I S T C

М Н Т Ц

International Science and Technology Center

Annual Report 2015

ISTC Moving forward to New Horizons

Annual Report 2015

Table of Contents

Statement of the Chairman of the ISTC Governing Board

The sparkling new headquarters of the International Science and Technology Center (ISTC) is symbolic of the bright future that member governments have in mind for this groundbreaking scientific center. Housed in ultra-modern offices at Nazarbayev University in Astana, Kazakhstan, its highly functional facilities underscore the ISTC's commitment to efficiency and effectiveness in scientific engagement. Inspired by the many scientists with whom the Center interacts, the ISTC is re-energizing international cooperative research. Interacting with new and younger scientists further spurs greater innovation, both at its headquarters co-located in the University and in activities around the globe. Astana's central location in Eurasia highlights the Center's value as a hub of scientific and technological networking on a broad geographic scale.

With the completion of the intergovernmental agreement to renew and refocus the activities of the ISTC, the Parties and Partners continue the shift from transitional activities such as the new headquarters to completing the transformation of the ISTC called for by the consensus strategy of the Parties. This transformation will enable a dynamic new partnership that reflects changes around the world in the face of accelerating technology.

This transformation must serve the interests of the existing Parties, but the new approach also opens the doors for additional governments to join or participate. The Parties have approved new rules and funding mechanisms to engage scientists from more countries and from more diverse regions of the world. Initiatives are more targeted to meet the needs of member countries in support of the health, wellbeing, and security of their citizens. Collaboratively, Parties and the Secretariat reduced administrative cost and the burdens of overhead. Programs are more flexible and dynamic.

The ISTC is fortunate in that it can build upon a quarter century of success. More than seventy-five thousand scientists from over 50 countries have participated in ISTC activities ranging from fully funded programs to seminars designed to bring different expertise together to meet new challenges. Linking existing scientific institutions keeps the Center's programs advancing S&T substantively and geographically, often aiding in the creation of new centers of excellence.

Building multi-disciplinary approaches to science and technology requires such international cooperation. This networking, in turn, promotes even greater cooperation and productivity. Whether the concerns involve water, disease, energy, industry, agriculture, security, or other societal needs, international engagement permits the total benefits of applied science to be greater than the sum of its individual parts. Some of the supported research seeks to address problems unique to local circumstances. Most are applicable in many regions, and some have global utility. In each case, however, all humanity ultimately benefits.

The successful transformation of the International Science and Technology Center has required

much shared work and close consultations between the Parties and the Center. The year 2015 was a tipping point. The new headquarters is in place and changes in staffing are well underway. As we move out on our common program for the future, it is appropriate to express appreciation to all who have contributed so much to create this enhanced partnership.

On behalf of the Governing Board, I wish to thank first the President and the Government of the Republic of Kazakhstan. Their leadership has been present from the beginning. Kazakhstan has provided one of the distinguished founding board members responsible for the early success and agility of the ISTC. Today, Kazakhstan provides staff and facilities vital to the headquarters' operations. Nazarbayev University – students, faculty, and its President – have provided a friendly and synergistic environment for our headquarters and its creative functions. We are most grateful for this collegial hospitality.

An intensely intergovernmental organization like the ISTC must rely heavily on experts and officials in the capitals of the member states to provide guidance and resources. The ISTC has been very fortunate that the current leadership has enthusiastically stepped up to the challenges. From centers of government spanning continents and oceans, they have kept communications open and ideas flowing and have met regularly to solve problems together. The Science Advisory Committee is the critical element in the ISTC's scientific rigor – peer review of submitted projects. The scientists of the SAC have been a great source of strength for Board actions and Science Center leadership.

Key to both the past success and the future accomplishments of the ISTC are the Partners from industry, non-governmental organizations, and diverse government agencies. The Partner programs of the ISTC provide more means to cooperate and are often the fastest way for members to obtain the benefits of the research they have funded. The ISTC will continue its successful cooperation of many years with the Science and Technology Center in Ukraine (STCU) even as each networks with additional centers of excellence. New Partners such as the Middle East Scientific Institute for Security (MESIS) are symbolic of the geographical transformation underway.

The Executive Director and the Secretariat provide the day-to-day direction of ISTC personnel and operations. These professionals are accountable to the Board, but they are also conduits for the voices of those who actually do the research or provide necessary support. The quality contributions made by this fine staff from many countries are essential to the success of the ISTC. As the ISTC staff continues to reflect the growing diversity of its membership, the highest international standards will be maintained. In acknowledging the contributions of staff in the headquarters and in the branch offices, the Board wishes to express its special appreciation for the intense additional work involved in completing the transition to the new ISTC headquarters.

Many opportunities have been identified for the transformed ISTC, but success requires that the Parties follow up on their vision. As the members refine their strategy and enhance implementation, they will seek the best ideas from Parties, Partners, staff, and participating scientists. Enhanced governance, true partnership, and wider reservoirs of talent and resources made possible by recent changes will expand the value of the ISTC further.

Ronald F. Lehman II

Chairman of the Governing Board International Science and Technology Center

Statement of the Executive Director

2015 for ISTC was probably one of the most significant years in the history of ISTC. Not only was it significant due to the closure of our Moscow office and the severing long established ties with the Russian Federation and its institutes and scientists on 16th July 2015, which composed a very significant part of ISTC's work over more than 21 years, but it was also the finalization of the transition to move to our new Head Office in Astana, Kazakhstan which had commenced in 2014. A sad time not only to sever our ties in the Russian Federation and our long serving and loyal staff, to whom we owe a great debt of gratitude, but also to new beginnings and a fresh start from which ISTC can move forward in many new ways and with many new plans that are underway that will promote ISTC into the next phase of its operations and history.
The transition to the new Astana head office has been a very busy period with all new Kazakh staff requiring ab initio training and a complete overhaul on methods and operations, which is still ongoing and will continue well into 2017.
During the December GB61 many new decisions were taken in respect to moving ISTC forward and adopting new strategies in terms of visibility and outreach to engage new potential countries to join ISTC along with new targeted initiatives for thematic areas of funding, with an emphasis on regional cooperation and collaboration, co-funding, larger projects, and with a focus on younger scientists.

Whilst the transition process has taken up a lot of time, normal business, projects, workshops and seminars have continued unabated across the regions. Although not so many projects commenced in 2015 due to the overriding importance of getting the new ISTC Agreement ready and signed, supplementary activities were very active and included many events and accomplishments.

A few examples of such activities include:
A Japanese funded Targeted Initiative Probiotics and Health conference held at Nazarbayev

University in May 2015 focusing on young researchers and students and on the development of new trends in medical treatments.
Japan also supported two workshops in Tokyo, Japan at the RADIEX 2015 Exhibition in July 2015 on Environmental Radioactivity Measures & Radioactive Disposal and also at LaserTech 2015 in Yokohama on Photonics.
The Republic of Korea supported two November 2015 workshops (NanoCon 2015), to demonstrate R&D in the field of nanotechnology and in the titanium materials areas. The scientific achievements were promoted for joint cooperation with research Institutes and Industrial companies based in Korea.
The workshop «Developments in Integrated Water-Resource Analytical Techniques and Remote Sensing Applications in Support of Water Resource Assessments in Central Asian Countries» was held in Astana, Kazakhstan on 14-18 September, 2015, sponsored by USGS, UNESCO & Kazakhstan Gharysh Sapary.
The SAC plays a very important and significant role at ISTC. The Science Advisory Committee's Annual Conference held a very successful seminar in Annecy in September in collaboration with STCU on Emerging and Re-emerging infectious diseases. Most notable amongst the 65 scientists and clinicians that attended was the participation of scientists from new and non ISTC countries such as Pakistan, Afghanistan,

and Mongolia, all future target countries for outreach.
A short time after this seminar, Professor Jean-Pierre Contzen, a long-time and well respected member of the International Science and Technology Center's Scientific Advisory Committee (SAC), unexpectedly passed away on October 27, 2015, in Saint Petersburg, Russia while on active duty as Chairman of the NIERSC foundation. Professor Contzen's formal relationship with the ISTC started from the very beginning as a founding father. He served as the ISTC's Board Chairman during its formative period and then in October 1998 he was welcomed as a European Union science representative to the ISTC SAC at its 13th Meeting in Moscow, Russia. From that time, he was a stalwart member of ISTC's independent science review and project evaluation committee. Professor Contzen will be greatly missed.
2015 was also a most memorable year for the Fukushima Initiative program 'On the environmental assessment for long term monitoring and remediation in and around Fukushima' for its successful completion. The ISTC has implemented the program collaboratively with the Science and Technology Center Ukraine 2013.

The Initiative was created in December 2011 through the direct support and encouragement of the Japanese government along with the state parties to the ISTC to deliver practical solutions to address the environmental impact of the Fukushima nuclear disaster. This program consisted of six different projects of chemical, physical, and biological countermeasures which were designed to help Japan in specified areas of nuclear remediation and long-term monitoring. The projects were funded by the European Union, the Ministry of Education, Culture, Sports, Science and Technology of Japan, and the U.S. Department of Energy's National Nuclear Security Administration.

The achievement of the six research projects of the Fukushima Initiative was presented at the final ISTC/STCU Technical Review Committee Meeting on the initiative, in Tokyo on December 5-6 of 2015. The research projects provided a unique understanding and practical approaches to monitoring and remediation following the Fukushima Daiichi nuclear accident. Project outcomes presented to experts from Japan, the United States, and the IAEA contributed to cumulative international experience in remediation and monitoring in view of the Fukushima Nuclear Power Plant Accident.
These research projects encouraged international collaboration between the scientists and demonstrated the benefits of the joint activity of the ISTC and the STCU.

The ISTC Governing Board established the "Future Energy EXPO-2017" Targeted Initiative at Governing Board 61 on December 9, 2015 following three months of background study by the ISTC Secretariat. Kazakhstan will host EXPO-2017 under the auspices of the Bureau International des Expositions (BIE) from June-September 2017 in Astana. "Future Energy" was chosen as the theme of EXPO-2017. ISTC will now assist in this initiative and will support Nazarbayev University, the organizers of EXPO, and ultimately Kazakhstan with the development of scientific content within the event by engaging ISTC's vast scientific network through the science communities of the ISTC's Parties.

As ISTC moves forward into its first full year of operations in Kazakhstan, we have already developed excellent relations and cooperation with many Kazakh stakeholders and I thank the Ministry of Education and Science and for Nazarbayev University for fully supporting the ISTC and our activities in Kazakhstan.
With the start of the new Targeted Initiatives we expect to see many more activities in the coming year in terms of funding and active projects and programs, moreover we intend to have our Branch Offices play a greater role in this area in future.

I would like to thank the representatives from all the ISTC Parties for their strong support and valuable contribution to the work of the various Governing bodies of the Centre as we look forward to new horizons at ISTC.
Finally, let me not forget all our staff who

deserve thanks and appreciation for all their hard work over what was a challenging 2015, especially those new staff who are embarking on ISTC's new road ahead and who are already contributing to the new ethos. We have a lot to look forward to and a lot to accomplish in the coming year.

David Cleave
Executive Director
International Science & Technology Center

In Memoriam of Professor Jean-Pierre Contzen, member of the International Science and Technology Center's Scientific Advisory Committee

Professor Jean-Pierre Contzen, a long-time and well respected member of the International Science and Technology Center's Scientific Advisory Committee (SAC), unexpectedly passed away on October 27, 2015 in Saint Petersburg, Russia while on active duty as Chairman of the NIERSC foundation.

He had an illustrious career starting with his joining the European Launcher Development Organization in 1964, where he worked on future space vehicle concepts. In 1969 he joined the European Space Organization where he developed programs for satellite applications. In 1974 he began a 25 years' association with the European Commission occupying successive Directorships of Programs of the Joint Research Center (JRC), Science & Technology Policy, Director General of the JRC and served as Special Adviser of the Commissioner in charge of External Relations. During this time, he was also member of the Standing Committee of START (Global Change System for Analysis, Research and Training) and member of the Management Board of the European Environmental Agency. He later served as an adviser to the Minister of Science & Technology of Portugal.

