCLUSTER will further enable Armenian scientists to contribute to the work of international science programs, and the development of advanced research techniques and technologies.

The President of the National Academy of Sciences of Armenia (NAS), Academician Faddei Sarkissyan, noted the significance of ARMCLUSTER. "The ARMCLUSTER project is yet another example of how international cooperation in science and technology can serve the needs of the country's development."

Funding for ARMCLUSTER project was provided by the European Union, and was distributed among eight institutes in Armenia and one in Georgia. The Research Institute for Informatics in Toulouse, France, and the Research

Institute of Computer Science at the University of Amsterdam, Netherlands provided technical advice and guidance to the project participants as collaborators on the project.

Speaking on the potential of ARMCLUSTER as a key step forward in developing information infrastructure in the region, the Vice-President of the NAS Academician Yuri Shukurian explained, "We plan to use the ARMCLUSTER as the core of a future grid in Armenia - a network that will greatly enhance capabilities of the country's research and education."

Nuclear Reactor Against Cancer

PROJECT # 1951

Despite the millions of dollars that have been invested into research to improve methods of treatments for various types of cancer, oncological diseases continue to have a high mortality rate, remaining one of the main causes of death globally. Traditional cancer treatment methods, such as chemotherapy, immunotherapy, and radiotherapy are effective in approximately only half of all patients.

A promising technology to more effectively treat certain cancers is Neutron Capture Therapy (NCT), a cutting-edge treatment method that uses neutrons captured during operation of a nuclear reactor to irradiate the tumor. A main advantage of NCT is the selective damage of tumor cells, avoiding many of the common severe side effects of other cancer treatment methods.

In the framework of a project (#1951) funded by the International Science and Technology Center, Russian scientists and researchers developed and implemented an experimental series of pre-clinical studies using NCT to treat melanoma in dogs. Research was carried out at a specially constructed irradiation room attached to the research reactor at the Moscow Institute of Physics (MEPhI), with scientists from MEPhI joined in their work by colleagues from SRC - Institute of Biophysics and the Russian Cancer Research Center.

The project results clearly demonstrate the effectiveness of NCT of inoculated tumors and spontaneous melanoma, with complete involution of tumor observed in 80% of cases.

The studies were carried out on a cellular and organism level. In addition to dogs with spontaneous melanoma, studies were carried out in small laboratory animals with inoculated tumors - sarcoma S-45, Erlich carcinoma, and murine melanoma B-16. The compounds used in the research were Dipentast (a gadolinium-containing MR agent developed by earlier) and borate ethers of 10[B]boron-L-phenylalanine with monosaccharides (BPA) that were prepared from 10[B]boron-L-phenylalanine immediately prior to use.

In cases where the irradiation of the target tumor in the organism is impossible due to the radiation damage of vital organs, surgery in combination with NCT may be necessary. The researchers of ISTC Project #1951 successfully performed this complicated procedure on a dog suffering from osteosarcoma of the ankle bone, irradiating the surgically removed bone fragment at MEPhI and implanting it back into its site on the dog. This groundbreaking treatment, the first of its kind in the world, demonstrated that NCT preserves the vitality of healthy tissues of the implant and prevents metastases.

The scientists and researchers of ISTC Project #1951 are eager to perform the necessary work in order to introduce NCT in clinical practice.

Professor Otto Harling from the Massachusetts Institute of Technology, and a collaborator on the ISTC Project, noted: "The Russian scientists have developed promising technologies to treat melanoma based on intra-arterial administration of the compound into the tumor-feeding artery, and to treat osteosarcoma using BNCT of the removed neoplastic bone with subsequent reimplantation. The latter results are the first in the world and may find practical application in treating osteosarcoma in various sites."

Irradiation room
at the IRT MEPhI
Nuclear Reactor

Preparation
for the treatment
in the irradiation box

New atlas of the pacific ocean —

PROJECT #1696

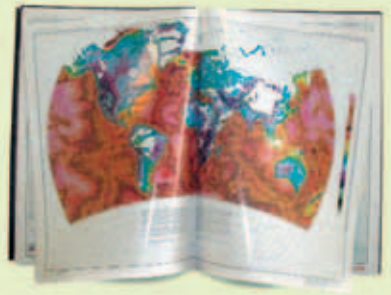
a vital tool for better using the mineral resources of the sea

Through the support of the ISTC, a group of Russian experts has developed a major new geological-geophysical atlas of the Pacific Ocean. This atlas is distinguished from more general oceanographic atlases of the world oceans by its extremely detailed and comprehensive descriptions of the geological structure and geophysical fields of the ocean floor, based on original data with minimum subjective interpretation. The atlas is a vital tool for better using the mineral resources in the seas and oceans, as well as use as a teaching material and reference source for universities. The atlas also provides an important new tool for lawyers and specialists in the fields of international maritime and geopolitics.

Previously Russian experts have developed similar atlases of the Indian Ocean (1975) and the Atlantic Ocean (1990). In response to the increasing need and demand for more information, the Pacific Ocean atlas was developed, concluding the creation of the series of geological-geophysical atlases for the major world oceans. In content and structure, the atlas is virtually identical to the atlases of the Indian and Atlantic oceans, although the date of completion reflects technological advances and progress in the scale of intensity of research. The objective was to give to a broad range of users a more detailed set of information about the geological and geophysical structure of the Earth. The Pacific Ocean Atlas contains 192 pages, and was published in the fall of 2003. It is under consideration to convert all three Atlases into digital form on CD-ROMs.

More than 240 leading scientists from Japan, USA, Russia, China, the United Kingdom, Germany, France and other countries participated in compilation of the Atlas. In the process of the work on the project, data of some of the most complex areas of the world oceans was collected and analyzed using modern technologies. The atlas could be influential in resolving numerous problems of Earth and Oceanic sciences.

The decision to create the Atlas was made by the Intergovernmental Oceanographic Commission of UNESCO, and the project was funded by the Japanese Government as Project 1696-00 of the International Science and Technology Center (ISTC). The project was guided by an International Editorial Board and carried out at the Vernadsky Institute of Geochemistry, Russian Academy of Sciences. Additional funding was provided by the Margaret Kendrick Blodgett Foundation, USA, Tokai University and the National Research Institute for Earth Science and Disaster Prevention, Japan. The printing of the Atlas was undertaken by the administration of navigation and oceanography in the Ministry of Defense of the Russian Federation.



Science Project Program

PROJECT #B898

A new class of microchiplasers

Laser sources are widely used in telecommunications, industry, medicine, modern audio and video technology. In 2003, over 23 billion US dollars' worth of lasers and products, of which the major elements are lasers, were produced. Modern technologies have an ever-growing requirement for diode-pumped microchiplasers, which have such merits as miniature size, low energy consumption, high efficiency and reliability. However, a problem that has until recently remained unsolved concerned the creation of microchip lasers that simultaneously generate short (trillionth fractions of a second, 10^{-11}—10^{-10} sec) and long (tens of kW) laser pulses. Microchiplasers with such features have especial potential for applications in medicine, biology and environment protection.

A group of 35 Belarus scientists from the Stepanov Physics Institute of the Belarus National Academy of Science (25 of who were previously experts in lasers weapons technology) have united under Project B-898, financed by the ISTC, to address this problem. The initial stage of the work commenced in 1999 – 2002 under an ISTC project with the creation of tunable solid-state lasers. Although this new project, devoted to the development of such microchiplasers, has been underway for less than a year, the researchers have already obtained impressive results. For the first time they are using intracavity pulse compression in microchip lasers, which is based on the effect of forced Raman scattering in crystals. Thanks to this, under an electrical power consumption of 1W, microchiplasers generate repeating pulse sequences with peak power of about 50kW and with a duration of $5x10^{-11}$ seconds.

Airbags will become even safer

Russian scientists are successfully developing smokeless gunpowder for automobile airbags, under ISTC Project № 1882. This powder combusts almost instantaneously at the most important moment, but the airbag will fill with a gas that is harmless to the passenger, not like known compositions today.

The Russian scientists, from the Institute of Chemical Physics RAS, propose to make car safety airbags even safer. Their theoretical and practical investigations have established of which compounds the powder, to combust at the moment of impact in an accident, should be comprised, so that the airbags fill instantly with gases that are harmless to humans and the environment.

"Despite the fact that the vehicles of well-respected car manufacturers have long since been equipped with safety airbags, the gas-generating compositions for them remain far from perfect," says one of the project authors, Candidate of Chemical Science David Lempert. "The problem is that the requirements of these compositions are incredibly strict, numerous and at times difficult to make compatible."

