

ANNUAL REPORT

2022

International Science
and Technology Center



- 1 ABOUT US
- 2 STATEMENT OF THE CHAIRMAN OF THE GOVERNING BOARD
- 4 STATEMENT OF THE EXECUTIVE DIRECTOR
- 6 PROGRAM ACTIVITIES SINCE RELOCATION TO REPUBLIC OF KAZAKHSTAN
- 7 KEY TRAINING EVENTS
- 9 MAJOR TARGETED INITIATIVES IN 2022
- 10 ISTC NUCLEAR PROJECT IN AFRICA
- 12 COVID-19 SUPPORT FOR ISTC MEMBER COUNTRIES IN CENTRAL ASIA AND THE CAUCASUS
- 13 EUROPEAN UNION FUNDED CBRN CENTERS OF EXCELLENCE
- 14 SUPPLEMENTARY BUDGETS PROGRAMS FUNDED BY JAPAN
- 16 PARTY AND PARTNER PROJECTS
- 27 LIST OF COMPLETED PRJECTS IN 2022
- 28 ISTC ORGANISATIONAL STRUCTURE
- 29 CONTACT INFORMATION

MISSION

Creating peaceful multilateral S&T collaboration for a safer, more secure, and sustainable world.

VISION

To be the partner of choice in creating, facilitating, and expediting impactful world-class, peaceful multilateral S&T collaboration aimed at making the world safer, more secure, and more sustainable.

BENEFITS

The ISTC is open for business and actively seeking new membership. Under the ISTC Continuation Agreement entered into force in December 2017, non-member governments may now apply to become new members with a seat on the ISTC Governing Board.

Members benefits include:

- Diplomatic privileges and immunities
- Exemptions from certain customs duties
- Professional project management
- Proven project delivery
- International accounting standards
- Technical expertise
- Direct, tax-free grant payments
- Intellectual property protections
- Low-cost implementation
- Trusted scientific partnerships
- Bilingual, cross-functional teams
- On-site monitoring



*Ronald F. Lehman, Ph.D.
Chair, Governing Board
International Science and Technology Center*

Ronald F. Lehman II

STATEMENT OF THE CHAIRMAN OF THE GOVERNING BOARD

Despite war, pandemics, and economic turbulence, ongoing revolutions in science and technology have continued to offer the prospects of greater health, prosperity, freedom, and security to much of the world. Unfortunately, no country alone can exploit all the emerging knowledge to its full potential, and the benefits achieved are often distributed unevenly. Moreover, with many technologies come risks as well as gains.

The nations that benefit most and mitigate risk best are those that work together openly so that everyone contributes to the advancement of all. This spirit of transparent cooperation is what has made the International Science and Technology Center (ISTC) a special organization. Indeed, this teamwork makes those who participate in the ISTC a special family with all its diverse histories, cultures, languages, and interests.

The ISTC has been a magnet for cooperation in Central Asia, where its Headquarters in Astana, Kazakhstan, reminds us of the historical importance of the great Eurasian steppes in connecting human knowledge. This networking applies to contemporary science and technology as well and at an even larger scale. As an organization, the ISTC involves more than just regional cooperation.

The ISTC is a global family. The boundaries of the nations involved with ISTC projects extend North and South from Norway and the Arctic through southern Africa and East and West around the globe 360 degrees, including countries in East Asia, Central Asia, the Caucasus, Europe, and North America.

In its 30 years, the ISTC has seen its footprint grow even as the world in which it was created has changed. Full membership on the Governing Board now includes nine countries plus the European Union (EU) with its 27 members. Kenya and Uzbekistan have been attending meetings in anticipation of becoming full Parties. In addition, more than 60 other countries have also participated in ISTC projects or activities.

The ISTC is an intensely intergovernmental instrument in which decisions require consensus of the Parties acting through the Governing Board. Under the updated ISTC Agreement of 2017, ratified by each full member as mandated by their own constitutional processes, the ISTC is now a global organization with a broader substantive mandate. At the same time, the new Agreement provides greater efficiency and codifies the organization's existing diplomatic status.

In providing a robust legal foundation, some important tax advantages were continued that facilitate cooperation in responsible science. Implementation is enhanced by a small, but strong professional staff at the Headquarters and a distinguished Science Advisory Committee. Joint investment and teaming provide for enhanced cost effectiveness, better performance, and shared accountability.

In its early years, the ISTC focused most heavily on cooperation in peaceful nuclear technology. Important nuclear projects remain in the ISTC's now more diversified portfolio including several in southern Africa and Central Asia related to Uranium safety and environmental cleanup. Through the Foundational Infrastructure for Responsible Use of Small Modular Reactor Technology (FIRST) program, a capability building initiative sponsored by the United States, the ISTC is also working with Kazakhstan to provide capacity building support to advance its consideration and potential deployment

of future small modular reactors (SMR), as a clean carbon-free energy source and consistent with the highest international standards for nuclear security, safety, and nonproliferation.

In recent years, more focus has turned to biotechnology, disease surveillance, and public health. Multi-national biosafety and bio-security training that matured in Central Asia was adapted further in other regions such as with the Institute Pasteur in Dakar, Senegal. The ISTC is proud of its contributions to public health during the COVID-19 pandemic. The agile response demonstrated the ability of the Center to meet the needs of the Parties quickly in an emergency. That flexibility, however, is the product of years of learning how to work well together in many different areas of expertise.