He was a Chairman of the Institute of Advanced Studies of the United Nations University and was the Invited Chair Professor at the Instituto Superior Técnico in Lisbon and at the Eurasian National University of Kazakhstan. He also dealt with environmental issues through his chairmanship of the Board of Guardians of the Russian Scientific NIERSC Foundation (Nansen International Environmental and Remote Sensing Centre) in Saint Petersburg and as member of the Scientific Committee of the Institut Royal pour la Gestion Durable des Ressources Naturelles et la Promotion des Technologies Propres (IRGT) in Brussels. He was also a member of the Committee of Applied Sciences of the Royal Belgian Academy.

Since 1995, Professor Contzen was an active member of the von Karman Institute for Fluid Dynamics Board of Directors and became its Chairman in 2005.

Professor Contzen's formal relationship with the ISTC started almost from the very beginning as a founding father. He served as the ISTC's Board Chairman during its formative period and then in October 1998 he was welcomed as a European Union science representative to the ISTC SAC at its 13th Meeting in Moscow, Russia. From that time moving forward, he was a stalwart of ISTC's independent science review and project evaluation through its 58th SAC Meeting held in September of 2015 in Annecy, France. He was the engine of the ISTC's Y2K initiative that set many precedents for successful targeted collaboration.

Professor Contzen was a very creative person and a catalyst for ISTC. He was a mentor to many at ISTC and to the SAC Committee. A brilliant engineer with an immense memory and with a broad understanding of science in general. Jean-Pierre was a person that was always willing and available to help. Professor Contzen will be greatly missed.

Last but not least, he was the beloved husband of Arlette Lacroix and father of Bernard, Baudouin, Christine and Thierry.

Overview of ISTC activities in 2015

The year 2015 was very busy in terms of forming the new legal basis and agreement for ISTC activities in its new headquarters in Astana. The Kazakh Government, ISTC Parties and the Secretariat put every effort towards finalizing the ISTC Agreement in time for a signing ceremony during the Governing Board 61 on 9th December 2015, which confirmed the status of ISTC in its new Head Office in Astana, Kazakhstan. Due to the overriding importance of getting the new ISTC Agreement ready and signed, the number of projects being funded and implemented had been reduced.

In December 2015 the Governing Board made many new decisions in respect to moving ISTC forward and adopting new strategies in terms of visibility and outreach along with new targeted initiatives for thematic areas of future funding, which ISTC will implement in 2016.

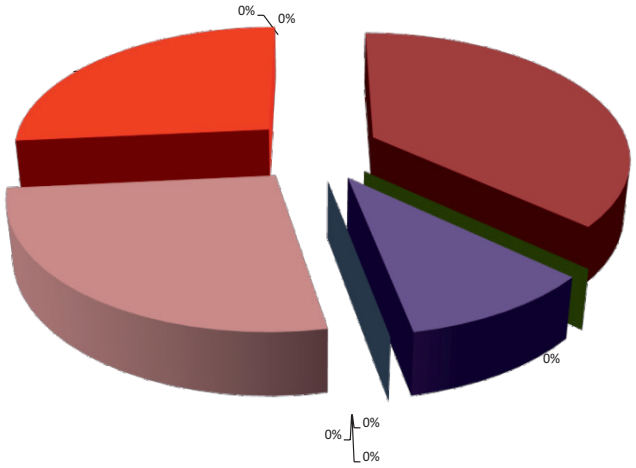
The statistical information provided below gives an overview of ISTC funded projects by their source of financing, beneficiary country and technology area from 1994-2015.

The figures show that between 1994 and 2015 the ISTC supported 2832 projects with a total value of $886,792,946. In 2015, 26 projects in total were funded by ISTC Parties and Partners.

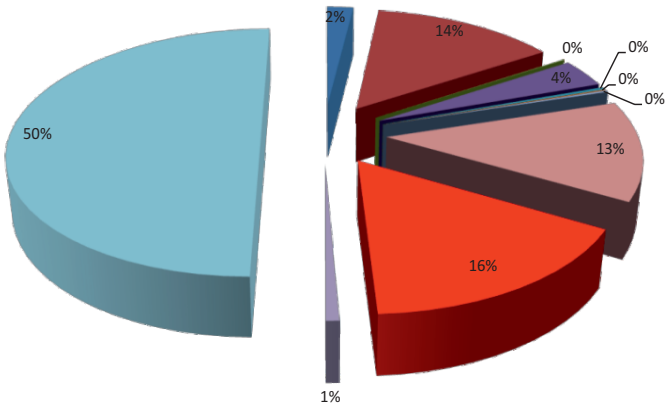
Project Funding in 2015 and Total Project Funding in 1994-2015 - by Source

Party	Amount in 2015 (USD)	Amount Total 1994-2015 (USD)
Canada	-	35,302,224
EU	2,145,285	246,988,848
Finland	-	1,185,960
Japan	599,646	65,580,795
Korea	-	5,161,952
Norway	-	1,881,450
Sweden	-	3,831,906
USA	1,552,657	228,900,936
* Partners	1,548,292	285,409,654
** Other	-	12,549,221
Total	**5,845,880**	**886,792,946**

Amount in 2015 (USD)



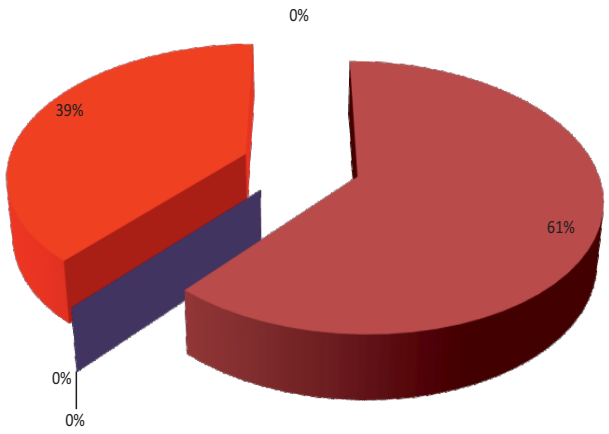
Amount Total 1994-2015 (USD)



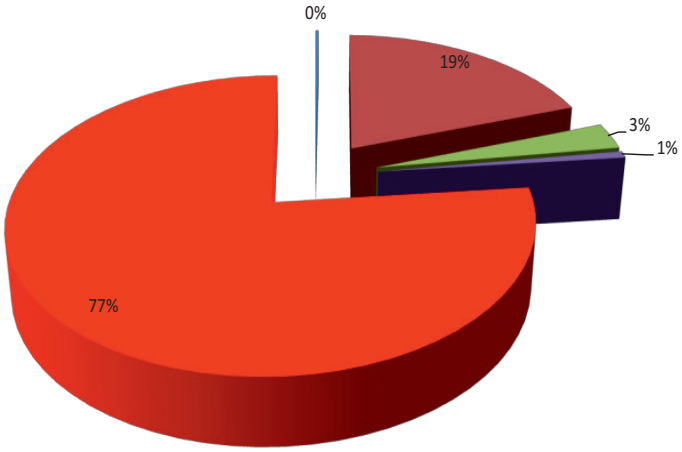
Partner Project Funding in 2015 and Total Partner Project Funding in 1994-2015 - by Party

Party	Type of Partner Company	Number of projects 2015	Partner Funding 2015 (USD)	Number projects Total 1994-2015	Partner Funding Total 1994-2015 (USD)
Canada	**Total**	**0**	**0**	**5**	**622,456**
	g	0	0	2	390,000
	n	0	0	3	232,456
EU	**Total**	**2**	**900,000**	**142**	**55,390,362**
	g	2	900,000	82	44,048,902
	n	0	0	60	11,341,460
Japan	**Total**	**0**	**0**	**65**	**8,469,857**
	g	0	0	17	3,169,953
	n	0	0	48	5,299,904
Korea	**Total**	**0**	**0**	**11**	**2,119,189**
	g	0	0	7	1,780,000
	n	0	0	4	339,189
United States	**Total**	**8**	**564 544**	**570**	**218,724,042**
	g	8	564,544	537	212,336,080
	n	0	0	33	6,387,962
****Total:**	**Total**	**10**	**1,464,544**	**793**	**285,325,906**
	GAP	**10**	**1,464,544**	**645**	**261,724,935**
	Non-GAP	**0**	**0**	**148**	**23,600,971**

Partner Funding 2015 (USD)



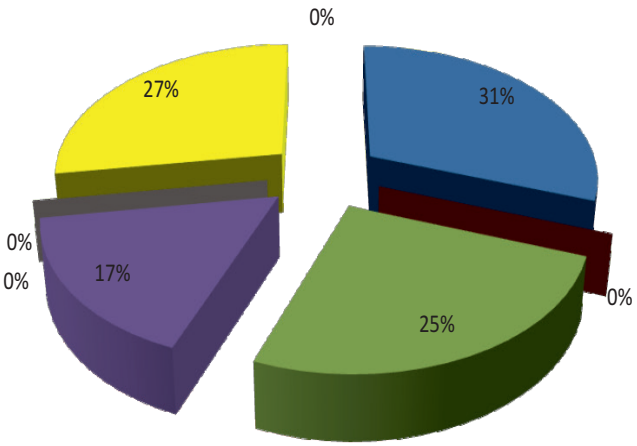
Partner Funding Total 1994-2015 (USD)



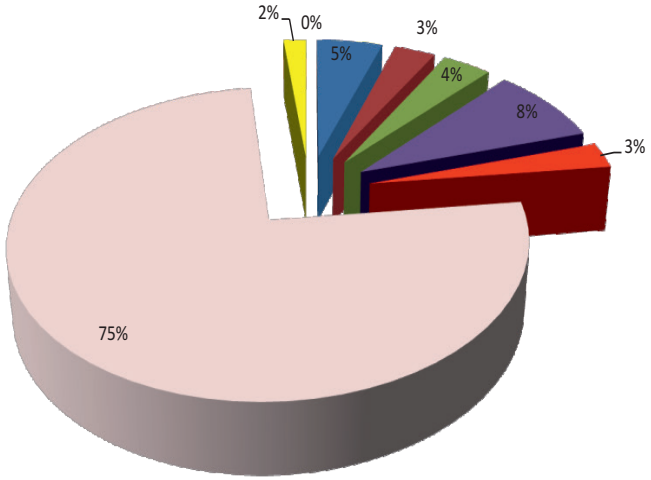
Project Funding and Total Project Funding (1994-2015)-by Beneficiary Country

Country	Number of funded projects 2015	Allocated funds 2015 (USD)	Number of funded projects Total 1994-2015	Allocated Funds Total 1994-2015 (USD)
Armenia	5	1,778,928	180	44,216,158
Belarus	0	0	100	27,481,454
Georgia	12	1,484,824	168	32,622,818
Kazakhstan	5	978,726	206	75,704,315
Kyrgyzstan	0	0	93	24,503,073
Russia	0	0	2 033	667,127,177
Tajikistan	4	1,603,402	51	15,073,657
Ukraine	0	0	1	64,296
Total	**26**	**5,845,880**	**2,832**	**886,792,946**

Allocated funds 2015 (USD)



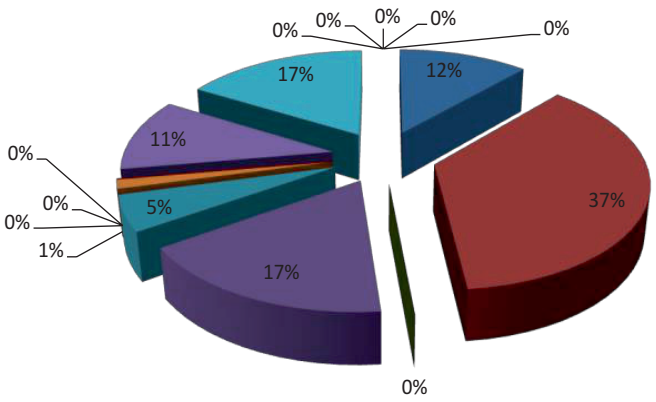
Allocated Funds Total 1994-2015 (USD)