The multiplicity of these requirements did not discourage the scientists. This is no surprise; the specialists from the Institute of Chemical Physics RAS have unique experience in the creation of regular powders and solid rocket fuels. To begin with they calculated theoretically from the atoms of which elements and in which groups of interconnected atoms the powder should comprise, to satisfy the main requirements. It became clear that atoms of just four elements should form the basis: carbon, hydrogen, nitrogen and oxygen. A computer program, developed by the authors for mathematical modeling of the powder compositions, produced a number of potentially suitable structures. Some have already been synthesized and tested; others still await synthesis and testing.

However, the researchers are not limiting their attention to the development of a smokeless and non-toxic chemical composition for safety airbags. They have also devised how to form the charge in such a way so that it combusts in fractions of a second. Verified experiments confirm that they have succeeded in increasing the velocity of the charge combustion by several times. Thus, the "inflatable protection" under the new recipe as developed by the Russian scientists, works faster and more reliably than the traditional solution. And, although the passenger or driver will not have to spend much time in the vehicle in case of an accident, smoke and toxic gases from the airbag will cause them no harm — there simply will not be any.

New standard mass made with ISTC help

This program began three years ago and it involves scientists from eight countries. The task is immense. A new standard mass will be created with maximum possible precision on a modern level of development for world science and technology.

Of the multitude of measurable values, the most important and the most basic, are time, length and mass. Standards of mass and length were made over one hundred years ago, in the form of the standard kilogram and the standard meter; they are held at the International Bureau of Weights and Measures in Paris. The standard hour was determined through the period of the Earth's rotation. Alas, however, it transpired that these standards are unstable. For over 50 years scientists from across the world have been trying to create an ideal standard mass: to produce a solid that consists of a known quantity of identical atoms, and weigh it. The problem lays in there not being a suitable material.

Now, however, thanks to the efforts of Russian scientists, such a material is available. More precisely, it will become available in the required quantity within the next few years. It is superpure silicon — pure in the sense that the vast majority of its composition is made up of silicon-28 atoms. As far as other impurities are concerned, including other silicon isotopes, they may be found in proportions not exceeding one atom for every 10 million silicon-28 atoms.

The first 140 grams of the superpure monoisotopic silicon have been obtained in the framework of an international project on the creation of a new standard mass. It is superpure silicon, 99.99% comprised of the silicon-28 isotope. There will be 5 kg of such silicon in three years time. This will be sufficient to produce a kilogram sphere, the number of silicon-28 atoms in which will be known precisely. At last the outdated weight held at the Bureau of Weights and Measures in Paris will be replaced by a standard in which not only the mass, but also the number of atoms will be defined to the maximum achievable limit of accuracy for world science today.

For the first time scientists will be able to clarify one of the most fundamental chemical values – the Avogadro Constant. However, this project promises a solution not only to fundamental tasks. Development of the technology to obtain superpure silicon isotopes couldlead to changes in microelectronics that are no less than revolutionary, just like the changes that eventually enabled the power and rapid action of three-storey high giant computers to be replaced by notebook machines.

Construction materials for space stations

Antenna and telescope mirrors, walls and partitions for space stations, solar battery panels and even houses on the Moon and on Mars — all this can be achieved with technology developed by Russian scientists in the framework of projects 2835 and 2836. What is more, it can be achieved quickly, with good levels of strength and reliability, with minimal expense of time, space, energy and money.

These construction materials or, to be more accurate, original semi-products for future structures, are brought into space in compact, hermetically-sealed containers. The half-finished product is connected to a compressed gas cylinder and inflated on site. In just a few hours the soft, moist fabric becomes a rigid, strong material in the form of a table, partition or antenna.

Using these pneumatic setting structures in space is the idea of specialists from the Babakin Scientific Research Center and NPO Lavochkin. And they propose that modules of space stations be built from these light yet sturdy materials, initially for orbital stations, but in future moving to lunar and Martian examples. Of course we are not talking about covering panels for spacecraft or roofs for houses, but of internal partitions, walls, and three-dimensional structures such as solar battery panels, antennae and telescope mirrors.

One of the greatest problems of construction in space, whatever is being built, is the supply of materials and structural details. Entire cumbersome designs simply do not fit into a spacecraft, which means they have to be carried in parts and then assembled in orbit. And this is incredibly difficult, especially for designs that require a particularly precise assembly. Primarily this applies to parabolic antennae and telescope mirrors; their diameter is measured in tens of meters and any distortion in their surface could lead to errors, sometimes of an irreparable nature.

"In essence our technology is simple," say the developers. "We form the future product from a special fabric, light and strong; what is important is that we do it all on Earth. We give it the required form, in a process that is strictly controlled. We place inside the structure something akin to a rubber inner bladder, such as you would find inside a football. Then we impregnate the material with a special solution. The semi-product for a future antenna is now ready. Now all that is needed is to pack it up, seal it hermetically, send it to its destination and then inflate it".

The essence lies in the fact that, when it dries the solution sets, turning the material it has impregnated into a strong, rigid, non-combustible shell. In space, in an airless environment, the water will vanish by itself, without the need for additional assistance. And the compressed gas will fulfill a double task: it will unfurl the product and give it its shape. So there is no need for additional expense on energy to inflate the structure or to fix its shape.

These pneumatic setting structures have not been in space yet. The scientists are optimizing the composition of the solution, selecting the best materials for the base and specifying the details of the technology with greater precision. But it is clear even today that in terms of strength the new materials are no worse than traditional ones, while they are several times lighter.

PROJECT # 1292

Barcode for explosives

Experts encounter a serious problem when studying the crime scene after an explosion. They can establish to a high degree of probability the type and power of the device used by terrorists and with what explosive substance it was filled with. However, they are usually unable to answer the most important question as to where and when the explosive itself was made: TNT is still TNT, regardless of the where and when it was produced.

Specialists from the Semenov Institute of Chemical Physics and their colleagues from several defense enterprises have developed special encoding additives. If these additives are introduced to the composition of the explosive, the site of the explosion will leave a kind of fingerprint, with which the explosive could be identified and the path of its legal movements could be traced; this would give the investigation into an incident of this kind a thread to uncover the supply channels of the terrorists. This most important work was fulfilled by the researchers in the framework of ISTC Project № 1292.

It is very difficult to make such encoding additives specifically for explosives; the requirements are too strict. On one hand they have to be completely harmless to the product (the explosive) and to the environment in their own right. On the other hand the explosion must not damage the encoding additive. And of course they all have to be individual, to ensure the reliability of the identification process. No dirt or impurities should be able to hinder the recognition of markers or to confuse them.

However, these complications proved no problem to the scientists from the Institute of Chemical Physics. The encoding additives they have proposed to introduce to the composition of explosives do not damage the explosive and are themselves undamaged after an explosion and have no adverse environmental effects.

"These are tiny grains of aluminum alloy, comprised of rare-earth elements," informs Project Manager and Head of Laboratory Yuri Karasevich. "There are very few such elements in nature and they are dispersed throughout the Earth's Crust. Therefore, in whatever quantities they may sensibly be found in special, pre-set combinations, they are not met in either natural or manmade objects. However it will be possible to find them at the site of an explosion; at least if they had been initially introduced to the composition of the explosive."

Naturally, it is not so simple to identify such "fingerprints" as it is to read information from a barcode in a supermarket. Here the task in fact involves a highly complex chemical analysis of microscopic samples, to discover how many rare-earth elements there are in the sample, what exactly they are and in what combination. And yet the researchers have coped with this most difficult of tasks.

For the analytical method the project authors proposed the use of laser-emission analysis of the element composition, using equipment developed by NPO Typhoon. The scientists also developed the necessary methodology and highly complex software for statistical analysis.

The first tests have already been conducted. Using a special bench in an explosion chamber the properties of an "encoded" explosive were studied and the scientists are confident that it explodes "as it should" – no worse than the explosive in its initial state. The same can be said for the "fingerprints" it leaves, which enable identification to the same level of reliability as a product that is identified by its barcode.

PARTNERING AND SUSTAINABILITY

Within the ISTC, the Partner and Sustainability Department is responsible for all organizations, which could benefit from the services that ISTC has to offer, and which would consider funding the development of projects involving former WMD scientists, as well as for developing and disseminating programs that create market-based and economically sustainable employment opportunities for Russian and CIS scientists previously engaged in weapons-based technological development.

By the close of 2004, the ISTC had 242 registered partners and had 502 partner projects proposed. Of these, 486 projects have thus far received board approval and were funded and active by the close of the year. Partner funding since the Department began operation now exceeds $190 million. The new commercialization group within the Department concluded 5 commercialization agreements by the close of 2004, which has created in excess of 300 sustainable jobs for ISTC beneficiaries.