One advantage of the multilateral approach to the advancement of S&T, with its mandatory transparency and robust accountability, is that it gives the ISTC wider credibility. Misunderstanding, misinformation, and even disinformation spreads widely in this age of rapid technological and social change. The ISTC is well positioned to help build public confidence in accurate, up to date information about dangers to the public and what can be done to provide greater safety and security.

The demonstration by the ISTC of successful, transparent multinational S&T cooperation was made possible by the commitment of the Parties, the value added by many participants around the world, and the diligence of the members of the Governing Board representing Armenia, the European Union, Georgia, Japan, Kazakhstan, Kyrgyzstan, the Republic of Korea, Norway, Tajikistan, and the United States. And, on behalf of the Governing Board, I wish to express special appreciation to the Government of Kazakhstan for hosting the ISTC headquarters and to the Executive Director and his staff at the headquarters and in the Branch Offices for their professional excellence.

Value and Number of Active Projects in FY 2022

Funders*	Amount in USD	Number of projects
EU	\$ 35,788,446	11
Japan	\$ 3,077,363	9
UK	\$ 285,807	1
USA	\$ 12,492,517	25
Singapore	\$ 2,059,971	1
Total	\$ 53,704,104	47
*Includes Parties and Partners		



*David Cleave
Executive Director
International Science & Technology Center*

STATEMENT OF THE EXECUTIVE DIRECTOR

For the International Science and Technology Center (ISTC), the year 2022 was momentous. As we saw the end of the Coronavirus Crises and the full resumption of staff working at the ISTC Headquarters and Branch offices, the escalation of the conflict in Ukraine had effects in ISTC member countries as emigres fled both Ukraine and the Russian Federation into ISTC Central Asian Countries and the Caucasus, the ISTC continued to show its flexibility and competence in successfully implementing projects worldwide outside of its earlier, more limited geographical remit. This bodes well for the future as Parties and Partners place their trust in the ISTC's professional ability as an implementing partner.

In 2022, the ISTC saw the practical completion of four large and complex EU CBRN funded projects. First, we completed the Strengthening the National Legal Framework project and provided specialized training on bio-safety, bio-security in Central Asian Countries. This project started in 2015 and finally culminated in the delivery of two mobile labs for Uzbekistan at the end of 2022. This project has been a major success story in the region – a success only added to when the project had to adapt to the Coronavirus epidemic by adding new aspects to the overall project. Second, two EU projects in Southern Africa – Support to the EU CBRN Center of Excellence for

Eastern and Southern Africa in Nuclear Security and also Nuclear Safety and Safeguards related transporting radioactive waste – also started in 2016 covering four Southern African Countries. Both projects met all the project deliverables on training and capacity building.

Third, the EU Project on the Development of Legal Acts aimed at supervision over remediation activities of territories contaminated by the uranium industry's radioactive waste in the Republics of Tajikistan, Kyrgyzstan and Kazakhstan delivered draft rules for monitoring during and after remediation works on the territory of uranium legacy sites. Guidelines for the characterization of Uranium legacy sites were developed based upon IAEA Safety Standards.

Fourth, the EU Targeted Initiative CBRN Export Control on Dual-Use Materials and Intangible Technologies in Central Asia will take a new strategic format moving forward. During 2022, however, the project delivered, developed and launched a Masters Course on Export Control in the Kyrgyz National University (KNU). Such a course is also being developed in Tajikistan and included Commodity Identification lists for participating Countries culminating in an Application APP being developed in Armenia that will be available later in a desktop version.

The EU project on preparedness and response for mass gatherings and other health threats covering 7 Central Asian Countries moved on apace providing multiple “train the trainer” courses in participating countries. In addition, Regional Working Groups with both the World Health Organization (WHO) and the World Bank's IFC Food Safety and Advisory Program agreeing to be observers. The UK's TOXBASE (Poison Information Centre's Chemical Database) agreed to give project participating countries access to their database. Regional activities continue to be held and expanded to strengthen health preparedness, response networks, and public awareness raising.

Japan continues to play a key partner role funding Projects in Kazakhstan, Armenia, Georgia and Tajikistan in scientific areas such as anti-microbial drug resistance (AMR), water purification, decontamination of water from various sources, nuclear fuels, radiation and irradiation studies, and green-house gas technologies to

name a few. Also, Japan has funded supplementary programs providing scientific exchanges and network opportunities in Japan for ISTC country scientists to participate in several and various conferences and fora.

The U.S. Department of State (U.S. DOS), has started to provide funding under its FIRST Initiative looking at the development of SMR's (Small Modular Reactors). Capacity building seminars on safety security and stakeholder outreach were held with Kazakh experts.

The U.S. Department of State is also funding through the ISTC projects (including training and grants) that will support scientists who were impacted by Russia's further invasion of Ukraine.

The U.S. Department of Energy (DoE/NNSA) has been and continues to be a major U.S. Government Partner funder of projects in multiple areas including seismic, nuclear and radioactive safety, security and safeguards, nuclear forensics, physical protection for radioactive sources and nuclear fuels, and safe and secure removal of nuclear waste.