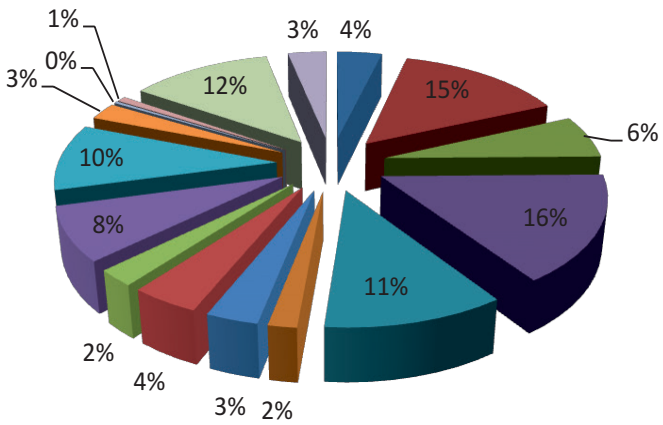
Total Project Funding (1994-2015) - by Technology Area

Tech area	No. of projects 2015	Allocated funds 2015	No. of projects Total 1994-2015	Allocated funds Total 1994-2015
Agriculture	3	689,271	92	34,841,415
Biotechnology	7	2,143,471	340	128,672,807
Chemistry	0	0	210	56,069,154
Environment	4	1,002,084	447	138 227 927
Fission Reactors	1	314,600	275	98,345,836
Fusion	1	80 026	52	15,622,334
Information and Communications	0	0	107	28,536,916
Instrumentation	0	0	136	37,424,855
Manufacturing Technology	0	0	75	21,412,969
Materials	2	648,134	219	70,026,612
Medicine	8	968,294	243	86,625,424
Non-Nuclear Energy	0	0	64	22,470,981
Other	0	0	18	2,798,135
Other Basic Sciences	0	0	30	6,859,930
Physics	0	0	420	109,012,928
Space, Aircraft and Surface Transportation	0	0	105	29,844,723
Total	**26**	**5,845,880**	**2,832**	**886,792,946**

Allocated funds 2015



Allocated funds Total 1994-2015



The Main Events of 2015

Agreement signing ceremony

The Agreement Continuing the International Science and Technology Center was signed in Astana on December 9, 2015. High level representatives of the ISTC member states USA, Korea, Tajikistan, Georgia, EU, Kazakhstan, Kyrgyzstan, Japan, Armenia, and Norway gathered in the Ministry of Foreign Affairs of the Republic of Kazakhstan to accomplish this significant goal.

This event is vital for the ISTC Parties and the Secretariat, as the signed Agreement allows all participants of the organization to move forward towards new and higher achievements. The ISTC members have worked hard over the last two years to help improve and modernize the ISTC and to sign the ISTC Continuing Agreement. It has been an important political and diplomatic accomplishment which will deepen scientific cooperation among the ISTC countries and strengthen this unique international organization which is dedicated to global peace and security.

The signed Agreement makes Kazakhstan an official host state for the ISTC and transfers the headquarters of the organization to Astana within the Nazarbayev University campus.

Left to right: *David Cleave, Executive Director of the ISTC; Simon Limage, Deputy Assistant Secretary for Nonproliferation Programs in the U.S. Department of State; Guang-Hoon Kim, Korea Electrotechnology Research Institute; Samvel Haroutiunian, President of the State Committee for Science of Armenia; Marine Chitashvili, Director General of Shota Rustaveli National Science Foundation; Ronald Lehman, GB Chairman of the ISTC; Aslan Sarinzhipov, Minister of Education and Science of Kazakhstan; Elvira Sarieva, Minister of Education and Science of Kyrgyzstan; Kamohara Masayoshi, Ambassador of Japan to Kazakhstan; Farhod Rahimi, President of the Academy of Sciences of Tajikistan; Eddie Maier, Deputy Head of Unit, Head of Sector CBRN, European Commission; Traian Hristea, Ambassador of EU to Kazakhstan; George A. Krol, Ambassador of USA to Kazakhstan; Ole Johan Bjørnøy, Ambassador of Norway to Kazakhstan.*

Parties to the Agreement Continuing the International Science and Technology Center (Continuation Agreement) signed the Agreement in Astana on December 9, 2015. High-level representatives of the ISTC member states United States, Korea, Tajikistan, Georgia, EU, Kazakhstan, Kyrgyzstan, Japan, Armenia, and Norway gathered in the Ministry of Foreign Affairs of the Republic of Kazakhstan to accomplish this significant goal.

This event is vital for the ISTC Parties and the Secretariat because, once it enters into force, the signed Agreement will allow all participants of the organization to move forward towards new and higher achievements. The ISTC members have worked hard over the last two years to help improve and modernize the ISTC and to sign the ISTC Continuation Agreement. The signature has been an important political and diplomatic accomplishment which will deepen scientific cooperation among the ISTC countries and strengthen this unique international organization which is dedicated to global peace and security.

The International Workshop on Life Sciences

This Workshop was held on May 13-14, 2015 at Nazarbayev University with the support of the ISTC.

More than 130 participants attended an annual International Conference of the Center for Life Sciences at Nazarbayeve University. They discussed the newest topics on human genome analysis and its applications to contribute to human health. ISTC was involved in the conference as a co-organizer with financial support from the Japanese Party.

Organizers and sponsors intended for the Conference to be an interactive platform for panel discussions and discoveries of new findings in personalized medicine, bioinformatics, systems biomedicine, as well as global health and microbiome research/technologies and their application.

The conference further included a workshop on hot topics in microbiome and probiotics research. During this workshop one of the common interests of ISTC was to unite young scientists with prominent experts from Japan and CIS countries.

By supporting these types of activities, ISTC will have a positive impact on the development of medicines, best practices to reduce the risk of transferred diseases, and much more. Despite the current transition period of ISTC's Head Office from Moscow to Astana, ISTC continues to formulate new ways forward for targeted funding and the search for new mechanisms for more regional activities and outreach.

U.S. - Central Asia Workshop on Biodiversity and Climate Change: Integrating Biodiversity of Natural Heritage with Sustainable Utilization in Central Asia

Central Asia possesses important and unique biological diversity. It is the origin of important domesticated crops and animals, including the apple and the horse. Moreover, the region's endemic plants and microorganisms have not been fully examined for potential biomedical uses. The Climate Change report of the Intergovernmental Panel on Climate Change highlights that changing land use and land cover, soil and water/air pollution, urban development, habitat fragmentation, selective exploitation of species, the introduction of non-active species and stratospheric ozone depletion are the consequences of human activities. It is now well recognized that such activities affect biodiversity. Impending climate changes in Central Asia pose a serious threat to the biodiversity in the region and there is an urgent need to document, preserve and develop a sustainability plan for the natural resources of the region.

U.S. and Kazakhstan Partners held an event on Biodiversity and Climate Change April 15-17, 2015. The workshop, planned with participation of Kazakhstan and regional Governments and Non-Governmental Organizations, was the first step in developing botany and microbial diversity repositories with possible expansion to animal and zoonotic diseases.

United States Partners included the National Institutes of Health , National Cancer Institute, National Institute of Allergy, Infectious Diseases

and the U.S. Geological Survey.
Kazakhstan Partners included the Ministry of Education and Science, the National Center for Biotechnology and Nazarbayev University.
There were numerous other U.S. and Kazakhstani participating institutions and agencies.

Kyrgyz green technologies were introduced at the exhibition RADIEX2015 and the experts meetings in Japan

Through ISTC projects, the Institute of Chemistry and Chemical Technology (ICCT) of the Kyrgyz Republic in cooperation with other institutions developed various technologies for remediation of polluted environments. ISTC introduced the green technologies at the Radioactive Decontamination & Radioactive Waste Disposal International Exhibition (RADIEX), which was held in Tokyo, Japan on July 15-17, 2015.

The exhibition has been held annually since 2012.

In 2015, 89 companies, including decommissioning companies, local governments, Japanese Trading Houses, and Japanese contracting companies and organizations, have presented innovative related technologies at 100 booths. The organizers reported that nearly 7,000 attendants visited the «RADIEX 2015» during these three days.

The ICCT presented via posters and oral presentations prominent technologies, such as magnetized nano-composites combined with cross-linked sorbents, non-stoichiometric inter-polyelectrolyte complexes (NIPECs) for polluted soil and new substances based on pectin for anti-cancer drug delivery. The ISTC provided financial and personnel support for the ICCT scientists.

Three days of active work at the Exhibition made it possible to present the abovementioned projects to potential Japanese Partners, including both private companies and governmental organizations. Interest from other countries' representatives was also very high. Practically all presented technologies aroused interest and technical inquiries. As a result, the ISTC booth attracted the attention of those who were interested in the new technologies and,with the support of ISTC, in cooperation with Kyrgyzstan and the CIS countries.

Furthermore, the ISTC, in cooperation with Kyrgyz scientists, visited the Japanese institutions of Tsukuba University, Japanese Atomic Energy Agency (JAEA), and the Japanese Association for Chemical Innovation (JACI).

The purpose of the technical meetings was to present and discuss new results on chemical and interdisciplinary research of ICCT. These

contributions gave a new view and improved insights into humic acid behavior, absorption of polyelectrolytes on the colloids. For each topic, there were talks on recently published results. Hot talks, questions, answers, and comments developed among contributing speakers and the participants. In the meeting at JACI, several JACI members expressed interest in air pollutants and GHG emissions control technologies as well as remediation technologies for the environment. The members also expressed their interest in the ISTC Partner Project scheme.

With the support of JAEA, the delegation of Kyrgyz scientists completed a one-day field trip to the contaminated areas in Fukushima prefecture affected by the Fukushima Daiichi Nuclear Power Plant accident. JAEA demonstrated:
i) contamination patterns on the field as a result of rain and river run-off
ii) the radionuclides behavior, and
iii) the environmental restoration of contaminated soil and agricultural products.

Experts from all over the world gathered in Annecy, France on September 14 - 15, 2015 for the ISTC Scientific Advisory Committee Workshop on Emerging and Reemerging Infectious Diseases

The ISTC annually organizes the workshops on the initiative of the Scientific Advisory Committee (SAC) of ISTC to create a platform for the experts in different spheres to share experiences.
In 2015 the SAC members held in France a joint ISTC - STCU - Fondation Mérieux- French

National Institute of Health and Medical Research health workshop on Emerging and Reemerging Infectious Diseases. The SAC invited experts not only from CIS countries and Georgia, but also from EU, United States, Afghanistan, Pakistan, Mongolia, and Moldova.

The main purpose of the workshop was to discuss trends and problems in infectious disease control in Europe and CIS countries. More than 60 scientists and specialists from National laboratories, institutions and universities, governmental and international agencies from different countries of Europe and Asia discussed the most recent topics in the healthcare, including modern approaches in diagnostics and treatment of such dangerous infections as Ebola, MERS, AIDS, Multidrug-resistant Tuberculosis (MDR TB). The workshop established new collaborative contacts for elaboration of joint R&D projects in the areas of infection disease control, Biosafety & Biosecurity.

The presentations of scientific achievements were divided into three thematic sessions:
(i) Emerging Infectious diseases: a continuous and global threat,
(ii) Hepatitis B (HBV) and Hepatitis C (HCV), and
(iii) Multidrug-resistant Tuberculosis.

Developments in Integrated Water-Resource Analytical Techniques and Remote Sensing Applications in Support of Water Resource Assessments in Central Asian Countries

The workshop explored developments in integrated water-resource analytical techniques and information and remote sensing applications in six central Asian countries in support of water resource assessment activities. The workshop also promoted collaboration among international partners for the exchange of scientific expertise regarding surface water, ground water, and remote sensing applications.