ATLAS presents award to a Russian manufacturer within an ISTC project

Russian machine building plant Molniya was awarded a prize for most exceptional contribution to construction of the ATLAS spectrometer project, for excellence in the construction of 29 modules for the Hadronic End-Cap Calorimeter of ATLAS.

The modules were constructed in the framework of an ISTC project funded by The European Center for Nuclear Research (CERN) through the ISTC Partner Projects program. The Molniya machine building plant, a former weapons manufacturer located near Moscow, constructed a total of 29 modules for the LAr Hadronic End-Cap Calorimeter (HEC) of ATLAS. Thirteen modules have already been integrated into the four wheels of the detector, with the remaining 16 calibration modules designed for the ATLAS beam tests.

To manufacture the unique copper plates and module structures required, the company set up a dedicated production process and developed stringent quality control criteria. The task was completed on time, within budget, and the completed modules surpassed required quality standards.

Spokesperson for the ATLAS project Peter Jenni emphasized the value of high-quality components to the ATLAS project in his presentation of the award to the project team at Molynia. "For physicists it is gratifying to see that all the pieces of the detector are coming together now from all over the world, we are closer to realizing our dream. This achievement would not have been possible without the right industrial partners and with Molniya we were happy to have such a partner".

Acknowledging the ISTC contribution made to the project, Mr. Jenni presented a second award to ISTC Proposal Group Leader Elena Ryabeva, who added "Molniya is one of the excellent ISTC projects; a former weapons cooperation turned to a peaceful task using high scientific knowledge".

The importance of such international cooperation and joint ventures was stressed by all in attendance at the award ceremony. In his speech, Juan Antonio Rubio, Head of Education and Technology Transfer at CERN, commented that "as many as 40% of companies holding a high technology contract with CERN have reported technological and market learning and other benefits. A new market product has been developed on average from each contract with CERN. This is an example of technology transfer (TT) through procurement, a classical TT channel. With Molniya the technological benefits have already happened and I'm sure others will follow".

PARTNERING PROMOTION

The Partnering Promotion Group within the Partnering and Sustainability Department is tasked with raising the profile of the ISTC amongst all organizations, be they governmental or commercial, which could benefit from the services that the ISTC has to offer, and which would consider either funding, or co-funding the development of projects involving former WMD scientists. The Group also retains a "customer care" remit for all current and potential partners and needs to ensure partners have "user-friendly" information and assistance to understand and access the services of the ISTC.

In 2004, the Group implemented Canadian, European, Korean, and US activities in 2004; targeting events, forums and company visits which could offer profile for the ISTC organization and secure longer-term partnering opportunities. The Group focused on developing a service and business-oriented approach to its outreach programs and will continue this process throughout 2005.

The Group's technology matchmaking service, which brings Russian and CIS scientists together with ISTC partners, has been a growth area in 2004. Six new Partner Projects with combined funding of $650,000 are currently under development as a result of matchmaking.

The Group publishes a quarterly, electronic-based newsletter 'Partner News' which is distributed to all partners and in 2005 will continue to develop the partner homepage and information sections of the ISTC website, as well as organizing and attending a program of events and visits.


ISTC PARTNER NEWS

From Nuclear Production to Consumer Goods...

ISTC Innovation Software Tools for Successful Ventures

The Many Faces of Partner and Sustainability Group

Below are the highlights of each regional efforts:

- The ISTC supported the US Department of State's Bio-Industry Initiative program at the Bio 2004 conference in San Francisco.

- In Canada, the ISTC participated in the Canadian Bio-Partnering North America Conference, Annual Convention on Biopharmaceutical and Health Technology Industry, and Montreal & Partnerships 2004 Conference. The ISTC has actively promoted its services and opportunities and has established several promising contacts for collaborations with Canadian companies and innovation agencies.

- In the European Union, the ISTC participated in the ILA International Air Show and the International Informatics and Biotechnology Convergence Conference, while sponsoring BioEurope 2004, the largest European bio-industry conference,. BioEurope 2004 provided excellent opportunities for the ISTC to promote itself and to meet with a number of companies operating in biotech/medpharma.

- In cooperation with the Korean Government and Korean Partners, the ISTC has organized multiple workshops, introducing Russian technologies to Korean firms in such areas as material science, nano-materials, lasers, optics, and biotechnology. The ISTC has also increased Korean business interest through greater ISTC Partner Promotion activities. In addition, the ISTC has received a 1 million USD investment commitment from a Korean Small and Medium Business Center.

COMMERCIALIZATION SUPPORT PROGRAM (ComSP)

The ISTC's Partner & Sustainability Department's Commercialization Group completed a second year of operation in 2004 under its mission of 'reinforcing the transition to market-based economies responsive to civil needs'. Using business as the tool to create win-win situations for industry partners and teams of ex-weapons experts, ComSP has executed agreements to create in excess of 300 civilian, sustainable jobs for eligible beneficiaries.

ComSP provides equal opportunity for all eligible beneficiaries to seek support and provides a cost-effective program that is complementary to other non-proliferation programs. This program upholds strict adherence to the ISTC's non-proliferation mission while providing a unique and comprehensive service to both business and scientists seeking to commercialize their technologies.

ISTC Training on Intellectual Property Rights (IPR):

ISTC ComSP provides training programs and counsel to Russian technology teams on disclosure rules for Intellectual Property Rights (IPR) and on development of formal plans to protect these rights. Qualifiedlegal assistance is contracted as needed during commercialization initiatives in order to help ensure that the rights of Russian scientists and of the Parties are protected.

Support and Services provided by the ISTC's Commercialization Group in 2004

Participation in the St. Petersburg Venture Capital Event:
ISTC sponsored and exhibited at the St. Petersburg Venture Capital Event, where technical teams across Russia and the CIS were introduced to potential partners and investors. ISTC received several requests for commercialization assistance as a result of this event.

ISTC Support for Institutes:
ISTC developed programs designed to strengthen thelong-term economic sustainability of institutes. ComSP is working with key institutes to develop plans for commercializing specific technologies. In addition, ISTC has developed a contract to set up technology transfer positions at 20 institutes and provide training on processes that supportlong-term sustainability.

Initiatives Underway

Pilot production of home radiation detectors.
Kvarta, a Russian company in the MEPhI Technopark through ISTC's Commercialization initiative designed and produced commercially viable dosimeters for the CIS marketplace. ISTC supplied industry standard design hardware and software to enable the process and speed-up revisions.

Design Services
Veisblat Design Bureau (VDB), formerly designed and built submarine and missile delivery systems, assitsted by ComSP expanded both in Russia and foreign commercial enterprises with marketing, training, software and design workstations to produce commercial aircraft and shipping systems.

Semiconductor Gases Pilot production of WF_6 &NF_3 gases for microprocessor production.
The Siberian Chemical Combine (SCC, Seversk), will produce semiconductor fabrication gases in the growing industry of customizing and editing commercially available microprocessors. ISTC provided the necessary quality and safety assurance systems for SCC to demonstrate their products to meet the requirements of customers.

Production for a hi-tech beauty product.
A US/Russia company developed an interesting beauty industry product based upon VNIIEF technologies from the closed city of Sarov. ISTC supplied critical equipment to turn prototypes fast, as well as pilot production units.

PARTNER PROJECT ACTIVITIES

Another service of the Partner and Sustainability Department is the Partner Projects Program, which provides account management services to help ensure success and satisfaction on joint projects between Partners and Russian/CIS Institutions. The Partner Projects Program gives Partners access to high quality Russian/CIS scientific and engineering talents with the added benefit of support through established international auditing procedures, mutually predetermined assignment of intellectual property rights, and guaranteed access by the host government to sites, equipment and resources.

Currently 12 Partner Project Managers manage 270 active partner projects with total funding over $130M in Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan and Russia. Each manager adds value by working closely with partners to develop new projects and helping potential partners identify promising technologies. Moreover these managers assist partners by carrying out customized activities ranging from regular site visits and workshops to special-request activities.

A few examples of important partners

US Bio Industry Initiative (BII)

The ISTC shares many of the same objectives with the US Department of State's Bio-Industry Initiative, or BII a major ISTC Partner activity. BII has a number of activities underway, and ISTC is coordinating its activities with BII to identify areas of cooperation and synergy in the biotechnology sector.