Other U.S. Government Partners such as NIH/NIAID/OCICB continue to be active in the funding of regional TB Portals in Kyrgyzstan, Georgia, and Kazakhstan and Antimicrobial Activity Databases in Georgia.

Another U.S. Partner, DoE/NNSA/ORS Project STELLA (Smart Technology to Extend lives with Linear Accelerators), is developing a LINAC-based RT system to replace the old Cobalt 60 equipment used widely in Central Asia. A Country fact finding "needs and gaps" seminar was organized in Almaty to determine Country data in this area. The STELLA Project is a collaborative effort with the ISTC, the International Cancer Expert Corps (ICEC), the European Organization for Nuclear Research, (CERN), the UK's Science and Technology Facilities Council (STFC), and the University of Oxford. More details on ISTC projects can be found in this Annual Report.

Thus, ISTC's Funding Parties continue to fund multi-varied activities and projects through ISTC in an ever expanding geographical scope and with many new and exciting projects on the horizon due to come forth in 2023

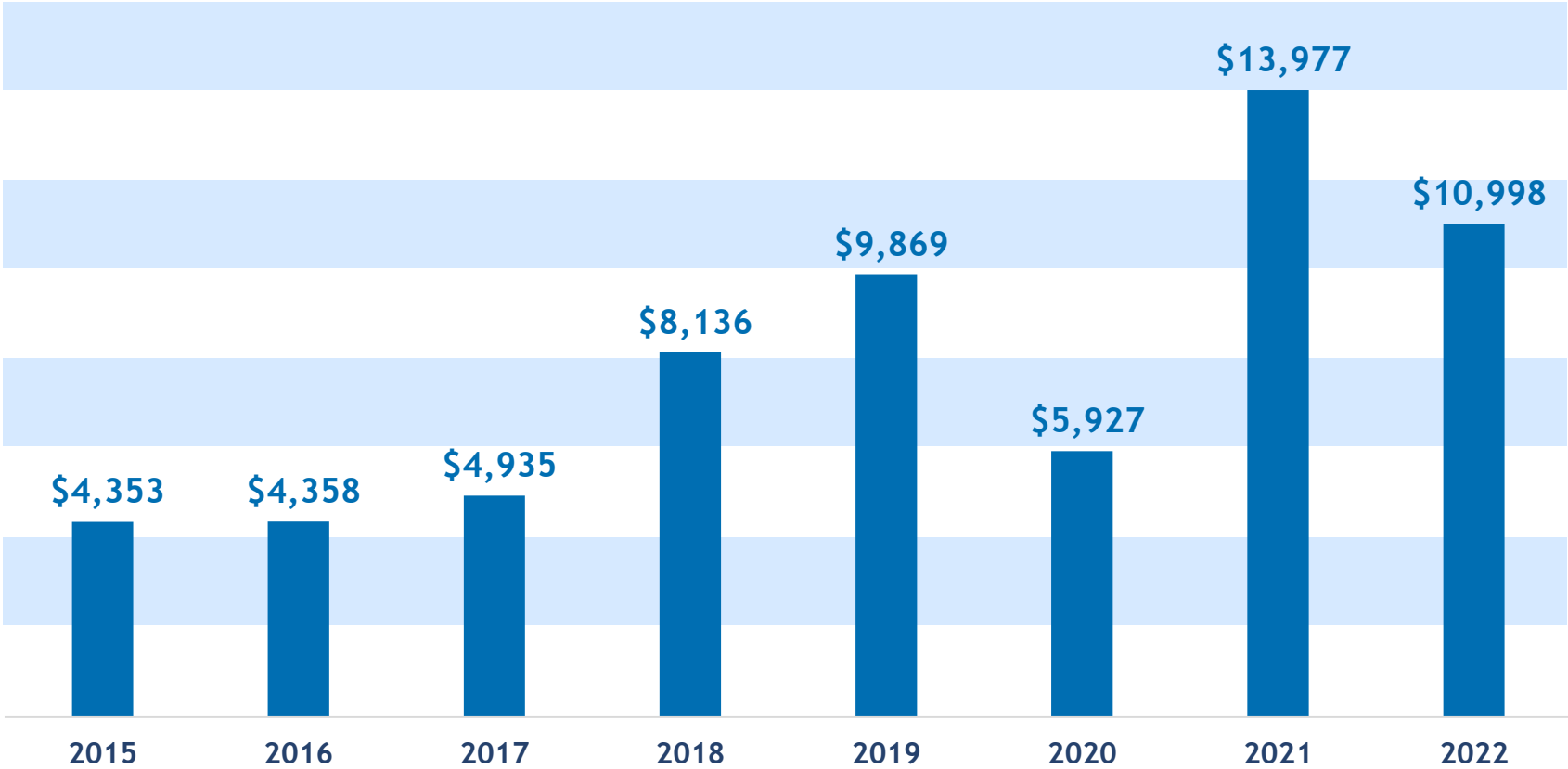
In addition, ISTC continues its outreach activities and hopes to welcome both Uzbekistan and Kenya into ISTC membership in the near future.

In conclusion I wish to thank the Government of Kazakhstan for hosting ISTC's Headquarters in Astana and for their continued support and involvement with ISTC and also I would again like to thank the Governing Board and Party Representatives for their continued longstanding commitment support and a guidance during the past year.