During the workshop the National Space Center, the KazHydromet Office and its hydrological station hosted visits of the participants. Also, they had a chance to visit the Kazakh National Museum in Astana and briefly learn the history of Kazakhstan.

ISTC/STCU Fukushima Initiative Expert Committee meeting in Tokyo

The ISTC/STCU Fukushima Initiative was formed in 2012 based on a desire to assist the Japanese authorities following the Fukushima Daiichi nuclear accident.

The European Union, the Ministry of Education, Culture, Sports, Science and Technology of Japan, and the U.S. Department of Energy's National Nuclear Security Administration supported the Fukushima Initiative . Additionally, the International Atomic Energy Agency (IAEA) provided technical consulting on a part of the projects.

In total, six research projects of the Initiative provided a unique understanding and practical approaches to monitor and remediate the aftermath of the Fukushima Daiichi nuclear accident in Japan.

The final review session of the Fukushima Initiative, which was held on November 5-6, 2015 in Tokyo, recognized the following achievements:
1. The Initiative facilitated a transfer of scientific knowledge from Armenia, Kazakhstan, and Ukraine which have robust nuclear programs and have studied incidences of severe environmental contamination with the former Soviet Union.
2. The sharing of this knowledge is valuable, as it provides greater insight into the complex relationship of such events within the local natural environment and its related ecosystems.

3. The project's results can be utilized in providing more comprehensive monitoring and remediation of the affected environment in and around the Fukushima site.
4. Although the results are considered to be at a basic fundamental stage of development, through continued study, they can be refined for future application.
5. Via bilateral collaborative studies between the scientists and their Japanese counterparts, novel monitoring and remediation technologies can be derived which have application in the Fukushima area.
6. International collaboration to understand the realities of a severe nuclear accident is important, because it can contribute to a more complete mitigation and remediation.
7. Expanded knowledge contributes to the development of more effective operating structures to prevent future events as well as a response to emergencies.
8. The Initiative was a successful showcase of the benefits of the joint activity of the ISTC and the STCU.

The 33rd ISTC-Korea Workshop "NanoCon 2015"

The workshop, hosted by the Ministry of Science, ICT and Future Planning ROK, took place in Seoul, South Korea. The event brought together ten leading scientists from Georgia, Kazakhstan, Kyrgyz Republic, Armenia, and Tajikistan with numerous counterparts and industrial companies from South Korea. NanoCon has become an interactive platform for the exchanging of opinions and the discussion of hot topics in advanced nanomaterials & nanometrology, nanonuclear materials, nanomedicine and nanobiotechnology including their industrial application.

In parallel to the workshop the hosts held a number of satellite meetings among the speakers, researchers, and industrial customers in order to exchange ideas and promote collaboration.

Besides the event, on November 4, the delegation of academics and researchers from CIS countries and Georgia visited Korea Testing & Research Institute, a company proving the testing, certification, and technical consulting in all areas of industry, and SAMHWA, an air conditioning engineering company.

Active engagement made it possible to deliver prominent nanotechnologies in individual technical meetings with both private companies and governmental organizations.

ISTC joins Nazarbayev University in supporting Astana EXPO-2017

Kazakhstan will host EXPO-2017 under the auspices of the Bureau International des Expositions (BIE) from June-September 2017 in Astana. "Future Energy" was chosen as the theme of EXPO-2017 in order to bring together the global community to take action in response to global energy challenges. Through both physical infrastructure, as well as the messages it conveys, "Future Energy" is intended to promote the adoption, implementation, and use of the best energy practices to encourage sustainable development. The ISTC Governing Board established the "Future Energy EXPO-2017" Targeted Initiative at Governing Board 61 on December 9, 2015 following three months of background study by the ISTC Secretariat.

The Initiative will support Nazarbayev University, the organizers of EXPO, and ultimately, Kazakhstan with the development of scientific content within the event by engaging ISTC's vast scientific network through the science communities of the ISTC Parties. The establishment of the framework for this cooperation was formalized in early 2016, with support from the European Commission, with core activity to include a facilitated exchange by the ISTC of high level scientists and thought leaders in advance, at the event, and at the conclusion of EXPO. To kick start this activity, ISTC worked with Nazarbayev University in supporting the Future Energy Forum: Climate Change and Energy that was held in Paris, France on December 9, 2015 in parallel with the UN Convention on Climate Change.

Together with our Parties, ISTC looks forward to this cooperation intensifying over the course of 2016 and 2017, as Kazakhstan works to prepare well-rounded and thought provoking content before taking the world stage at "Future Energy EXPO-2017."

Remarkable Projects of 2015

Kazakhstan

Development of a set of measures for production of assured quality agricultural goods under radioactive contamination conditions

The Fukushima Nuclear accident led to extensive radionuclide pollution spread across vast areas of Japan. Most of the geographical areas impacted were used for agriculture. Restrictions that were applied to agriculture in the affected areas have negatively impacted food security in Japan taking into account the urbanized structure of Japanese society and the associated limited space for cultivation. Additionally, the toll on society from the accident has been significant with the displacement of hundreds of thousands of residents in the area, loss of incomes based on commercial agriculture, and the long-term concerns of possible health consequences.

ISTC project K-2085 has served to help Japan better understand the consequences of the accident on agriculture and the long-term implications for both plant crops and animal husbandry within the contaminated area. It was recognized that to produce agricultural goods that are safe in terms of radiation, it was necessary to characterize radionuclides distribution in the tissues and organs of crops and animals. Given the shortage of agricultural land it is essential for Japan to conduct activities that make it possible to reduce the transfer of radionuclides in crop products, which are key to the human food basket as well as for the diet of farm animals.

ISTC Project number	K-2085
Project Manager	Panitskiy Andrey
Leading Institute	National Nuclear Center of the Republic of Kazakhstan / Institute of Radiation Safety and Ecology, Kurchatov, Kazakhstan
Foreign collaborators	International Atomic Energy Agency, Vienna, Austria (Osborn D) Pacific Northwest National Laboratory, Richland, WA, USA (Onishi Ya)
Financial parties	US Department of Energy / Global Initiatives for Proliferation Prevention Program, Washington, DC, USA
Total cost of the project	122500 USD + 92500 EUR / 122500USD

Collection of radionuclide contaminated water for testing within the project and preparation of experimental crop beds.

The territory of the former Semipalatinsk Test Site (STS) in Kazakhstan, where there are ecosystems with various radioactive contamination caused by different types of tests (ground, atmospheric and underground nuclear tests as well as nuclear explosions excavated space, etc.) served as the backdrop for the conduction of the project during 2014-15 with the intent to address deficiencies in existing data on radionuclide distribution in agriculture as well as statistical tools to help predict the long term impact of radionuclides within the food chain. The main objective achieved was the development of a set of measures for production of agricultural goods with assured quality in various conditions of radioactive contamination.

Scientists in Japan and elsewhere well received the projects results and were published by the Japanese Atomic Energy Agency. Full scientific findings are to be published later in 2016 in a separate scientific publication. Organizers assess that the results obtained have greatly added to the body of knowledge on radionuclide contamination in living systems and can serve as a basis for future emergency response and management.

Development of a method for obtaining and using of tuberculous bacteriophage

ISTC Project number	**K-2086**
Project Manager	Syrymkyzy Nazym Syrym E-mail: nazym-syrym@mail.ru
Leading Institute	The Republican Government Enterprise on the basic of economic control rights "Research Institute for Biological Safety Problems" , Gvardeiski, Kazakhstan
Foreign collaborators	Hokkaido University / Research Center for Zoonosis Control, Sapporo, Japan (Suzuki Ya) Institute of Microbiology and Laboratory Medicine, Gauling, Germany (Antonenka U)
Financial parties	Japan and EU
Total cost of the project	**466300 USD**

Main objectives:

Tuberculosis is a serious infectious disease resulting in the second largest death toll in the modern world after HIV. The Kazakhstani project K-2086 (Development of a method for obtaining and using tuberculous bacteriophage) aims to develop a new biological technology against bovine tuberculosis. The research, which is being conducted at the Research Institute for Biological Safety Problems, will lead to a fundamentally new method of phage therapy for tuberculosis based on selective, specific microbial viruses with limited side effects.

Results in 2015:

In the course of 2015, researchers completed mycobacterium phage collection and the project started to study the main biological and molecular-genetic properties of the obtained mycobacterium phages. The researchers collected more than 3000 biological materials and soil samples from livestock buildings in the different regions of Kazakhstan.

The project researchers carried out the isolation of mycobacterium phages from the collected samples. They further studied the molecular properties of isolated mycobacterium phages, followed by a screening test of the phage strains in terms of anti-tuberculosis activitity. As a result, the researchers identified a promising strain of mycobacterium phage. Further detailed molecular-genetic analyses and animal tests will be performed next year. The project has the commercial potential for the production of an anti-tuberculosis drug which can be used by pharmaceutical industries.

Photo 1- Preparation of samples from environmental objects

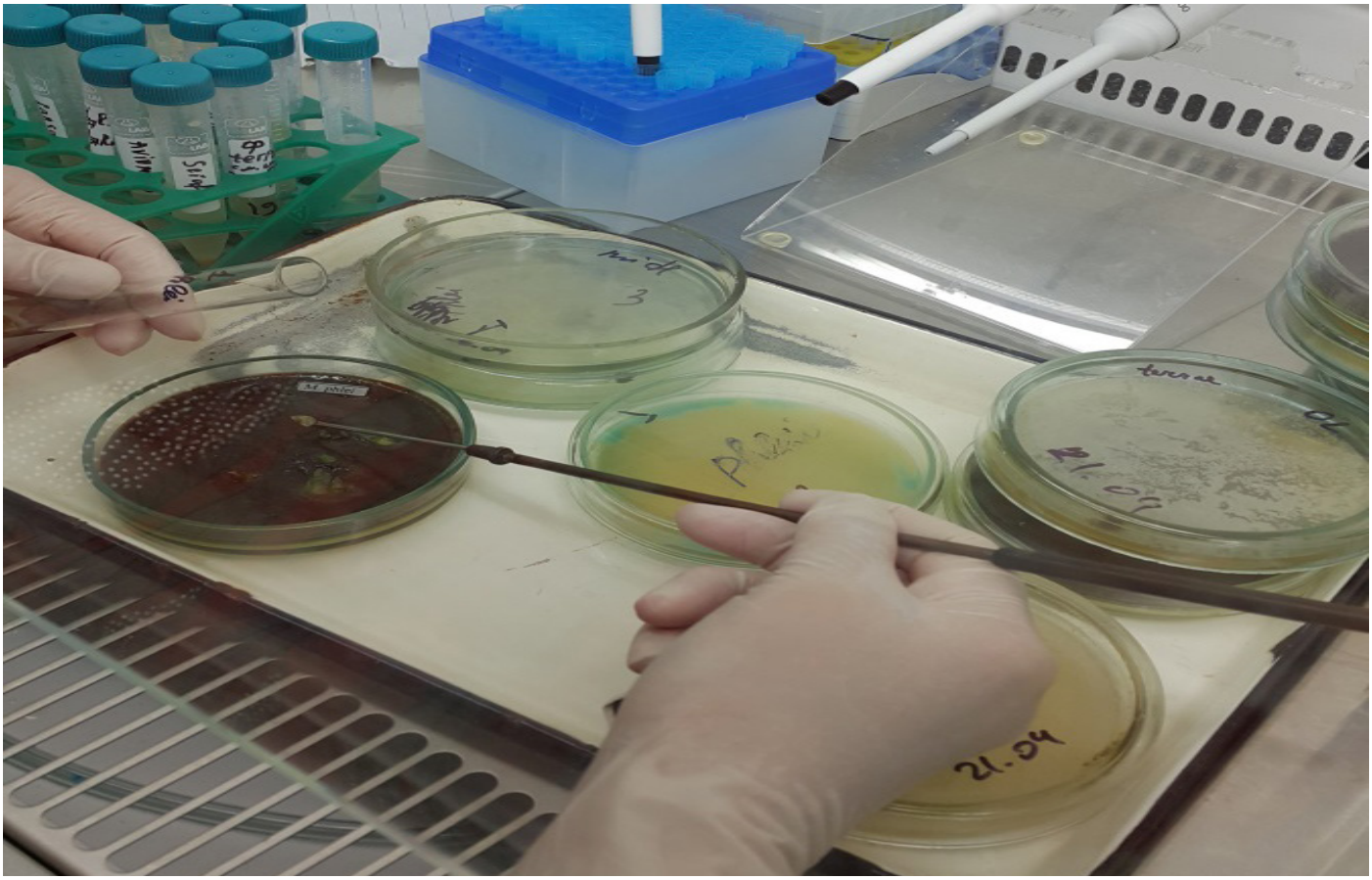


Photo 2 - Selection of phage clones

Georgia

Distribution and Diversity of Bartonella Pathogens among People and Animals in Georgia and Evaluation of Factors Associated with the Emergence of Bartonellosis