Good Laboratory Practices (GLP) Training organized by NP TEMPO and sponsored by BII, with guest instructors from the Regulatory Affairs Professional Society (USA), February 2005

US Department of Health and Human Service (DHHS)

One of the DHHS objectives is to find solutions to socially transmitted diseases (TB, HIV, Hepatitis and etc). Activities included, various diagnostic method and instrument development, new drug and vaccine research. In 2004 significant achievements were made through partnerships, including:

- Diagnostic Tuberculosis biochips,
- The Russian State Research Center of virology and Biotechnology (Vector) developed a pilot HIV vaccine candidate which is currently in a US patent process with support US DOS Bio-Industry Initiatives,
- A vivarium was newly renovated for preclinical trials of a new DNA-vaccine at the Institute of Highly Pure Preparations in St. Petersburg.
- DHHS-BTEP/ISTC co-sponsored a workshop "Antidotes to highly toxic chemical substances", organized by the Institute of Toxicology, St. Petersburg. Approximately 30 participants from the Institute of Toxicology and DHHS/Agency for Toxic Substances and Disease Registry, and U.S. Army Medical Research Institute of Chemical Defence attended the workshop.
- Co-sponsoring by two USG Partners – BioIndustry Initiatives (BII) and DHHS/BTEP. Helm Global Group company with In Step Training, Dublin, Ireland, including two US experts from Elli Lilly and FDA (Food & Drug Administration) taught Good Laboratory Practice (GLP) in Ireland.

European Office of Aerospace Research and Development, (EOARD)

In partnership with the ISTC, EOARD's objective is to develop fund and manage basic research in the areas of aeronautical science, mathematics, information technology, radio frequency technologies and others. Since 1999 EOARD has funded some 89 projects. In 2004 alone, 11 projects have been added or extended for further research opportunities.

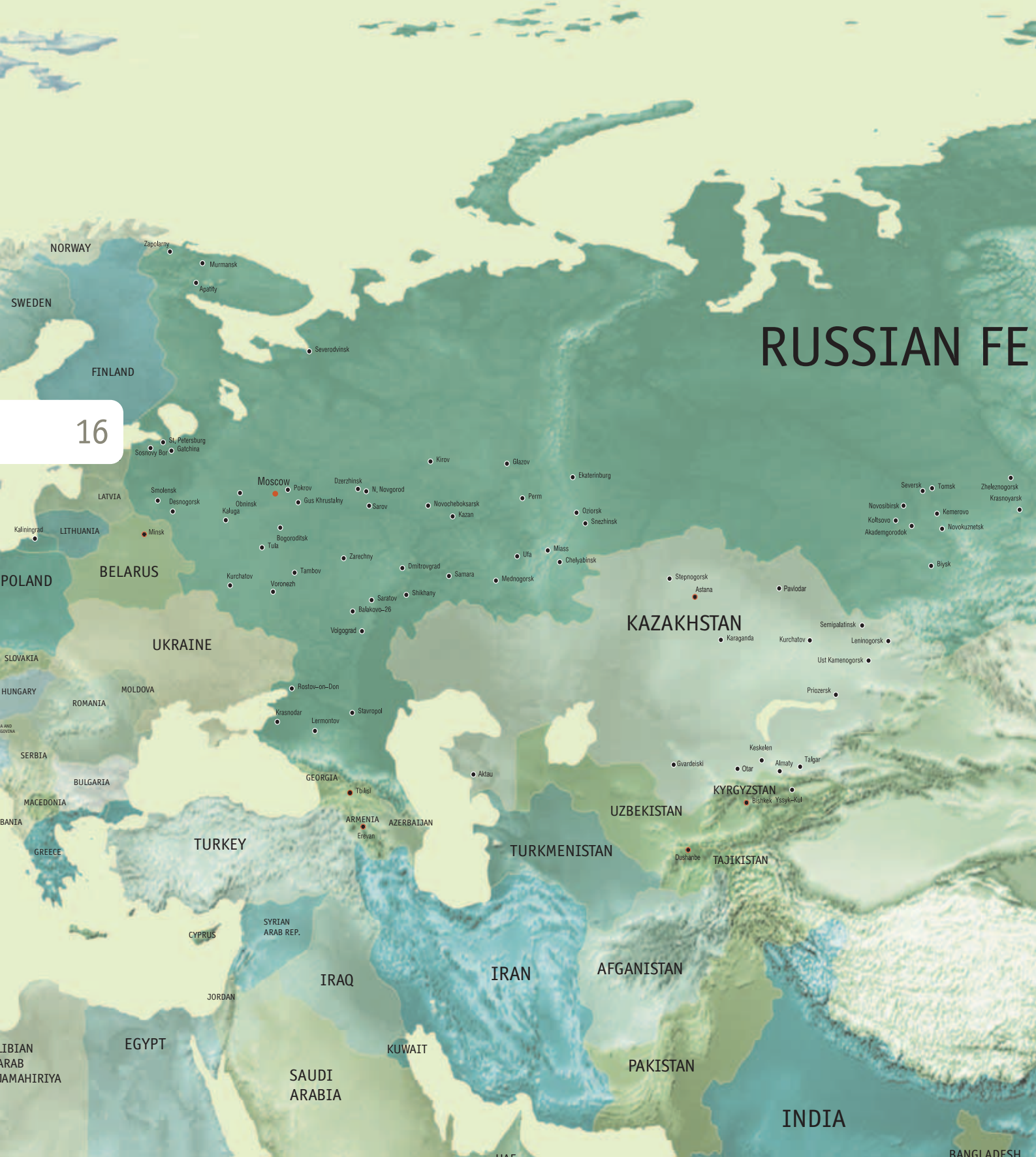
Fuel Cell Targeted Initiative

ISTC's Targeted Initiative (TI) Program focuses on support of promising research and development by assisting Russian and CIS R&D experts in the transition from R&D to economically self-sustaining activities. The TI approach is applicable for complex technical, financial or managerial-structure projects that have a single well-defined goal.

The first ISTC TI project has focused on fuel cell technology, which provides a highly efficient means of generating electric power with minimal pollution. This initiative draws on the highly developed skills and experience of Russian engineers from closed nuclear cities. The objective of the project is to construct and conduct a pilot test of a small capacity, approximately 7 KW fuel-cell power plant to meet the needs of Russian consumers. This multidisciplinary high-technology project involves the participation of five Russian institutes, the government agency RosAtom, and private companies Gasprom and Orgenergogaz.

The TI fuel cell project began its first phase in April 2004, with a feasibility study supported originally by the EU and US funding parties and later joined by Canada. Activities of the project are jointly observed by the TI Steering Group and the Technical Advisory Group which also evaluate progress and plan next steps.

LOCATION OF ISTC PROJECTS



● ISTC PROJECT LOCATION

● ISTC PROJECTS LOCATED IN MOSCOW REGION

Bolshie Vyazyemy
Chernogolovka
Dolgoprudny
Dubna
Dzerzhinskiy
Elektrogorsk
Elektrostal
Fryazino
Istra-2
Khimki
Klimovsk
Korolev
Lytkarino
Lyubertsy
Lyubchany
Mendeleevo
Mytischi
Nemchinovka-1
Obolensk
Podolsk
Protvino
Puschino
Sergiev Posad
Serpukhov
Stupino
Troitsk
Zelenograd
Zhukovsky

● CIS CAPITALS

Case Study — VACCINES OF A "GARDEN VARIETY"

PROJECT # 2176

Scientists from Novosibirsk are engaged in the development of an unusual vaccine which, apart from being less expensive to produce, safe and painless to administer, is also edible. The research is being accomplished in the framework of the ISTC Partner Project #2176, which is funded by the Agricultural Research Service of the U.S. Department of Agriculture, and so far the project team has managed to introduce a HIV antigen protein gene into tomatoes.

Usually, vaccines are injected, but some – like the polio vaccine – can be ingested or eaten. Thus, a number of years ago plant genetic engineers started producing vaccine proteins in plants to test their effectiveness, which started a whole new area of plant derived edible vaccines. This approach has already been used to test vaccines for hepatitis viruses and some bacterial pathogens, but Dr. Sergey Shchelkunov at SRC of Virology and Biotechnology "Vector" wondered if an edible vaccine for HIV AIDS could be produced. Dr. Shchelkunov's laboratory teamed up with other Russian scientists from both the Novosibirsk Institute of Biological Chemistry and Basic Medicine, and the Siberian Institute of Plant Physiology and Biochemistry in Irkutsk, Russia. A functional vaccine from their work is still to be tested, but as a result of project 2176 the researchers were able to insert into the chromosome of tomato plants a gene from HIV. Furthermore, they were able to show that the corresponding protein product from the HIV gene was expressed in different parts of the transgenic tomato plant including ripe fruit. And, because this is a vaccine based on a single protein from HIV, there is no risk of acquiring an HIV infection from eating the tomato fruit.