I would like to express my sincere thanks to the ISTC Staff, including the Branch Offices who continue to champion our cause at home and in the region and for their steadfast dedication, professionalism and hard work in 2022.

ISTC looks forward to continuing that success into 2023.

PROGRAM ACTIVITIES IN THOUSANDS OF U.S. DOLLARS SINCE RELOCATION TO REPUBLIC OF KAZAKHSTAN



KEY TRAINING EVENTS

In coordination with ISTC the consultancy ENCO organised on 25-26 January 2022 a workshop entitled: “Control of Cross Border Movement of Mobile Radioactive Sources” in accordance with the implementation program of Project 60 Support to the Centre of Excellence of Eastern and Central Africa in Nuclear Security
online

1st International & 28th National Conference on Nuclear Science & Technology

Train the Trainer Workshop under EU CBRN CoE Project 87 “Preparedness and Response for Mass Gatherings and other Health Threats in Central Asia” 94 experts from Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan and Uzbekistan were trained on:

- Food Safety
- Water safety
- Chemical Safety and role of Poisons Information Centers
- Public Health Command, Control and Communication (C3) systems

Uzbekistan, Tajikistan

The CN-295, International Conference on the Safety and Security of Radioactive Sources, jointly organised by the IAEA Divisions of NSRW and NSN. ISTC participated in the International conference on the Safety and Security of Radioactive Sources: Accomplishments and Future Endeavours, convened by the IAEA and the Weapons Threat Reduction Program of Global Affairs Canada, on 20-24 June 2022 in Vienna. The event brought together more than 600 senior government officials and representatives from organizations involved in the safety and security of sources.
Austria

January

February

March

April

May

June

Training of law enforcement, emergency response, border guard and custom control personnel in basic COVID-19 protective measures in Tajikistan. According to the ISTC Project P53, 6-10 February 2023, within the framework of the Thin Blue Line program, a training course was held on the topic “Training of law enforcement, emergency response, border guard and custom control personnel in basic COVID-19 protective measures in Tajikistan”. The course was organized for specialists of Border Guards, Ministry of Defense and Committee of Emergency situation and civil defense. It was organised in the Regional Training Center on WMD non-proliferation and export control for 15 representatives of the countries of Central Asia, Caucasus and Afghanistan
Tajikistan

EU AGREEMENT INSC/2018/402647 – Water Treatment Facility at Taboshar
Tajikistan

Under Project 53 of the Initiative, two (tent-based) mobile laboratories and associated training and field exercises were provided to Uzbekistan. ISTC partnered with the Bundeswehr Institute of Microbiology (IMB) to provide the mobile labs and associated training of Uzbek experts to manage and run the mobile laboratories
Uzbekistan

The ISTC organised 4th Annual ACE Global Council Meeting in Uganda (12-14 September 2022) with participating organization's members and students from African countries to discuss issues related to Bio Informatics & Data Intensive Science. Global Council Meeting was presented by Technical Working Group & Round table, Student Showcase, Workshops (Sources of 3D Models for Virtual Reality and 3D Printing, Virtual Reality for Visualizing Biomedical Research Data Using ChimeraX, Genomics Data Analysis: Pipeline Development Using Snakemake Workflow Management System, OSG's Open Science Pool) and VR Poster Presentations & Demonstrations.

Uganda, South Africa

10 year anniversary of the NSSC Network

Austria

ISTC organised Japan-funded efforts to strengthen international networks by providing scientific & technical exchange opportunities in Japan, including the Science and Technology in Society Forum in October (3 participants), industrial exhibitions in October & November (BioJapan and WSEW, in total 8 participants), and international conferences in November (IHMC and IYNC, in total 8 participants). One international conference in October held at Nazarbayev University was also supported.

Japan

The ISTC organised 2022 International TB Portals Consortium Meeting in Munich, Germany with participating members from Europe, Central Asia, Caucasus, African countries, China and India. The International Tuberculosis Portals Consortium and the TB Portals Program are initiatives of the Office of Cyber Infrastructure and Computational Biology at the National Institute of Allergy and Infectious Diseases (NIAID), part of the U.S. National Institute of Health (NIH). Sponsorship for this meeting is provided by the ISTC. TB Portals Consortium Meeting was presented by Members' project reports and discussion materials such as TB Portals Program updates and Scientific results, Deep Security Problems in the Deep Learning Era, Virtual Screening of Potential Inhibitors of Drug-Resistant Forms of Tuberculosis, Human Whole Genome Sequencing for TB Patients and others.

Germany

July

August

September

October

November

December

On 24-26 August 2022 III International Scientific and Practical Conference "The Role of Women-Scientists in Science, Innovation and Technology Development", has been held in Gulistan city (Sughd region, Tajikistan) which was attended by more than 100 participants.

Tajikistan

The ISTC in cooperation with International Cancer Expert Corps (ICEC) has undertaken a regional study to understand the level of access to linear accelerator-based radiation therapy for cancer patients. Regional countries participated in this project include Armenia, Azerbaijan, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. The study's main objective was to determine barriers to and plans for the adoption of medical linear accelerators (LINACs) for cancer treatment. As a result the conference has been held in Almaty with all representatives of participating countries.