ISTC Project number	G-1683
Project Manager	Malania Lile E-mail: anthrax@ncdc.ge, malanial@yahoo.com, ncdc@ncdc.ge
Leading Institute	National Center for Diseases Control, Tbilisi, Georgia
Foreign collaborators	Centers for Disease Control and Prevention (CDC) / National Center for Infectious Diseases/ Division of Vector-Born Infectious Diseases, Fort Collins, CO, USA (Kosoy M)
Partners	US Department of Health & Human Services / US Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA
Project Duration	Beginning from 1 December 2013 for 30 months
Financial parties	Japan and The Global Initiatives for Proliferation Prevention Program
Total cost of the project	126300 USD

The main objectives:

Collection of blood and tissue samples from rodent species and domestic animals from different regions of Georgia to determine the regional diversity of Bartonella spp.

- Development of additional antigens for serological assays from rodent-associated isolates.
- Characterizations and comparisons of the isolates obtained in Georgia with those obtained in the USA.
- Analyses of the human patient samples for detection and identification of Bartonella isolates by serology, PCR, and microbiological techniques.
- Identification of Bartonella species directly in clinical specimens by PCR-sequencing analysis

of several genes.

- Improvement of techniques for direct DNA amplification and detection of uncultured Bartonella species in environmental and clinical specimens.

Comparisons of different DNA fingerprinting techniques and performance of molecular typing of Bartonella isolates found in Georgia using evaluations of genetic variation of variety of genes, including 16S rRNA, citrate synthase (gltA), cell division protein (ftsZ), polymerase beta-subunit (rpoB) and other gen

Achievements:

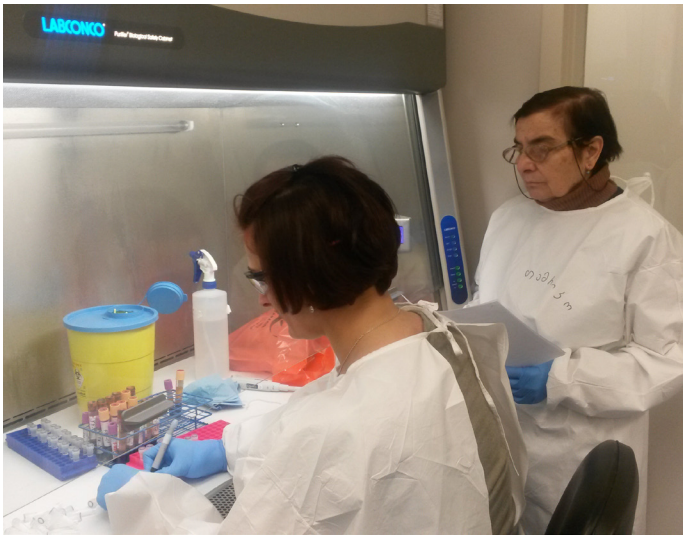
During the ongoing study, scientists of the National Center for Disease Control and Public Health (NCDC) and their domestic colleagues and foreign collaborators obtained interesting and novel results. For example, researchers discovered new bacterial species within the genus Bartonella from rodent reservoirs. The proposed name for the species is Candidatus Bartonella tbilisii. Characterization of the bacterial cultures based on sequence analysis of five genes (gltA, ftsZ, nuoG, rpoB, and ssrA) supported the conclusion that the jird-associated Bartonella strains comprise a distinct monophyletic clade that likely represents a novel Bartonella species that was tentatively named as Candidatus Bartonella tbilisii until the full characterization. More investigations are necessary to determine the impact of this bacterium on wildlife and human health (A manuscript – "Prevalence and diversity of Bartonella species in rodents from Georgia (Caucasus)" by Malania, Lile; Bai, Ying; Osikowicz, Lynn; Tsertsvadze, Nikoloz; Katsitadze, Guram; Imnadze, Paata; Kosoy, Michael was submitted and accepted to the American Journal of Tropical Medicine & Hygiene; AJTMH-16-0041.).

Even more importantly, researchers described a human case of bartonellosis with lymphadenopathy in association with another Bartonella spp., which previously was not described as a human pathogen. The obtained data can be interpreted that this Bartonella strain is spread by urban rats. This discovery indicates a potential human risk from contact with rats within Tbilisi. The detection of a rat-associated Bartonella species in the capital of Georgia raises public health concerns and highlights the need to further explore its zoonotic potential and pathogenic characteristics. (A manuscript in Emerging Infectious Diseases - (http://wwwnc.cdc.gov/eid/article/22/3/15-1823_article).

Also, during the study period, researchers discovered HIV/Bartonella co-infection and

Note: Filed work - catching of rodents for testing on Bartonella spp.

Note: vectors collected during field work from Aspindza region - ready for further identification and investigation



obtained evidence of several additional human cases presumably associated with zoonotic Bartonella species; one of these species has never been described as a human pathogen. Even more strikingly, several positive cases were diagnosed among AIDS patients that allows the suspicion of a role of Bartonella pathogens as important sources for secondary bacterial infections threatening immune-compromised people in Georgia.

Another study of cardiac tissue samples obtained from endocarditis patients provided other interesting results with the detection of the bacterial growth from one tissue sample. This is the first evidence of Janibacter hoylei PVAS-1 associated with human endocarditis in the world. The etiological role of this bacterium as a source of the case has not been established yet and requires further investigation.

During the project, researchers introduced to Georgia modern laboratory methods, including serological tests of Bartonella-specific antibodies, improved bacteriological approaches, and advanced molecular detection using multiple targets as well as rapid-assay by using quantitative PCR assay and improved the laboratory capacity of the Georgian public health for diagnostic of Bartonellosis.

Armenia

Remediation of Cs-contaminated soils through regulation 134Cs and 137Cs soil-plant transfer by polymeric sorbents

ISTC Project number	A-2072
Project Manager	Tadevosyan Anna Hovhannesovna, Ph.D
Leading Institute	Institute of Hydroponics Problems NAS RA, 108, Noragyugh, 0082 Yerevan, Republic of Armenia, Tel.: (374 10) 563 015, e-mail: hydrop@netsys.am; www.sci.am
Supporting Institutes	Yerevan Scientific Research Institute "Erplastpolymer", 127, Arshakunyats Avenue, 0007 Yerevan, Republic of Armenia, Tel.: (374 10) 488 090
Foreign collaborators	1. Dr. Upendra Singh Rohatgi, Brookhaven National Laboratory, Bldg 197D, Upton, NY, USA Tel.: +631-344-2475, e-mail: rohatgi@bnl.gov 2. Dr. Shuji Tsuruoka, Research Center for Exotic Nanocarbons (ENCs), Shinshu University 17-1 Wakasato 4-chome, Nagano, Japan, Tel.: +81-26-269-5740, e-mail: s_tsuruoka@shinshu-u.ac.jp
Project Duration	24 months, 01 June 2013 - 31 May 2015
Financial parties	Japan and The Global Initiatives for Proliferation Prevention Program
Total cost of the project	**250000 USD**

Project Goal is to provide new procedures and development of technology for remediation of Cs-contaminated soils with different contamination levels through regulation of biological migration of polymeric sorbents in the water – soil – plant system.

Researchers used the classical stage-by-stage scheme for selection of polymer materials in the project:

- synthesis; selection of polymers according to physical and chemical properties. The sorbent compositions were obtained using inorganic fillers.
- Assessment of the effectiveness of polymers in soil and hydroponic culture of plants;
- determination of radioactive cesium content in water – soil – plant and water – nutrient solution – plant systems;
- determination of migration and accumulation of radioactive cesium in soil layers (0-5; 5-10; 10-20cm), above-ground and under-ground parts of plants depending on application of the polymer; revealing the dependence of redistribution of radionuclides in systems water – soil – plant and water – nutrient solution – plant on the type of a polymer material, variety of a plant and number irrigation.

Project main outcomes will embrace the development of new models for stage-by-stage remediation of agricultural lands in and around Fukushima contaminated by radionuclides, especially by 134Cs and 137Cs:

In this research, scientists prepared novel composite adsorbents consisting of inorganic filler (bentonite, zeolite) and binding polymer. They evaluated composite for removal of radioactive cesium from aqueous solutions and soils. The developed polymer sorbents demonstrated efficiency of actions for Cs-contaminated water purification without post filtration. Despite the type of polymer matrix the additions of filler and ferrocyanides increased adsorption of radioactive cesium.

Researchers chose some effective polimeric sorbents for plant cultivation. At the beginning of the study, Sample 13 had the maximal high water purification coefficients for 137Cs and 134Cs and was used for the first and second vegetative seasons of plant growth. Sample 13 was the most stable one. Upon further investigation, scientists developed new compositions with the highest uptake of radioactive cesium. Compositions 13* and 73* have the greatest level of absorption of radioactive cesium and were selected for the second vegetative seasons of plant growth. Sample 13, Sample 13*, and Sample 73* have excellent mechanical properties, and separate easily from aqueous solutions and soils. At the given period Sample 13 has the potential for commercial application.

After testing some of the effective polymers for plant growth we made some conclusions:

- The application of polymers in Japanese basil culture allows us to cut in half the nourishment frequency in hydroponics and in 25% irrigating frequency in field, and ensure the same and even an higher yield of leaves (for food) with high quality indices.
- The use of Sample 13 and 13* polymers in plant root-inhabited zones lowered the accumulation of 137Cs in basil leaves both in hydroponics and soil.
- Sample 13 and 13* polymers lowered 137Cs concentration in the soil layer by 10-20% compared with the control.
- The use of Sample 13 and 13* in soil and hydroponics will support the collection of more

Hydroponic equipment with basil plants

Armenian researchers in the Expert Meeting

Anna Tadevosyan with collaborator Shuji Tsuruoka

Polymers wrapped in latticed cloth in shape of ribbons for growing rice

ecologically sound biomass for food.

- Based on our initial experiments there is an opportunity to obtain ecologically sound soybean in Cs-contaminated soils by using polymeric sorbents (additional investigations are necessary).
- In Cs-contaminated soil by radiocaesium absorbance capacity polymers have the following trend: 73*>13*>13.

The present work describes potential countermeasures to control radioactive Cs transfer from soil to agricultural plants. In conclusion, we propose new countermeasures to Fukushima, namely, the use of polymeric sorbents for Cs-contaminated water and soils.

During the project, scientists synthesized implementation compositions by room-temperature polymerization technology. These compositions have high efficiency uptake for 137Cs and 134Cs from water. The compositions have not been tested in field conditions, as their physical-and-chemical properties were studied at the end of the 2nd year of the project implementation.

The room-temperature polymerization technology is of great interest as a more feasible method of obtaining gels. Therefore, we will continue the search for adsorbents obtained through this technique in future as a follow-up to our investigations.