The choice of tomatoes for these experiments was well planned, because previous researchers have done similar work in tobacco and potato plants. But, of course tobacco cannot be eaten and potatoes must be cooked before consumption, which in most cases destroys the medicinal properties of the vaccine. Edible vaccines have also been produced in bananas, which can be eaten fresh, but bananas can only be grown under tropical conditions. Thus tomatoes were a wise choice because they can grow in many different climate zones and conditions, and their fruit can be eaten fresh.

To introduce the HIV gene into tomatoes, the Russian scientists took advantage of a naturally occurring bacteria which has been harnessed by plant genetic engineers to introduce foreign pieces of DNA into many different plant genomes including tomatoes. All of this was done in tissue culture in thelaboratory, but when whole plants were regenerated in test tubes they were moved to special greenhouses where the transgenic tomato plants grew like usual tomato plants. Scientists then applied PCR (polymerase chain reaction) technology to confirm the presence of the HIV gene in the transgenic plants. Other techniques were also used to confirm that the correct HIV protein was being made in different parts of the transgenic plants including and most importantly the ripe fruit of the tomato plants.

However, this was only the beginning of the scientist's work. For example, the researchers had to check whether the HIV gene was inherited by subsequent generations of plants. To do this they took seeds from transgenic tomatoes, let them germinate and grew a second generation of transgenic tomatoes, which also proved to contain the HIV gene and antigen protein just as the their parent plants had.

Of course, there remains many avenues of research to explore regarding edible HIV vaccines (e.g., efficacy, mechanisms of action, etc.), but in the words of the Russian scientists "The resultant transgenic tomatoes present significant interest as a basis for the creation of edible vaccines against HIV/AIDS and hepatitis B." Thus, although a useable edible vaccine against AIDS may be years away, the results from ISTC project #2176, the potential convenience, safety andlow cost of edible vaccines and the hope that AIDS and other deadly diseases may someday be controlled makes the efforts worthwhile.

COMPETENCY BUILDING

The Competency Building Program provides business-training support to ISTC beneficiaries. This training improves the skills needed to create, develop and maintain economically sustainable business and commercialize technologies.
The ISTC is creating resource centers that take advantage of distance-learning technologies that will reach larger numbers more cost-effectively. These centers are designed to provide a base for versatile distance-learning that includes both multimedia courses and seminars. The centers will also include business-related reference materials and expert consultations for ISTC beneficiaries who are seeking information and partnership on commercialization. ISTC is establishing its first resource center in Bishkek, Kyrgyz Republic in cooperation with the ISTC branch office that islocated there.

The multimedia-training course on 'Business Planning' was completed.

Three specific training events were conducted in 2004:

"SME Business and R&D Commercialization", Dimitrovgrad, Ulyanovsk Region
In anticipation of layoffs at Research Institute of Atomic Reactors (NIIAR), Dimitrovgrad Administration requested ISTC to help re-skill researchers. ISTC conducted a seminar for approximately 60 participants, mainly NIIAR specialists, introducing commercialization concepts. As a result, several commercialization requests were submitted to ISTC.

"Commercialization of ISTC Project Results", Issyk-Kul, Kyrgyzstan
Seminar focused on developing initiatives to commercialize R&D resulting from ISTC Projects, as well business management level presentations. Approximately 50 ISTC Project Managers and participants from Kyrgyzstan took part in the event. During the 3-day seminar ISTC specialists delivered a sample presentation of a product to potential investors and simulated meetings with representatives of industry with a Q&A session.

"Jumpstarting Business Relationships with Western Companies", Pushchino, Moscow Region
ISTC and the Center for Strategic and International Studies (CSIS), Washington DC, USA co-organized. Approximately 140 former WMD scientists from Russian/CIS institutes participated. Seminar provided business, marketing, and basiclegal topics essential to developing partnerships with western pharmaceutical and biotechnology firms and enabled attendees to interact directly with US industry representatives regarding, technologies and services with commercial potential.

Commercialization of ISTC Project Results Seminar, Issyk-Kul, Kyrgyzstan, September 2004

Partner Requested Long-Term Training Events:

Twolong-term training events funded by the US Bio Industry Initiative (BII) are underway: Under these one-year agreements the CERBRD and TEMPO will develop specific curricula, select lecturers and instructors, and prepare training materials, up-grade needed training equipment and etc.

a) The Centre for Ecological Research and BioResources Development (CERBRD), Pushchino, will organize and conduct a Workshop "Development of the Pilot Plant Training Facility for Bioengineering and Biotechnology Specialists" for 40 participants.
b) The Center of Modern Medical Technology (TEMPO) will organize 3 Workshops "Development and launch of GLP preclinical trial competency-building program" for 100 participants.

COMMUNICATION SUPPORT

Communications Support aims to improve the telecommunication infrastructure of institutes where current capabilities inhibit the successful accomplishment of ISTC work and the development of commercial opportunities.

Activity in 2004

The ISTC has funded 32 projects in Russia, Belarus, Kazakstan, Kyrgyzstan, Tajikistan, and Armenia. Of these, 17 have been completed, 2 are under completion, and 13 are in progress.

The ISTC's first Communications Center — Tajikistan

The ISTC opened its first Communication Center in the Republic of Tajikistan at the Academic Township of the Academy of Sciences on 23 September, 2004. The Communication Center links five of the township's research institutes, providing their scientists with state-of-the-art communication resources. The Ambassador from the United States to Tajikistan, Richard Hoagland, and the Secretary Science General of the Academy of Sciences, Prof. Khakim Akhmedov, cut the ribbon opening the new Center. Approximately 30 people from the local science community attended the opening.

JAPAN — TECHNOLOGY WORKSHOPS

The ISTC and the Science and Technology Agency of the Government of Japan regularly organize workshops to highlight technologies and topics of global significance and to facilitate the development of project proposals corresponding to these topics. The Workshop fund covers travel expenses of CIS scientists who participate in these workshops, which are held in cities throughout Japan.

Activity in 2004

20 February, 2004, Tokyo, Japan
29th ISTC Japan Workshop on Advanced Robotics in Russia

10-20 April, 2004, Tokyo, Japan
30th ISTC Japan Workshop on Advanced Catalysis Technologies in Russia

1 October, 2004, Tokyo, Japan
31st ISTC Japan Workshop on Advanced EUV Technologies in Russia

17 November, 2004, Oarai, Japan
32nd ISTC Japan Workshop on Reactor Irradiation Technologies in Russia/CIS

1-11 December, 2004, Tokyo, Japan
33rd ISTC Japan Workshop on Metal Surface Treatment Technologies in Russia/CIS

TECHNOLOGIES DATABASE

The ISTC established the Technologies Database Program to establish and expand information exchange infrastructure concerning research activities, toward promoting the expertise of CIS research institutes and cooperation between CIS and foreign technical experts.

Activity in 2004

The CIS Science and Technologies Internet Portal at http://tech-db.istc.ru contains information on activities of approximately 400 CIS research institutions collaborating with the ISTC. The portal comprises information on more than 7,000 science and technology projects supported by the ISTC, enabling any user to quickly pinpoint projects of interest in numerous fields of research. Every month, several thousands of hits are registered to search the portal for useful science and technology information. The ISTC regularly welcomes new participants to its international portal, and there are now 12 separate organizations contributing materials and resources.

A silver medal award for the ISTC Technologies Database

During the conclusion of "High-Technology Week" in St. Petersburg, Russia on 11 June, 2004, the International Science and Technology Center received an award for its contributions to the revival of Russian science, and a silver medal award for the ISTC Technologies Database. The medal award for the Technologies Database recognizes the ISTC "Science and Technologies in the CIS" portal as a leading information resource, contributing infrastructure for the exchange of scientific-technical information. The award is signed by the Russian Federation Minister for Education and Science A. Fursenko.

TRAVEL SUPPORT

The ISTC strongly encourages CIS scientific teams to develop their project proposals with the participation of foreign collaborating organizations. The Travel Support program fosters collaboration by reimbursing travel and related expenses for CIS scientists who wish to begin or continue technical consultations on the proposals they submit to the ISTC. Program funds also cover travel expenses for scientist participation in international meetings and conferences relevant to their specialization. Funding for the program is provided by voluntary contributions supporting specific technical areas and CIS institutes.

Activity in 2004

Scientists and technical team members were funded on 342 individual trips to collaborating organizations, seminars, and conferences located worldwide.