Kazakhstan

According to the ISTC EU CBRN CoE Project 87 – Preparedness and Response for Mass Gatherings and other Health Threats in Central Asia on 1-2 November 2022, a national training course was held in which 22 participants took part from various ministries and departments of the Republic of Tajikistan: Ministry of Health and Social Protection of Population, Ministry of Defense, Committee for Emergency Situations and Civil Defense, Food Safety Committee, Border Guards, CBRN Security Agency, Institute of Chemistry and Institute of Veterinary Medicine. Training course was organized in the Regional Training Center on WMD non-proliferation and export control for countries of Central Asia, Caucasus and Afghanistan. The training course was led by PRECA chemical safety expert Ms. Raquel Duarte Davidson.

Tajikistan

MAJOR TARGETED INITIATIVES IN 2022

Targeted Initiative on CBRN export control of dual-use goods and technologies for Central Asia

The ISTC supports EU funded efforts to engage industry, research, and academic communities in the CIS and adjacent regions by raising awareness of the risks related to tangible and intangible transfers of goods and technologies by implementing a series of projects. The projects and their results were presented in a side event at the 9th Review Conference of the Biological Weapons Convention in December 2022.

In Tajikistan, courses on ethics and dual-use can be implemented in several universities, and the courses will continue in the future (a handbook to support the lectures was published). In Kazakhstan, at the Eurasian National University (ENU) there is a master's course with export control modules running and another module on responsible science (a handbook was produced for this course). In Armenia, hundreds of students took the course on responsible science and intangible transfers, and some universities requested to have them in their curricula. This will take place in 2023.

In Kazakhstan, both in Almaty and Astana, and Kyrgyzstan master's programs with export control components and new activities and programs are planned for 2023.

Kamshat Saginbekova graduated with her PhD at the University of Liege. The jury underlined the high quality of her research and called for the publication of the thesis. The research contributes to the field by providing the methodology for strategic trade data (three sets of data of six-digit HS codes of dual-use items), studying Central Asian countries from the political and economic aspects, providing the complete picture, building the Strategic Trade Control (STC) legislation database for 14 countries, and providing the first attempt to examine the impact of dedicated dual-use technologies on Free Trade Policy (FTP).

The Internal Compliance Procedures (ICP) manual for the CBRN industries is available now in the ISTC website and the team who produced it is now devoted to the development of a web-based repository of export control materials. A course on commodity identification was implemented at the Customs Department of the Kyrgyz National University (KNU), Bishkek. An Armenian team developed an app for commodity identification/classification, it is available for mobile phones and also there is a desktop version.

ISTC NUCLEAR PROJECTS IN AFRICA

In the last five years ISTC managed two large EU programs (EUR 7.5 million in total) in 24 countries in East, Central and Southern Africa designed to help strengthen nuclear safety and security in these regions. It carried out more than 150 activities comprising in-person and remote workshops, expert visits and recommendations, trainings, field and tabletop exercises for the benefit of national nuclear regulators and other stakeholders. It assisted the improvement and compliance with IAEA standards of regulatory frameworks and raised the capacity of local actors, as noted in Zambia's report to the UNSCR 1450 Committee. Knowledge sharing with African partners included best practices in radioactive sources management, standard operational procedures, hazards response preparedness, equipment needs assessment, stakeholders' engagement and an inspections manual as a specific deliverable.

Throughout the implementation, ISTC engaged the African Commission on Nuclear Energy, the Forum of Nuclear Regulatory Bodies in Africa and the Southern African Development Community, re-vitalizing the latter's Nuclear Regulators' Network.



ISTC supported the summits in Nairobi, Pretoria and Accra of the African Young Generation in Nuclear, and the emergence of African chapters of the Women in Nuclear movement. The message for greater nuclear safety reached more than 1,300 participants (a quarter of whom were women) in training courses and public advocacy events.

ISTC encouraged regional regulatory harmonization and exchange of information among neighboring countries on trans-boundary movements of uranium ore and radioactive sources. The memorandum of cooperation between Zambia and D.R. Congo opened the way towards bilateral agreements on exchange of relevant data, that soon may lead to a multilateral arrangement, as envisaged by the NRN Action Plan elaborated under the project. To enhance and encourage that process, ISTC deployed an Information Tracking System in eight African countries. The ITS is a novel IT tool for real time monitoring of international nuclear transport which received recognition at the 2021 IAEA International Conference on the Safe and Secure Transport of Nuclear and Radioactive Materials.