Conclusion:

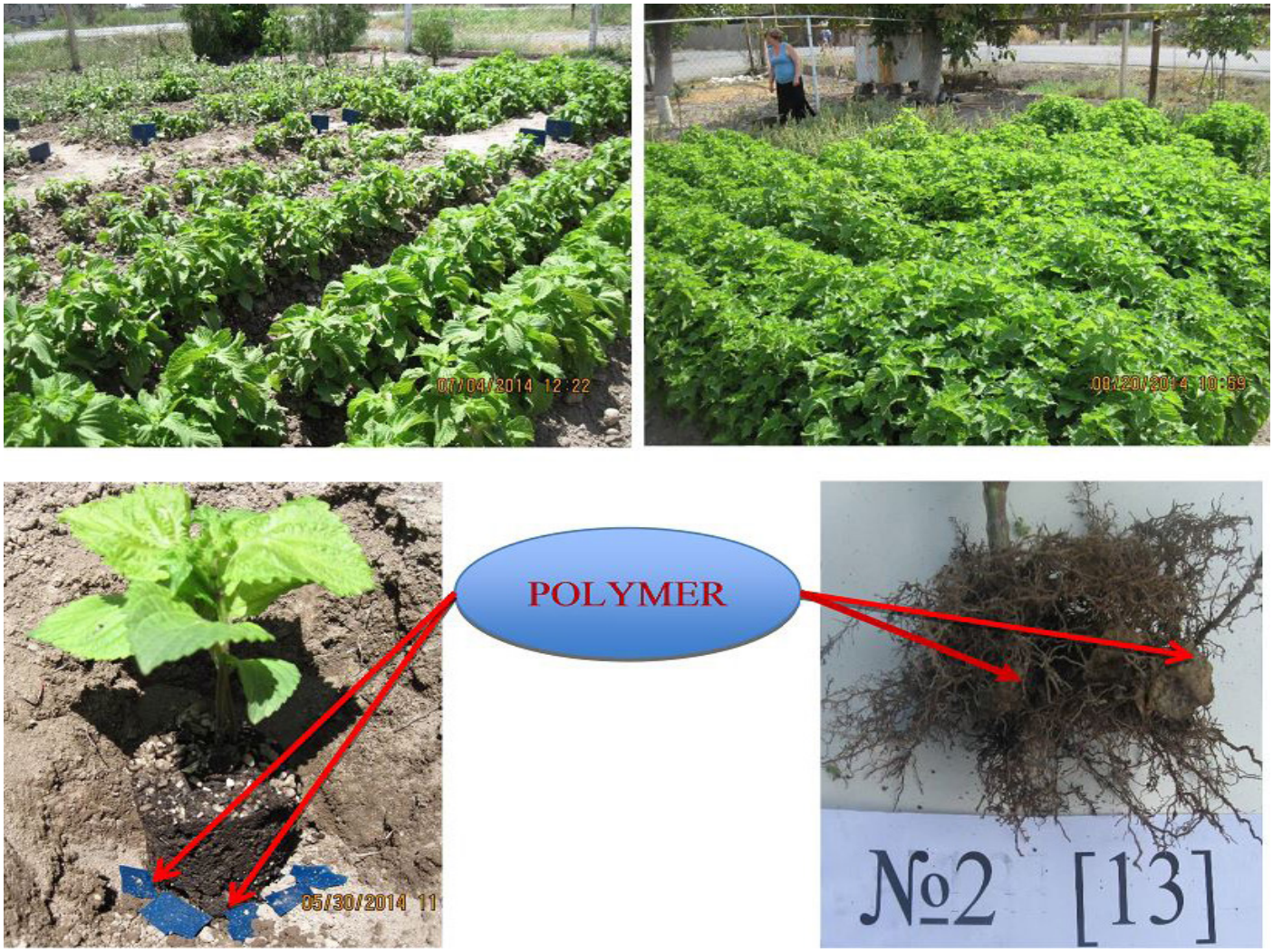
- In this project we propose new countermeasures to Fukushima: to bind radioactive cesium using polymeric sorbents with the subsequent possibility of polymer (accumulated radioactive cesium) removal from soil.
- Laboratory samples of the most effective

Radioactive Eluate

Saplings and polymers before platning

polymeric sorbents can be provided for testing in the contaminated area of Fukushima.

- The high water purification level (up to 90%) of our sorbents allows us to also offer them for water purification in the Fukushima region.
- We recommend using Sample 13 and 13* polymers for growing plants in areas with low levels of contamination which will allow for the collection of harmless and radioecologicaly safe biomass for food.
- In addition, we suggest using hydroponic cultivation of food plants in areas with low and medium levels of Cs-contamination.
- Another advantage of Sample 13 is that after adsorbing radioactive cesium, it can be condensed into small volumes with carbonization.
- Proposed technology pertains only to plant growth. It differs from conventional farming only with the addition of a certain amount of polymer to root-inhabited zones of plants during seedlings planting. Other agricultural activities (plant care, harvesting, etc.) are the same.
- Will not require special units, equipment or activities.
- Can be easy applied to agricultural lands in particular, requires no special knowledge, easily accessible to everyone even in areas of habitation, crofts and farming.



View of experimental field

Kyrgyzstan

Molecular - genetic monitoring and passportization of transboundary Sari-Dzhas focus of plague in Kyrgyzstan and Kazakhstan via GIS-technologies

ISTC Project number	KR-2111
Project Manager	Sariyeva Gulmira Edigeevna E-mail: Gulmira_sarijeva@mail.ru
Leading Institute	Issyk-Kul State University named after K. Tynystanov, Karakol, Kyrgyzstan
Supporting Institutes	Karakol Department of Quarantine and Dangerous Infections, Karakol, Kyrgyzstan
Financial parties	Centers for Disease Control and Prevention (CDC) / National Center for Infectious Diseases/ Division of Vector-Born Infectious Diseases, Fort Collins, CO, USA (Kosoy M) University of Texas / Medical Branch, Galveston, TX, USA (Motin V L)
Total cost of the project	207800 USD + 152659 EUR / 207800 USD

Scientists incorporated new methods of diagnostics of especially dangerous infections to improve the effectiveness of Kyrgyzstan's labs with quarantine and especially dangerous infections, .

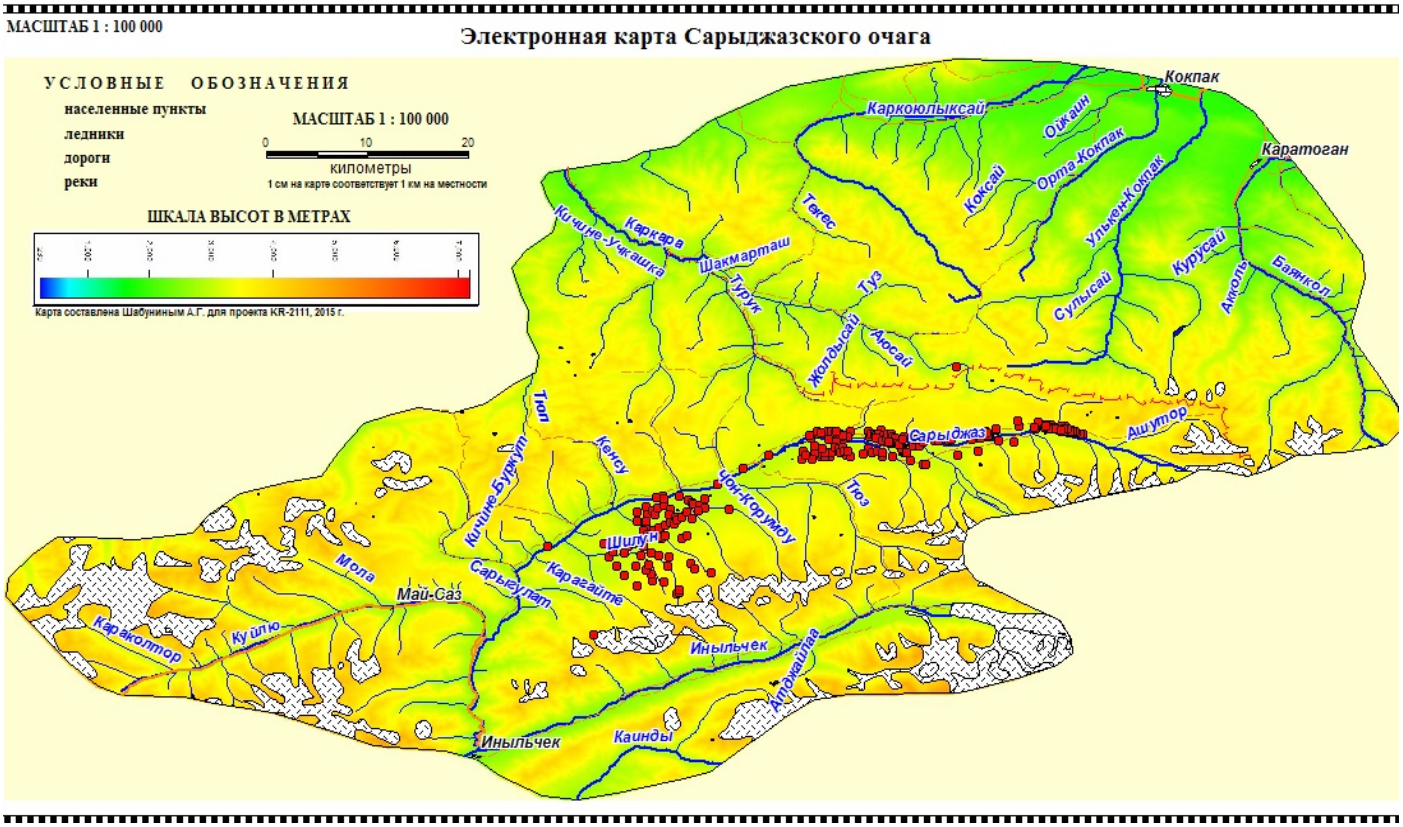
Within the framework of ISTC project #KR-2111 in the Kyrgyz Republic, four sides concluded an international agreement about joint research. These are Issykkul State University named after K.Tynystanov of the Ministry of Education and Science of the Kyrgyz Republic, Republican Center of quarantine and especially dangerous infection (RCQEDI) of the Ministry of Healthcare of the Kyrgyz Republic, Karakol regional department of quarantine and especially dangerous infections and RSC "Kazakh scientific center of quarantine and zoonotic infections named after M.Aikimbaev" of the Committee on consumer rights protection of the Ministry of National Economy of the Republic of Kazakhstan.

Within the framework of ISTC #KR-2111, for the first time, scientists integrated on the basis of RCQEDI multilocus variative analysis of 7 specific loci (MLVA-7) from 6 plague strains isolated in the Sari-Dzhas plague focus of Tyan-Shan natural area of plague. Kazakh specialists provided consultative and practical support.

The above-mentioned method allows for the identification of a strain of plague from the native material of the dead human body within 4 hours. It allows for a quick preliminary result and its confirmation in case of suspicion that the diseased has plague.
Until now, no work has been undertaken because of financial difficulties. Within the framework of the ISTC project # KR-2111 scientists began phylogenic research on plague features, located in the collection of living cultures.

Specialists of the Karakol center of quarantine and especially dangerous infections jointly with RCQEDI are preparing antiepidemic groups to conduct antiepidemic and preventive activities in the territory of Sary-Dzhas natural focus.
We plan to install and integrate genetic diagnostics in polymerase chain reactions (PCR in the real-time mode) on the basis of Karakol division of quarantine and especially dangerous infections.
Depending on the results of this cooperation, we plan cooperation on joint projects between contiguous areas of Talas valley with Kazakhstan, Alay rayon of Osh oblast, and Tajikistan for episootological and epidemiological research of plague,

Zoologist-parasitologist and technician in anti-plague suits do an autopsy of marmots in the filed laboratory of expedition 2015



Map of the Upper Sari-Dzhas site of the Sari-Dzhas nature focus of plague. Red points are places of animals caught in 2015. GPS-mapping.