THE SCIENCE WORKSHOP PROGRAM

The Science Workshop Program is targeted on establishing effective collaboration and facilitating long term scientific partnership through organizing meetings and topical discussions between beneficiaries of the ISTC projects/programs and their colleagues from the territories of the ISTC Funding Parties.

The program is implemented by organizing separate events in the form of a workshop dedicated to a particular technical area and involving a limited number of the participants directly associated with the discussed topic.
Scientific Workshops can, upon approval from the Financing Party, be either specifically ISTC-dedicated events, ISTC sessions linked with topic-related workshops/conferences, supported by other organizations or industry groups, or mini-workshops for the purpose of developing project ideas or confirming the basis of collaboration.

Activity in 2004

22-23 January, St.-Petersburg, Russia
International Workshop "Preparation of the International Polar Year 2007-08".

12-16 April, Sarov, Russia
Second International Seminar "Interaction of Hydrogen Isotopes with Structural Materials".

23-24 April, Moscow, Russia
International Conference "G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction".

10-12 May 2004, Strasbourg, France
CAUSIN "hands-on" Workshop

20-23 June, Freiburg, Germany
International Conference "EuroSun 2004"

28-30 June, St.-Petersburg, Russia
International Workshop on Multiple Scattering in Lidar Experiments (MUSCLE XIII)

7-9 July, Novosibirsk, Russia
International Symposium on Boron Neutron Capture Therapy

14-19 July, Moscow, Russia
The 2nd International Conference "Genomics, Proteomics and Bioinformatics for Medicine"

18-23 July, St.-Petersburg, Russia
"Phonons: Physics and Applications" — ISTC Special Session at the 11th International Conference on Phonon Scattering in Condensed Matter (Phonons 2004)

22-27 August, Novosibirsk, Russia
4th International Symposium "Modern Problems of Laser Physics"

29 August - 03 September, St.-Petersburg, Russia
International Workshop "Desorption-2004"

6-9 September, Altay, Russia
International Conference "High Energy Materials: Demilitarization and Civil Applications"

8-10 September, Koltsovo, Novosibirsk Region, Russia
International Conference "Development of International Collaboration in Infectious Disease Research"

13-17 September, Krakow, Poland
International Symposium and Workshop "Nano and Giga Challenges in Microelectronics Research and Opportunities in Russia"

20-21 September, Almaty, Kazakhstan
Biosafety and Biosecurity Workshop for the Central Asian and Caucasus Regions

21-25 September, Almaty, Kazakhstan
Workshop on International Cooperation on Plague Surveillance

22-24 September, Moscow, Russia
International Conference "Innovation Management in a Global Environment"

27 September-1 October, Adler, Russia
International Workshop "Chemical Physics of Carbon Nanocomposites"

29 September-9 October, Ottawa, Canada
International Workshop "From Fundamental Principles to Health, Environment, Security and Defense Applications"

13-15 October, Moscow, Russia
18th Meeting of the International Contact Expert Group (CEG) on Radioactive Waste Management in North-West Russia

18-20 October, St.-Petersburg, Russia
International Conference "Technical means for prevention of radiation terrorism andliquidation of its consequences"

6-9 December, Moscow, Russia
International Workshop "Water Jet Technologies — Equipment and Applications"

7-8 December, St.-Petersburg, Russia
International Workshop "Biophysics of Oncological Processes"

Participants of the International Conference and Exhibition "EuroSun 2005", June 2004, Freiburg, Germany.

SCIENTIFIC SEMINARS

The ISTC organizes and conducts seminars toward heightening the awareness of CIS scientific potential, maintaining strong international scientific cooperation between foreign and CIS scientists, linking scientific potential with technology markets, and establishing cooperation with other international organizations and programs. Seminar topics are of broad technical and global interest and support the objectives of the Center and of other international nonproliferation initiatives.

Activity in 2004

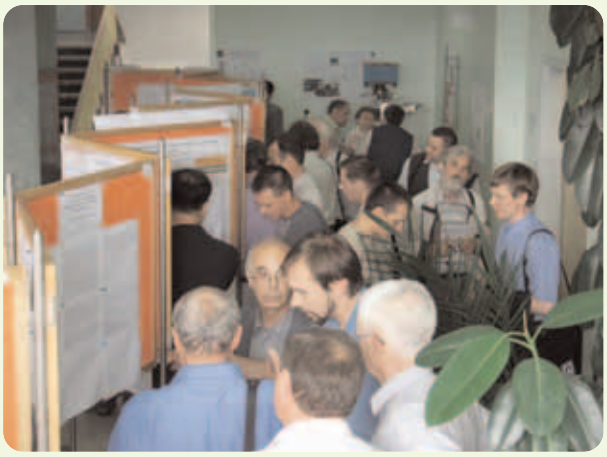
2-8 May 2004
Ship "Mikhail Kalinin"
(starts in Nizhniy Novgorod), Russia
International Conference "X-ray Methods based on Submicron Resolution Optics for Microsystems and Nanotechnologies"

16-19 June 2004
Tbilisi, Georgia
International Conference "Measuring Microsystems for Environmental Monitoring"

19-23 July 2004
Akademgorodok, Novosibirsk, Russia
XV International Synchrotron Radiation Conference and Workshop: "Synchrotron Radiation for Paleo-Climate Study"

22-26 September 2004
Yerevan, Armenia
International Conference "Unification and Optimization of Radiation Monitoring on NPP Location Regions"

2-4 November 2004
Ekaterinburg, Russia
7th ISTC Scientific Advisory Committee Seminar
"Scientific Advances in Chemistry: Heterocycles, Catalysis and Polymers as Driving Forces"



Participants of the XV International Synchrotron Radiation Conference

PATENTING SUPPORT

The Patent Support Program upholds the contribution of ISTC projects and their participants to new inventions and ideas that have commercial value. The ISTC Secretariat administers this program to provide financial support to CIS institutes. Program funds are used to pay costs associated with the initial stages of patenting.

Activity in 2004

Recipient Institutes submitted to the Secretariat 21 Records of Invention as notifications of potential inventions made under the ISTC funded projects.

The Secretariat received 7 applications and provided financial support to 4 patent applications arising from ISTC project results for the amount of US$7,491. 3 national (Russian) and 5 PCT patent applications were filed.

IPR Working Group

With the objective to strengthen the ISTC's role and services in the area of Intellectual Property Rights the ISTC Parties have decided to establish a special Working Group on IPR issues (ISTC IPR WG). Both IPR experts and policy persons will form the Working Group.

2004 OFFICIAL EVENTS

January 30

The Scientific Advisory Committee held its 29th meeting at Brookhaven National Laboratory (Upton, New York, USA).

March 1

The ISTC announced that Canada has become a full member of the ISTC effective 1 March 2004. Canada now joins the European Union, Japan, Russia, and the United States as a permanent member of the ISTC Governing Board. With the inclusion of Canada and the expansion of the European Union, there are now 37 member countries in the ISTC.

April 5

The ISTC Governing Board held its 33rd meeting at ISTC Headquarters in Moscow, approving 59 new projects representing over $10.6 million and Euro 5.1 million in new funding.

April 16

The International Science and Technology Center welcomed Mr. Norbert Jousten as its new Executive Director.

April 24

The Executive Director represented the ISTC at an international conference on the G8 Global Partnership Against the Spread of Weapons of Mass Destruction, organized by the PIR Center in Moscow.

May 24

The Scientific Advisory Committee held its 30th meeting at ISTC Headquarters in Moscow.

May 26

The Executive Director visited Kazakhstan and the Kyrgyz Republic for meetings with government officials and to review ISTC project activity at leading institutes.

June 29

The International Science Laboratory (ISL) officially opened at the Stepanov Institute for Physics in Minsk, Belarus. The ISL is a joint scientific research venture between the Stepanov Institute, The Fraunhofer Institute for Nondestructive Testing (Saarbrucken, Germany) and the International Science and Technology Center.

President of the National Academy of Sciences of the Republic of Belarus, Acad. Mikhail Myasnikovich, Director of the Fraunhofer Institute Prof. Michael Kroening, and ISTC Executive Director Norbert Jousten at the ISL opening ceremony

June 16

The ISTC greeted a delegation from the Foreign Affairs Committee of the UK House of Commons to discuss bilateral ISTC – UK cooperation and broader multilateral engagement through the EU.

July 19

The ISTC conducted its 34th Project Funding Session, approving 25 new projects representing nearly $2 million and Euro 4,6 million in funding.