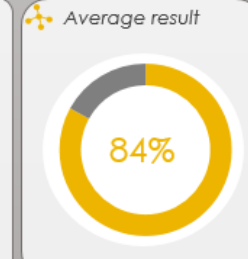
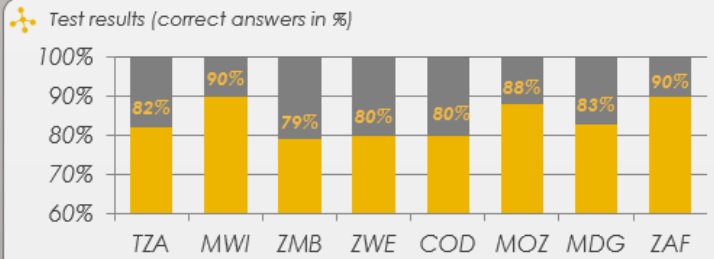


Countries

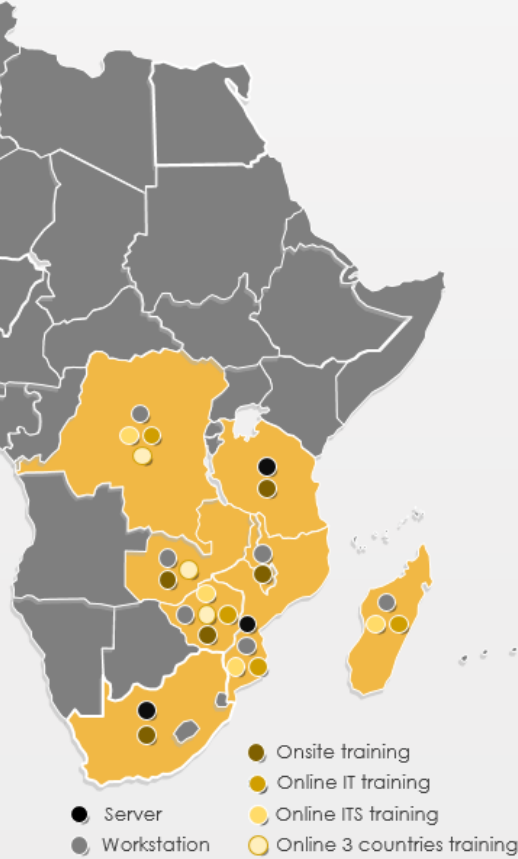
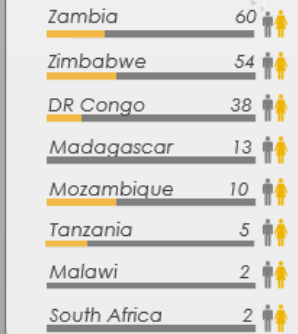


ITS Project Training Dashboard

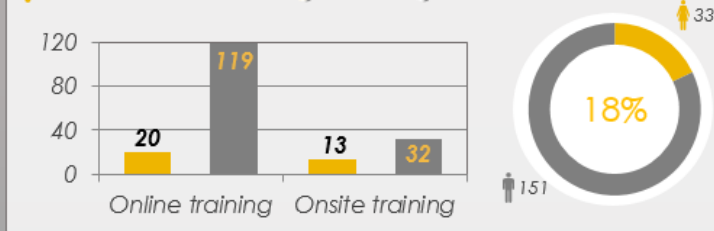
Project Expansion – countries joined



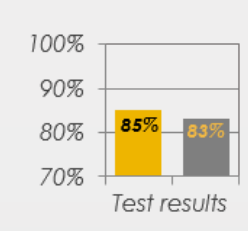
Participants



Participants by gender



Results by gender



COVID-19 SUPPORT FOR ISTC MEMBER COUNTRIES IN CENTRAL ASIA AND THE CAUCASUS

PR-120

The coronavirus pandemic has presented a major test of domestic and international governance. Recognizing the difficulties that countries can face, international organizations are showing solidarity by helping the most vulnerable countries to combat the coronavirus pandemic. For this purpose, the United States Department of State under its Biosecurity Engagement Program in cooperation with the European Union Chemical, Biological, Radiological and Nuclear Risk Mitigation Centres of Excellence (EU CBRN CoE) Project 53 “Strengthening the National Legal Framework and Provision of Specialized Training on Biosafety and Biosecurity in Central Asian Countries” has allocated funding to support ISTC member countries in their respective responses to the ongoing COVID19 pandemic.

Objectives:

- Improving the biosafety and biosecurity for law enforcement, emergency response, customs control and border guard personnel by providing basic infection prevention control training
- Improving the biosafety and biosecurity for medical facilities and laboratories personnel by providing training and workshops focused on sanitary control risk assessment
- Improving regional coordination and collaboration for disease outbreaks by holding an international conference

- Number of Master Trainers trained by international consortiums – **36** (Armenia **2**, Georgia **8**, Kazakhstan **9**, Kyrgyzstan **7**, Tajikistan **10**)
- Number of training workshops held by Master Trainers – **54** (Armenia **13**, Georgia **20**, Kazakhstan **10**, Kyrgyzstan **8**, Tajikistan **3**)
- Number of people trained by Master Trainers – **1070** (Armenia **154**, Georgia **399**, Kazakhstan **372**, Kyrgyzstan **110**, Tajikistan **35**)
- Number of people supported for participation in the EU CBRN CoE – Biosafety Association for Central Asia and the Caucasus (BACAC) international Conference on COVID-19 Pandemic: Lessons Learned – **76**



EUROPEAN UNION FUNDED CBRN CENTERS OF EXCELLENCE

P 53

Project Highlight/ Accomplishment	EU CBRN CoE Project 53 Activity: Provision of two rapidly deployable diagnostic laboratories to Uzbekistan
Leading Institute	Republican Specialized Scientific and Practical Medical Center for Epidemiology, Microbiology, Infectious and Parasitic Diseases (RSSPMCEMIPD) and the Research Institute of Virology (RIV)
Foreign Collaborators	Institute of Microbiology, Bundeswehr (IMB), Germany
Project Duration	April 2022 - February 2023
Funding Parties	European Union
Budget	\$1.2 million (out of overall budget of \$9.1 million)

If anything became clear during the last 3 years of the COVID-19 pandemic, it is that many biosafety and biosecurity risks and challenges remain. One of these is the lack of disease surveillance and diagnostics capabilities during a disease outbreak in remote regions, especially for low- and middle-income countries. Often the required capabilities and capacities to investigate and address outbreaks are concentrated in urban centres, while remote regions often lack adequate equipment, supplies and sufficiently trained staff to respond to an outbreak. A solution to this problem is to create mobile diagnostics laboratory capabilities.