Tajikistan

Southern-Central part's dust storm and Northern uranium wastes tailings isotope migration monitoring in Tajikistan

ISTC Project number	T-2076
Project Manager	Abdullaev Sabur Fuzaylovich E-mail: lfa.fti@tascampus.eastera.net, tjdust2004@mail.ru
Leading Institute	Physical-Technical Institute, Dushanbe, Tajikistan
Supporting Institutes	Nuclear and Radiation Safety Agency (NRSA), Dushanbe, Tajikistan
Financial parties	NASA / Goddard Space Flight Center, Greenbelt, MD, USA (Holben B N) Universite de Lille, Lille, France (Goloub P)
Total cost of the project	367775 USD

Thanks to the support of the ISTC, the Atmospheric Physics Laboratory in the name of S.U.Umarov, and the Physical Technical Institute of the Academy of Sciences of the Republic of Tajikistan established a system for monitoring of atmospheric processes. At the Atmospheric Physics Laboratory researchers installed:

-Sun photometer AERONET network (CIMEL) for the study of the optical and microphysical characteristics of aerosol which are available on the NASA website:
http://aeronet.gsfc.nasa.gov/cgi-bin/type_one_station_opera_v2_new?site=Dushanbe&nachal=0&year=23&month=2&aero_water=0&level=2&if_day=0&if_err=0&place_code=10&year_or_month=0

- Network Gas analyzers CO2, H2O and O3 for the study of greenhouse gases in the atmosphere.

- A set on the base of the Sun tracking system of the Solys-2 (Kip & Zonen) for the study of the radiation characteristics of the atmosphere (direct, diffuse, reflection, global radiation and surface albedo).

The experimental results based on a representative set of data on AERONET system consisting of 49980 measurement scenario, to 21 of atmospheric parameters for the period 2010-2016 helped to create the database.

A Study of the elemental and isotopic composition of samples (over 200 samples) of dust aerosol and soil of transportation of dust storm.

The most important results are as follows.

Fig.1. Sun Photometer CIMEL (France)

Fig.2. Complex on base of Sun tracker SOLYS-2(Kipp&Zonen)

The systematical radiation monitoring of seasonal radionuclide migration carried out in the area of the Digmai tailing dump of Northern Tajikistan.

The results scientists obtained showed that the average flux density and volumetric activity of radon from the surface of the Digmai tailing dump and adjacent zone is higher during the summer in comparison with that during the winter. It is probably caused by soil desiccation and crack extension occurring on the surface of the tailing dump that leads to greater radon escalation from the soil.

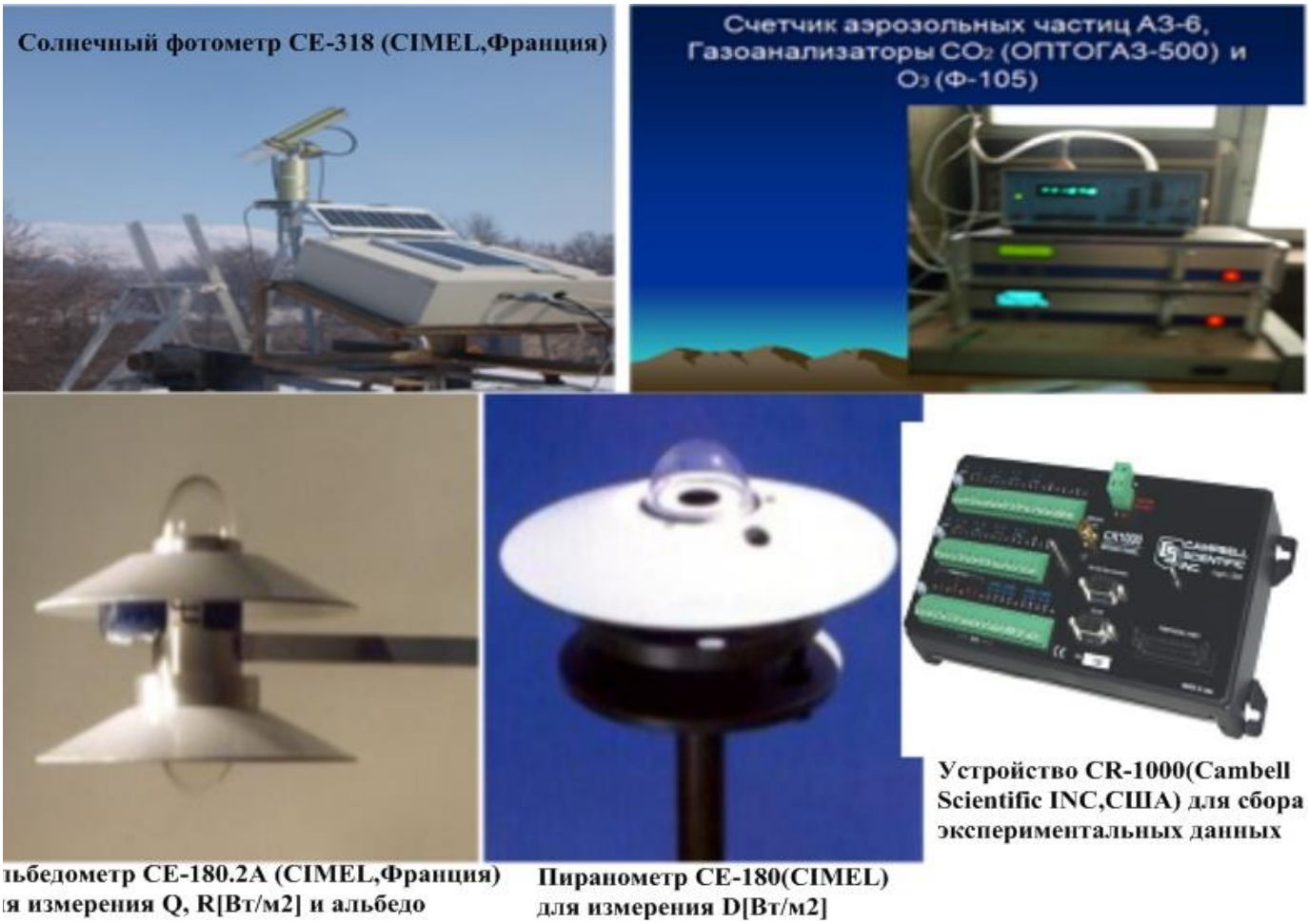


Fig.3. Complex equipment for research of atmospheric process

Fig.4. Complex equipment for research of atmospheric process

Taking into consideration environmental conditions, i.e. relief specificity, texture of superficial crust, prevailing winds, and based on the analysis results researchers discovered that all plant species contain four element-contaminants, such as: U, Cd, Pb and Zn. The analysis helped to get an idea of the dust pollution scale due to wind carryover of radioactive material from the surface of the tailing dump. Based on all above-mentioned data, researchers designed a biogeochemical map of the Digmai tailing dump . Scientists observed the most intensive contamination by radioactive and heavy metals in the western part of tailing dump area that is associated with relief and prevailing wind directions.

a) *б)*

Fig.5. Digmai wastes tailings : a) general view , b) cracks on the surface of the tailings .

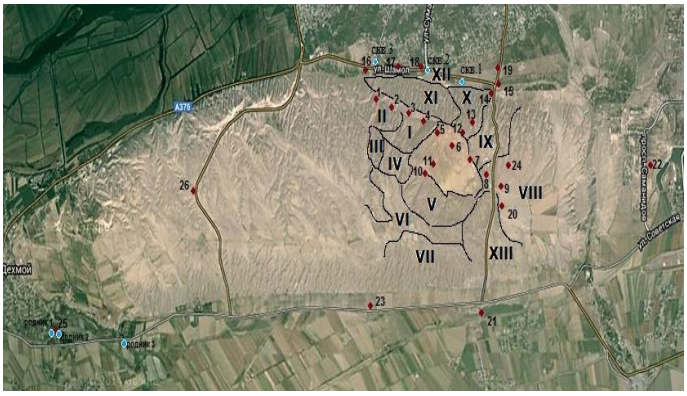


Fig.6. Sampling points and exposition dose rates (EDR) measurements, as well as halo contours of biochemical sampling of radiochemical contamination of Degmay tailing

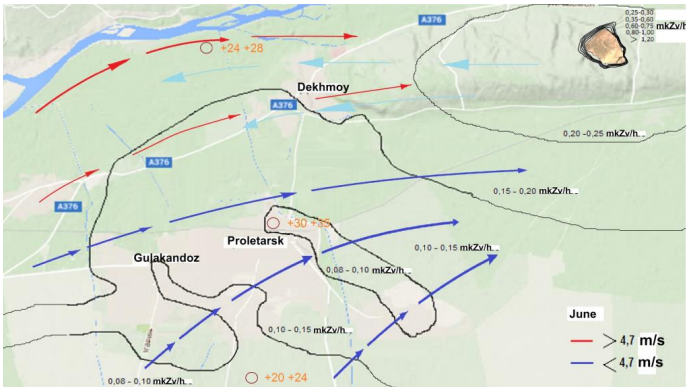


Fig.7. Radiological map of the J.Rasulov district.

Researchers determined the gamma background radiation for the surface of the Digmai tailing dump.
According to the results, average background radiation of MED (minimum effective dose) is μ2.14 Sv/h. The maximum background radiation of MED for Digmai elevation is 22.28 μSv/h.
Systematical measuring of exposure rate (MED) is organized in the inhabited areas around the Digmai tailing dump. We found that MED values of observed areas and inhabited localities do not exceed background radiation (0.15-0.22 μSv/h).
Within the project scientsits studied the dust material composition samples within Chkalovsk city was studied and determined the chemical element content. The results showed that an increase (almost 1.3-1.4 times) of chemical elements in the dust material was observed in the summer when the tailing dumps are dried out and it contributed to the migration of dust mass transfer from the surface of the tailing dump.

Arboviruses and Arboviral Infections in the Republic of Tajikistan

ISTC Project number	**T-2119**
Project Manager	Kadamov Dilshod
Leading Institute	Institute of Zoology and Parasitology named after E.N.Pavlovsky, Dushanbe, Tajikistan
Supporting Institutes	Tajik Research Institute of Preventive Medicine, Dushanbe, Tajikistan
Foreign collaborators	Health Protection Agency / CAMR (Centre for Applied Microbiology & Research), Porton Down, UK (Hewson R) Natural History Museum, London, UK (Harbach R E)
Project Duration	**November 01, 2014 – October 31, 2016**
Financial parties	Ministry of Defense, London, UK
Total cost of the project	**430000 USD**

The main tasks and results:

The prevention and etiological decoding of arboviral infectious disease outbreaks is hampered by a huge variety of causative viruses, the large scale of these being epidemic outbreaks, which affect considerable numbers of the population in short periods of time, the necessity of laboratory-confirmed diagnosis, and the absence of specific treatment and prevention measures in most cases. Many of these viruses have close associations with many species of animals that serve as reservoirs and are the direct source of infection to humans, in addition to causing occasional epizootic outbreaks in agricultural animals.

In ISTC project T-2119, we are building on the previous work by strengthening the detection and monitoring capability of the Tajik Research Institute of Preventive Medicine of the Ministry of Health and Social protection of Population of the Republic of Tajikistan. ISTC project T-2119 focuses on the arboviruses that cause CCHF, WNV, TBE, and ISK. It involves the Institute of Zoology and Parasitology (IZP) whose leading role is the collection and identification of arthropod vectors. Significantly, all collection work, arthropod identification, viral detection and clinical diagnostics is being conducted in Tajikistan and is developing key capabilities and has brought together the expertise of two key institutes.

In the framework of the project implementation in both the Institute of Zoology and Parasitology and the Tajik Research Institute of Preventive Medicine we completed a biosafety upgrade in accordance with WHO standards, introduced confirmatory testing capability with RT-PCR, which resulted with better monitoring of arbovirus disease, and established an underlining capability as a national diagnostic centre.