September 27

The Scientific Advisory Committee held its 31st meeting at the Tomsk Scientific Center of the Siberian Branch of the Russian Academy of Sciences (Tomsk, Russia).

September 10

The ISTC hosted a delegation from the Netherlands Parliament, who visited the Center for discussions and briefing on Netherlands involvement in ISTC activities.

October 4

The National Academy of Sciences of Armenia, in cooperation with the Armenian Ministry of Science and Education and the ISTC, hosted the “Armenian Day of Science”. The all-day event celebrated the achievements of Armenian scientists working in close cooperation with experts around the world, and laid out a vision for the continued development of Armenian science in an international context.

October 27

The Governing Board of the ISTC held its 35th meeting at ISTC Headquarters in Moscow, approving 39 new projects representing over $3.8 million and Euro 4.7 million in new funding.

October 28

The International Science and Technology Center welcomed 300 participants from 37 nations to the celebration of its 10-year anniversary of operations, with an all-day conference and evening reception held in downtown Moscow.

November 2

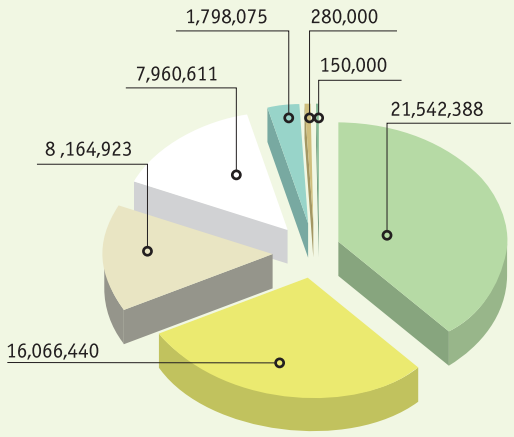
The ISTC Scientific Advisory Committee in cooperation with Institute of Organic Synthesis of the Urals Branch of the Russian Academy of Sciences held its 7th annual seminar in Ekaterinburg with the theme "Scientific Advances in Chemistry: Heterocycles, Catalysis and Polymers as Driving Forces".

ISTC Executive Director presenting gift to a medal-winner of scientific Olympiads

2004 ISTC FINANCIAL SUMMARY

To fulfill its nonproliferation mission, the ISTC Parties, Partners, and project Collaborators contribute financial, in-kind, and human resources to the Center. These resources are used to engage weapon scientists and technical team members in peaceful science projects through ISTC Programs.

New Project Funding by Source

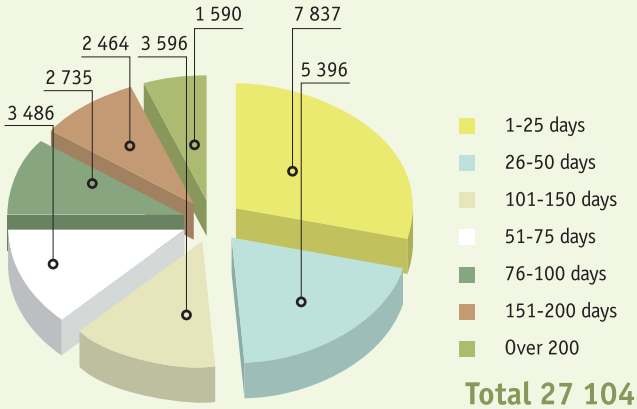


Total $55,962,437

Participants Redirected to ISTC Projects in 2004

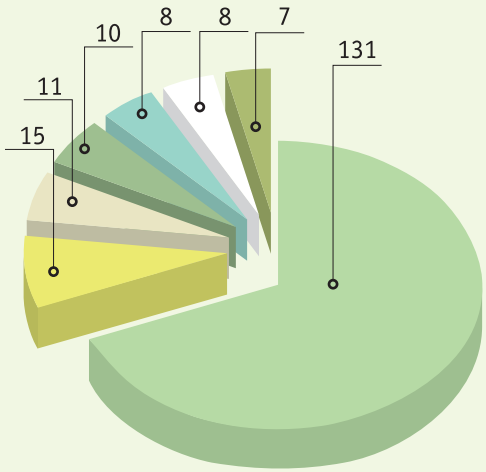
In 2004, the ISTC paid 27 104 project participants US$ 47 286 280 in grant payments for a total of 1 982 792 person-days of effort on ISTC projects.

Participants by Days Redirected



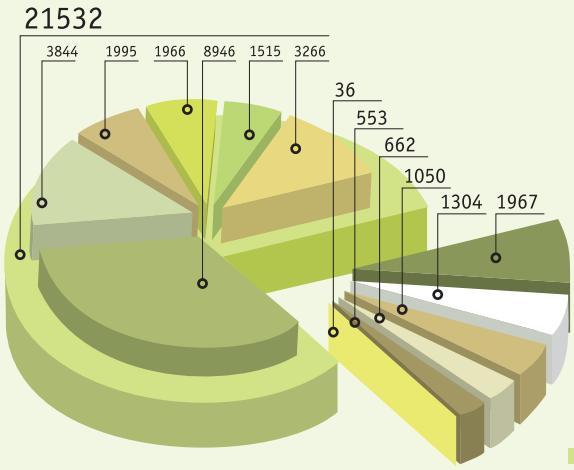
Total 27 104

New Project Funding by Location of Leading Institute



Country	No. of projects	Allocated funds
Russia	131	41,773,835
Georgia	15	3,960,038
Armenia	11	2,833,848
Kazakstan	10	2,439,330
Belarus	8	1,998,688
Tajikistan	8	1,817,072
Kyrgyz Republic	7	1,139,624
Total	**193**	**$55,962,437**

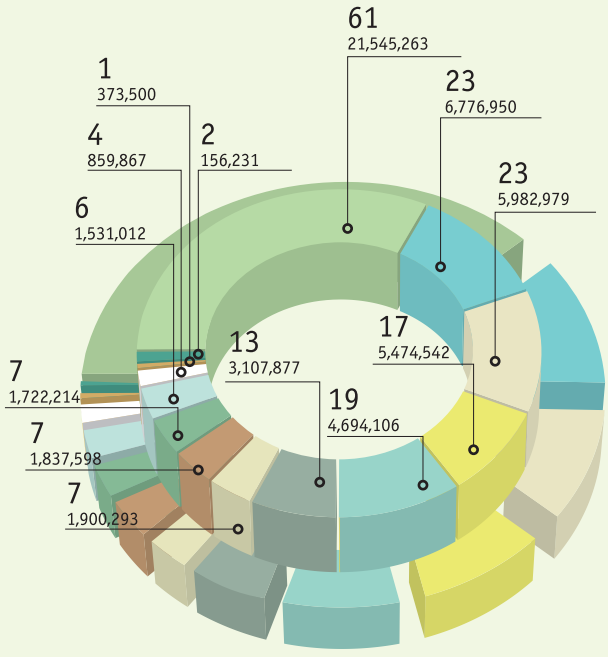
Project Participants by Country / Region



- Russia / All locations
- Kazakhstan
- Armenia
- Georgia
- Belarus
- Kyrgyz Republic
- Tajikistan
- Russia / Moscow
- Russia / Nizhny Novgorod
- Russia / St.Petersburg
- Russia / Chelyabisk
- Russia / Novosibirsk
- Russia / Other cities

27 104 people total

New Project Funding by Technology Area



Technology area	No. of projects	Allocated funds
Biotechnology and Life Sciences	61	21,545,263
Environment	23	6,776,950
Physics	23	5,982,979
Chemistry	17	5,474,542
Fission Reactors	19	4,694,106
Materials	13	3 ,107,877
Information and Communications	7	1,900,293
Instrumentation	7	1,837,598
Non-Nuclear Energy	7	1,722,214
Space, Aircraft and Surface Transportation	6	1,531,012
Manufacturing Technology	4	859,867
Other	1	373,500
Fusion	2	156,231
Total	**193**	**$55,962,437**

PARTIES TO THE ISTC AGREEMENT

Governing Parties


Canada


European Union


Japan


Russian Federation


United States of America

Other Parties


Norway


Republic of Korea

CIS Parties


Armenia


Belarus


Georgia


Kazakhstan


Kyrgyz Republic


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 member CIS country, held by the Republic of Tajikistan in 2004.

The Coordination Committee representatives are appointed by the Parties and meet prior to Governing Board meetings to review details of projects 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, determines new directions for project and program activities, and evaluates ongoing projects.