One example of how the EU CBRN CoE Initiative is providing support to address this need for mobile lab capabilities was done under Project 53. Of the Initiative, two (tent-based) mobile laboratories and associated training and field exercises were provided to Uzbekistan.

ISTC partnered with the Bundeswehr Institute of Microbiology (IMB) to provide the mobile labs and associated training of Uzbek experts to manage and run the mobile laboratories.

The implementation of this effort was complicated by the outbreak of the COVID-19 pandemic, but in 2021 the two rapidly deployable diagnostic laboratories were delivered to Uzbekistan and training workshops commenced in June 2021.

During 2022 training of Uzbek experts was completed through two training workshops and two field exercise.

Although this Uzbek mobile lab effort under Project 53 will be completed in February 2023, the IMB will continue the established cooperation under a newly funded project by the German Biosecurity Programme for the coming three years, which will continue the support for the mobile lab teams and expand the cooperation more deeply.



Uzbek experts loading the mobile lab on to the bus to be taken to Bukhara



Uzbek experts disinfecting, packaging equipment, and disassembling mobile labs at end of field exercise

SUPPLEMENTARY BUDGETS PROGRAMS FUNDED BY JAPAN

Strengthening Scientific Networks

The ISTC promoted Japan-funded programs to strengthen international scientific networks by providing scientific and technical exchange opportunities for experts mainly from ISTC member countries. This supported participation in several events held in Kazakhstan and Japan:

STS Forum and Young Leaders Program in Kyoto, Japan, 1-4 October 2022

This “STS” means “Science, Technology in Society” and the purpose of this forum is to discuss the benefits of advances in science and technology, and also the concerning issues they newly raise, with the global opinion leaders consisting of not only scientists, but also policymakers, business leaders, university presidents, research institute directors, presidents of science and technology investment foundations, and the media. The forum will also provide a valuable opportunity for young scientist to talk with Nobel laureates. In 2022, ISTC supported 3 young researchers from Armenia, Kazakhstan and Tajikistan.

BioJapan 2022, Yokohama, Japan, 12-14 October 2022

The BioJapan 2022, Asia’s Premier Partnering Event for the Global Biotechnology Industry exhibition has played an important role in facilitating interaction between Japanese and global companies/organizations and stimulating new business opportunities for almost two decades. Top business development, licensing, and alliance management professionals, R&D personnel, and biotech company executives from around the world have gathered in Yokohama, and there were around 15,800 visitors in these three days. In 2022, ISTC supported two teams’ participation, one from Armenia and the other from Georgia.

“Modern perspectives for biomedical sciences” in Astana, Kazakhstan, 20-21 October 2022

The conference took place in Nazarbayev University and is aimed at presenting current research and development activities in the field of bioengineering and regenerative medicine, global health, genomic and personalized medicine, system biology and bioinformatics. As part of the conference, scientists from leading scientific organizations near and far abroad made presentations: Kazakhstan, Kyrgyzstan, Tajikistan, Armenia, Georgia, as well as Japan, USA, Italy, France, Sweden. Along with the speeches of the speakers, poster sessions were held with reports by young scientists.

The conference was attended offline and online by more than 1,500 students from among scientists, doctors from all regions of the Republic of Kazakhstan, as well as the countries of Central Asia and the Caucasus.

International Human Microbiome Consortium (IHMC) in Kobe, Japan, 8-10 November 2022.

The human microbiome is the aggregate of all microbiota living in or on the human body, which includes their genome information. The renowned scientists and researchers in the microbiome field from all over the world gathered in this 9th international congress which was held in Kobe, Japan from 8th to 10th of November 2022. ISTC supported 6 participants from Armenia, Georgia, Kyrgyzstan, Kazakhstan, Tajikistan.

World Smart Energy Week in Osaka, Japan, 16-18 November 2022

The exhibition is categorized into five fields of “Solar cell/module and PV systems”, “Rechargeable Battery”, “Smart Grid”, “Biomass technology” and “Decarbonisation solutions”. About 12,000 visitors to this exhibition devoted their opportunities to trade, information exchange, R&D collaboration and business meetings.

Kazakhstan team representing “Nazarbayev University” and “Institute of Batteries LLP (IoB)” demonstrated various energy storage devices developed by their team to various potential partners and collaborators.

Kyrgyzstan team representing the Public Foundation Center for Renewable Energy and Energy Efficiency Development (CREED) in Kyrgyzstan presented the activity of the company, company products and the situation on the energy market in the Kyrgyzstan.