The international scientific community now has information on circulating disease in Tajikistan. We have the possibility to exchange material with our collaborator, virus isolation and characterisation, study of uncharacterised viruses (e.g. ISK), validation of PHE assays (standard and new) against circulating strains, opportunities to study virus and human disease in detail, opportunities to study virus, vectors and reservoirs in detail, prediction of future outbreaks and their spread, infectious disease problems, emergent zoonoses, and vectors and mammalian reservoir species virtually unknown to the international scientific community.

The main objective of this project is to renew some of the comprehensive ecological and virology investigations of natural foci of arbovirus infections in the territory of Tajikistan. This would provide a clear understanding of the modern circulation processes, their molecular evolution in confined landscapes with the simultaneous prevention of dangerous epidemic situations. Most importantly, to help address public health issues and develop control plans, we informed the population and medical staff about risks associated with especially dangerous diseases.

The project gives the possibility for young scientists, participating in the project, to obtain valuable experience and establish international links with the project collaborator and to take part in joint seminars and conferences. To this end, we trained young scientists underwent trainings on entomology skills, molecular methods of investigation and biosafety/biosecurity.

situations. Most importantly, informing the population and medical staff about risks associated with especially dangerous diseases, was carried out in order to help address public

Fig. 1. Entomologists training

health issues and develop control plans.

The project gives the possibility for young scientists, participating in the project, to obtain valuable experience and establish international links with the project collaborator and to take part in joint seminars and conferences. Young scientists underwent trainings on entomology skills, molecular methods of investigation and biosafety/biosecurity.

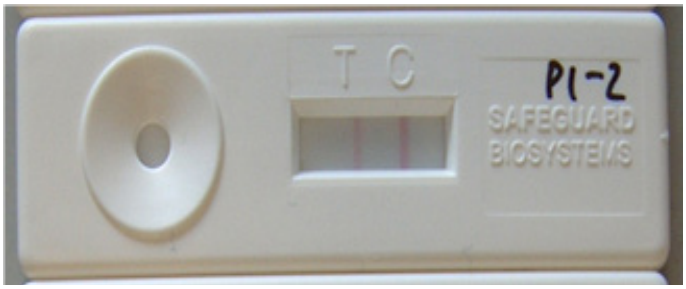


Fig.2. Development of rapid tests for CCHFV

PPE for Mosquito collection using back pack aspirator

List of Projects Completed in 2015

Project No.	Short title
#K-1983	Forensic Methodology for Study of Alcoholic Beverages
#K-2050	Stabilization of Photovoltaic Cells
#K-1797	Fuel for High Temperature Gas Cooled Reactor
#KR-1593	Animal Brucellosis in the Kyrgyz Republic
#T-1223.2	Arbovirus Infections in Tajikistan
#K-1704	Transgenic Plants for Sheep Pox Prophylactic
#T-1989	Food Safety in Tajikistan
#KR-1516	Bacteriological Safety in Fergana Valley
#T-1998	Biosafety Centre and Human Capacity Building in Tajikistan and Afghanistan
#K-2046	Renovation of Animal breeding facility in KSCQZD
#K-1817	Bio-safety Training in Kazakhstan
#K-2052	Training of trainers on biosafety and biosecurity
#T-1882	Nano-Size Powders
#K-2029	Soil anthrax foci in Kazakhstan
#T-1892	Sources of Food Contamination

Lead Institute	Approved funds	Collaborators
Kazakh National University / Center of Physical and Chemical Methods of Analysis	USA	Denmark, USA
National Nuclear Center of the Republic of Kazakstan / Institute of Nuclear Physics	Partner	USA
National Nuclear Center of the Republic of Kazakstan / Institute of Nuclear Physics	Japan	Germany, Japan
Kyrgyz Res earch Institute of Livestock, Veterinary and Pastures	Partner, Other	UK, USA
Tajik Research Institute of Preventive Medicine	Partner	USA, UK
The Republican Government Enterprise on the basic of economic control rights "Research Institute for Biological Safety Problems"	Partner	USA, UK
Republican Center for State Sanitary Epidemiological Control	Partner, Other	Slovakia, USA
Institute of Medical Problems of Southern Branch of the NAS KR	Canada, Other	Canada, UK
Public Organisation «Modern Scientists»	Partner	Kazakstan, UK, Denmark
Kazakh Scientific Center for Quarantine and Zoonotic Diseases	Partner	Belgium
Kazakh Scientific Center for Quarantine and Zoonotic Diseases	Partner	Canada, Germany
Kazakh Scientific Center for Quarantine and Zoonotic Diseases	Partner	Belgium
Institute of Chemistry named after V.I.Nikitin, Academy of Sciences, Republic of Tajikistan	USA	USA
National Biotechnology Center of Kazakstan / Research Institute for Biological Safety Problems	Partner	USA
Institute of Chemistry named after V.I.Nikitin, Academy of Sciences, Republic of Tajikistan	Partner	USA

ISTC Structure

Permanent Governing Board Parties

- European Union
- Japan
- Republic of Kazakhstan
- United States

Other Parties

- Norway
- Republic of Korea

CIS Parties and Georgia

- Armenia
- Kazakhstan
- Kyrgyz Republic
- Tajikistan
- Georgia

Members of the Governing Board:

United States of America	*Ronald F. Lehman II*	*Chairman of the Governing Board*
European Union	*Eddie Maier*	*European Commission*
Japan	*Noritsugu Takahashi*	*Ministry of Foreign Affairs of Japan*
Republic of Kazakhstan	*Takir Balykbayev*	*Ministry of Education and Science of the Republic of Kazakhstan*
United States of America	*Simon Limage*	*U.S. Department of State*

Members of the Scientific Advisory Committee:

Japan	*Tokio Fukahori*	*(MEXT) Ministry of Education, Culture, Sports, Science and Technology, Japan*
European Union	*André Syrota*	*The French Alternative Energies and Atomic Energy Commission (CEA)*
	Jean Muylaert	*The von Karman Institute for Fluid Dynamics*
	Nigel Lightfoot	*Connecting Organizations for Regional Disease Surveillance (CORDS)*
	Maurice Leroy	*University of Strasbourg*
Republic of Kazakhstan	*Bersimbay Rakhmetkazhi*	*L.N.Gumilyov Eurasian National University*
United States of America	*Jeffery Richardson*	*Stanford University*

Parties Contact Information

European Union

Eddie Maier
Deputy Head of Unit
DG for International Cooperation and Development
Stability, Security, Development and Nuclear Safety Unit
European Commission

J59 04/055
B-1049 Brussels/Belgium
Tel: +32 2 29 56 138
Fax: +32 2 29 66 228
E-mail: Eddie.Maier@ec.europa.eu

Sorin Popa
Senior Program Manager
DG for International Cooperation and Development
Stability, Security, Development and Nuclear Safety Unit
European Commission
J59 04/066
B-1040 Brussels/Belgium
Tel: +32 2 29 66 209
E-mail: sorin.popa@ec.europa.eu

Republic of Kazakhstan

Dinara Sekerbaeva
Expert of International Cooperation Section of the Science Committee
Ministry of Education and Science of the RK
Tel: +7 7172 742483
Fax: +7 7172 742457
E-mail: dinara.sekerbaeva@edu.gov.kz

Japan

Makiko Murai (Ms.)
International Science Cooperation Division
Ministry of Foreign Affairs of Japan
Address: 2-2-1, Kasumigaseki, Chiyoda-ku, Tokyo 100-8919, Japan
Tel: +81-3-5501-8229
E-mail: makiko.murai@mofa.go.jp

Junichi Hirata
Senior Specialist for International Research Coordination
International Science and Technology Affairs Division
Science and Technology Bureau
Ministry of Education, Culture, Sports, Science and Technology (MEXT)
Address: 3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo, 100-8959, Japan
Tel: +81-3-6734-3990
Fax: +81-3-6734-4058
E-mail: j-hirata@mext.go.jp

United States of America

Jonathon D Walz
Department ISN/CTR - HST 3327
US Department of State
Address: 2201 C Street, NW, Washington DC 20520
Tel: +202 736 49 61
Fax: +202 286 03 10
E-mail: WalzJD@state.gov

Jeffrey Scott Waldo
International Science Centers
Office of Cooperative Threat Reduction
Bureau of International Security and Nonproliferation
U.S. Department of State
(resident in U.S. Embassy Berlin)
Tel: +49-30-83-05-25-43
E-mail: WaldoJS@state.gov

Norway

Johnny Almestad
Fagdirektor/ Director
Ministry of Foreign Affairs
Section for Russia, Eurasia and Regional Cooperation
Tel: + 47 23 95 06 26
Mobile: + 47 481 80 324
E-mail: jam@mfa.no

Ingar Amundsen
Head of the section for international nuclear safety
Norwegian Radiation Protection Authority
E-mail: Ingar.Amundsen@nrpa.no

Republic of Korea

Mihyun Nam
Assistant director of the Multilateral Cooperation Division
Ministry of Science, ICT and Future Planning
Seoul, Republic of Korea
E-mail: olive9209@korea.kr

Hye Soo Kim
Researcher
EU & International Organization Programs
National Research Foundation of Korea
Seoul, Republic of Korea
Tel: +82 2 3460 5616
Fax: +82 2 3460 5729
E-mail: khsoo1017@nrf.re.kr

CIS Parties and Georgian Contact Information

Republic of Armenia

Samvel Haroutunyan
Chairman
Ministry of Education and Science of Armenia
State Committee of Science
Yerevan, 375010
Armenia
Tel: +374 1 526602
Fax: +374 1 580403
E-mail: gpk@edu.am

Georgia

Nikoloz Bakradze
Office of International Relations and Fundraising
Shota Rustaveli National Science Foundation (SRNSF)
Georgia
Tel: +995 32 2 200 220 (ext. 4406)
Mob: +995 577 57 75 11
E-mail: bakradze@rustaveli.org.ge; nikabakradze@yahoo.com

Kyrgyz Republic

Sharipa Zhorobekova
Member of the Presidium,
National Academy of Science of Kyrgyz Republic
Tel: +996 312 392366

Fax: +996 312 392062
E-mail: jorobekova@istc.kg

Republic of Tajikistan

Farhod Rahimi
President of the Academy of Sciences of the Republic of Tajikistan
Dushanbe, Tajikistan
Tel: +992 37 221 50 83
Fax: +992 37 221 4911
E-mail: frahimi2002@yahoo.com; academy@science.tajik.net

Secretariat Contact Information

General Inquiries / information
Astana 010000
53, Kabanbay Batyr Avenue
Nazarbayev University
Block 39
Tel: + 7 7172 769534 / 769536
E-mail: istcinfo@istc.int

Executive Director
David Cleave
Astana
Tel: + 7 7172 769513
E-mail: cleave@istc.int

Deputy Executive Director
Aidyn Turebayev
Tel: +7 7172 769511
E-mail: turebayev@istc.int

ISTC Branch Office, Almaty

29/33, Shevchenko Street, 050012, Almaty, Kazakstan
Natalya Tomarovskaya
ph.: 7 (727) 293-9740
fax: 7 (727) 293-9694
e-mail: tomarovskaya@istc.int

ISTC Branch Office, Armenia

Yerevan, Republic of Armenia
Hamlet Navasardyan
Tel: +374 60 62 35 17
Fax: +374 10 58 44 83
E-mail: navasardyan@istc.int

ISTC Branch Office, Georgia

Tbilisi, Georgia
Irina Khomeriki
Tel: +995 32 223 700
Fax: +995 32 912 386
E-mail: khomeriki@istc.int

ISTC Branch Office, Kyrgyzstan

Bishkek, Kyrgyz Republic
Vitaly Kovalenko
Tel: +996 312 431 171
Fax: +996 312 431 171
E-mail: kovalenko@istc.int

ISTC Branch Office, Tajikistan

Dushanbe, Republic of Tajikistan
Mukhabatsho Khikmatov
Tel: +992 37 227 8737
+992 91 913 9598
Fax: +992 37 227 9394
E-mail: khikmatov@istc.int