Members of the Governing Board:

Chair (USA) Ronald F. Lehman II
European Union — Achilleas Mitsos
Japan - Jun Niimi, Takanori Uehara
Russian Federation — Lev Ryabev
Canada - Allan Poole
United States of America — Victor Alessi
Tajikistan — Ulmas Mirsaidov

Members of the Scientific Advisory Committee:

Japan — Yasushi Seki (Chairman), Yutaka Murakami
European Union — Jean-Pierre Contzen, André Syrota
Russian Federation — Evgeny Avrorin, Yuri Trutnev
United States of America — Steven Gitomer, Upendra Rohatgi Singh

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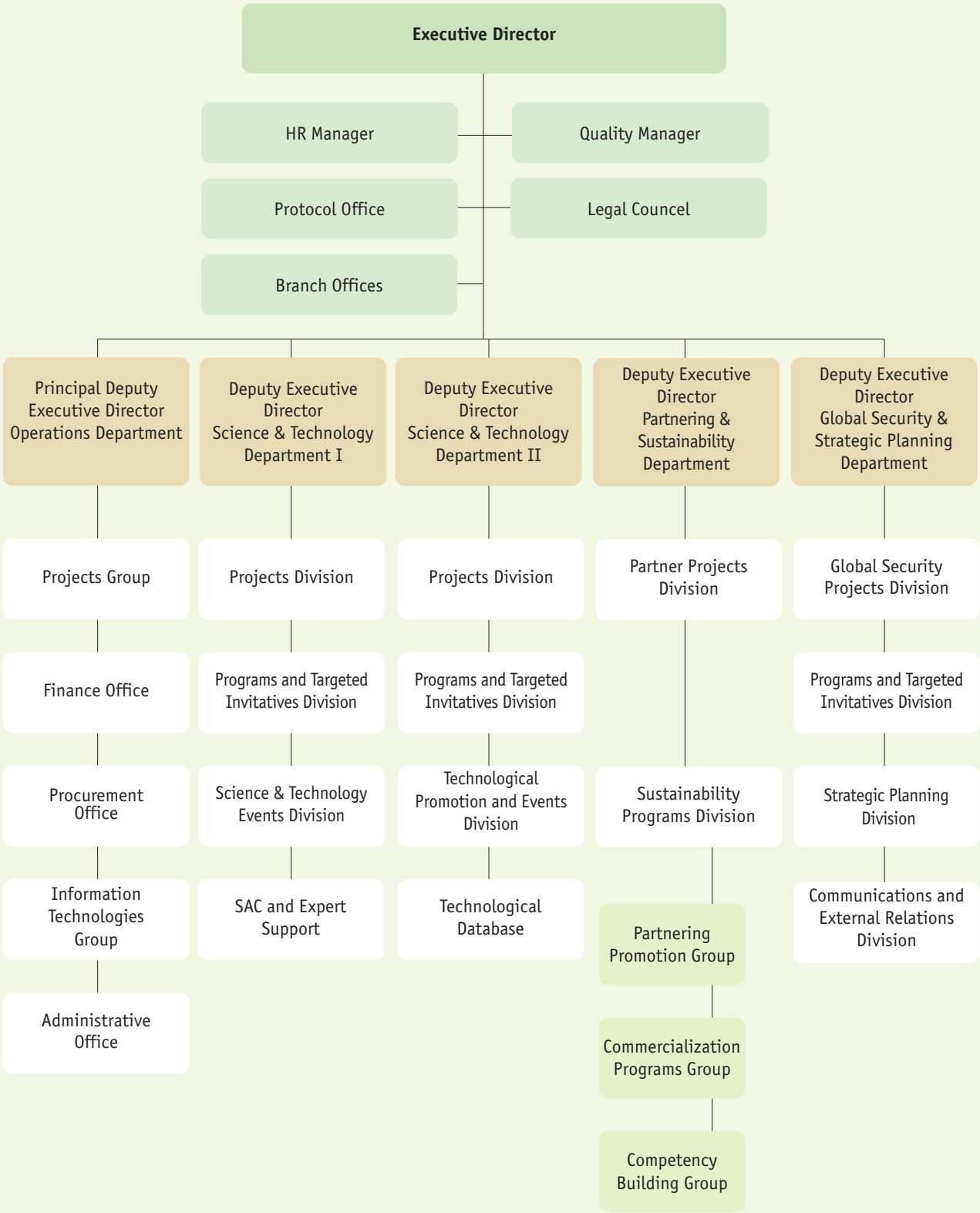
SECRETARIAT STRUCTURE

Headquartered in Moscow with Branch Offices in six CIS countries, the Secretariat is the executive body of the ISTC. It implements the decisions of the Governing Board and manages the daily operations of the Center.



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Uwe Meyer
Norbert Jousten
Toshihiko Oguru
Lawrence Wright
Leo Owsiacki

SUMMARY OF ISTC PROJECT FUNDING

Technology Area	2004				1994-2004	
	Funded		Completed		Funded	
	No. of projects	$ Value	No. of projects	$ Value	No. of projects	$ Value
Biotechnology and Life Sciences: Biochemistry, Cytology, Genetics and Molecular Biology, Ecology, Immunology,Microbiology, Nutrition, Pathology, Pharmacology, Physiology, Public Health, Radiobiology	61	21,545,263.02	39	11,492,283.00	450	169,951,155.44
Chemistry: Analytical Chemistry, Basic and Synthetic Chemistry, Industrial Chemistry and Chemical Process Engineering, Photo and Radiation Chemistry, Physical and Theoretical Chemistry, Polymer Chemistry	17	5,474,542.23	11	1,825,835.00	123	32,282,824.14
Environment: Air Pollution and Control, Environmental Health and Safety, Modeling and Risk Assessment, Monitoring and Instrumentation, Radioactive Waste Treatment, Remediation and Decontamination, Seismic Monitoring, Solid Waste Pollution and Control, Waste Disposal, Water Pollution and Control	23	6,776,950.39	34	7,222,036.50	329	97,862,489.44
Fission Reactors: Decommissioning, Experiments, Fuel Cycle, Isotopes, Materials, Modeling, Nuclear and Other Technical Data, Nuclear Instrumentation, Nuclear Safety and Safeguarding, Reactor Concept, Reactor Engineering and NPP, Reactor Fuels and Fuel Engineering	19	4,694,106.25	20	5,563,655.00	216	66,691,711.18
Fusion: Hybrid Systems and Fuel Cycle, Inertial Confinement Systems, Magnetic Confinement Systems, Plasma Physics	2	156,231.20	4	914,162.00	45	12,549,321.34
Information and Communications: Data Storage and Peripherals, High-Definition Imaging and Displays, High Performance Computing and Networking, Microelectronics and Optoelectronics, Sensors and Signal Processing, Software	7	1,900,293.90	12	2,744,444.00	91	23,144,683.74
Instrumentation: Detection Devices, Measuring Instruments	7	1,837,598.83	17	4,854,906.00	111	30,632,251.41
Manufacturing Technology: CAD and CAM, Engineering Materials, Machinery and Tools, Manufacturing, Planning, Processing and Control, Plant Design and Maintenance, Robotics, Tribology	4	859,867.88	6	864,174.52	59	19,306,236.90
Materials: Ceramics, Composites, Electronic and Photonic Materials, Explosives, High Performance Metals and Alloys, Materials Synthesis and Processing	13	3,107,877.51	10	2,585,905.00	169	55,088,037.37
Non-Nuclear Energy: Batteries and Components, Electric Power Production, Fuel Conversion, Fuels, Geothermal Energy, Heating and Cooling Systems, Miscellaneous Energy Conversion, Solar Energy	7	1,722,214.17	4	675,150.00	53	16,984,058.61
Other	1	373,500.00	3	170,000.00	20	4,014,116.00
Other Basic Sciences: Agriculture, Building Industry Technology, Electrotechnology, Geology, Natural Resources and Earth Sciences	0	0.00	3	1,054,201.00	23	4,889,617.00
Physics: Atomic and Nuclear Physics, Fluid Mechanics and Gas Dynamics, Optics and Lasers, Particles, Fields and Accelerator Physics, Plasma Physics, Radio-frequency Waves, Solid State Physics, Structural Mechanics	23	5,982,979.17	37	7,570,045.00	322	77,050,948.59
Space, Aircraft and Surface Transportation: Aeronautics, Astronomy, Extraterrestrial Exploration, Manned Spacecraft, Space Launch Vehicles and Support Equipment, Space Safety, Spacecraft Trajectories and Flight Mechanics, Surface Transportation, Unmanned Spacecraft	6	1,531,012.95	4	1,149,201.00	85	24,396,723.98
Total	193	55,962,437.50	204	48,685,998.02	2096	634,844,175.14

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ANNUAL REPORT 2004