PARTY AND PARTNER PROJECTS

COMMODITY IDENTIFICATION TRAININGS FOR CUSTOMS OFFICERS

REPUBLIC OF ARMENIA

SB-246-WS03

The main purpose of the project is increasing Customs officers knowledge in the sphere of Export control and help them to make classification of dual-use and military items. Four trainings in Gyumri, Vanadzor, Sisian and Yerevan were very successful. By the Customs suggestion the project will be continued in 2023-2024.

Leading Institute	Research Center for the Problem of Non Proliferation of Weapons of Mass Destruction, Armenia, Yerevan
Foreign Collaborators	N/A
Project Duration	May 2021 - December 2022
Funding Parties	U.S. Department of Energy/NNSA/International Nonproliferation Export Control Program (INECP)
Budget	\$50,000



Gyumri, Armenia

DEVELOPMENT OF RF TIMING PROCESSOR WITH AN EXTREMELY HIGH TIME-RESOLUTION

A-2390

The research team has experimentally attained the extremely small-time difference resolution ($\sim 10^{-11}$ seconds), time stability ($\sim 2 \times 10^{-13}$ seconds/hour) and paved the way to the final resolution target of less than 10^{-12} seconds with theoretical consideration, in the development of a new RF (Radio Frequency) Timer for keV energy electrons. The experiments were carried out using the synchronized RF laser beam in CANDEL institute in Armenia. Funding was provided by EU and Japan.

Leading Institute	A.I. Alkhanyan National Science Laboratory (Yerevan Physics Institute) Foundation (AANL), Yerevan, Armenia
Participant Institutes	Nazarbayev University, Astana, Kazakhstan
Foreign Collaborators	Extreme Light Infrastructure-Nuclear Physics, Bucharest-Magurele (Romania), Johannes Gutenberg-Universitaet Mainz, Institute of Physik, Mainz (Germany), Tohoku University, Sendai (Japan), University of Glasgow, Glasgow (UK)
Project Duration	April 2018 - March 2022
Funding Parties	Japan: \$150,275 EU: \$150,275
Budget	\$300,550

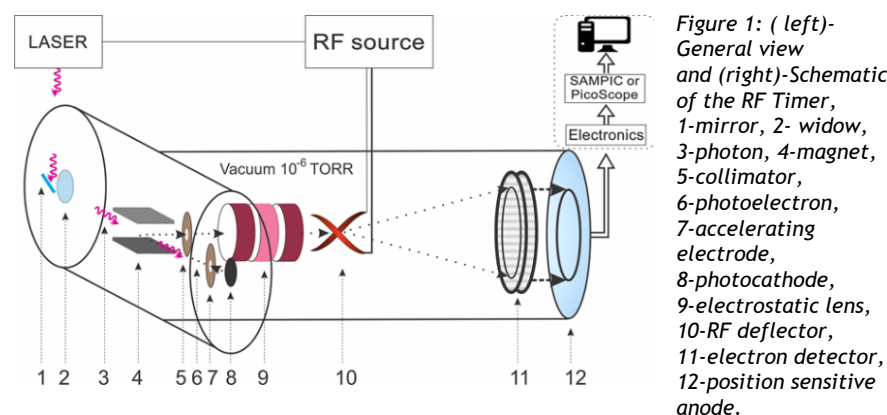


Figure 1: (left)- General view and (right)-Schematic of the RF Timer, 1-mirror, 2- widow, 3-photon, 4-magnet, 5-collimator, 6-photoelectron, 7-accelerating electrode, 8-photocathode, 9-electrostatic lens, 10-RF deflector, 11-electron detector, 12-position sensitive anode.

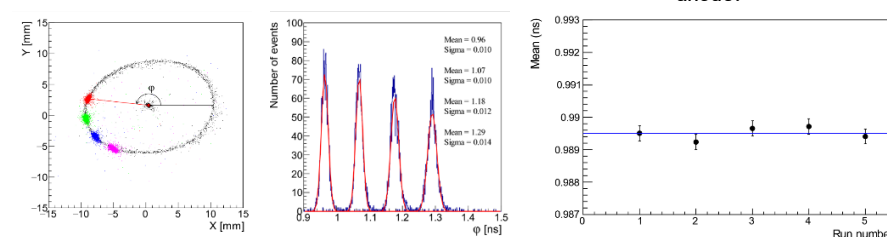


Figure 2: (Left) Example of 2D images of anode hit positions. The color spots on the circle correspond to phase distributions of 500 MHz RF-synchronized photoelectrons for the 4 different fixed phases (corresponding to 100 picoseconds time difference). The different phases are labeled 1-4. (Middle) phase, i.e. time distributions of the scanned synchronized photoelectrons. The time resolution is about 10-11seconds. (Right) the mean values of sequentially measured time distributions in a one-hour period at 10 min intervals, demonstrating that the time stability of the RF Timer over a period of ~1 hour is about 2×10^{-13} seconds.

SCIENTIFIC SUBSTANTIATION OF THE POSSIBILITY OF CREATING NEW BACTERICIDAL ZEOLITE FILTER MATERIALS FOR PURIFICATION-DECONTAMINATION OF WATER FROM VARIOUS SOURCES



GE-2506

Funded by Japan, the project started from 1 May 2022. The chemical composition of 3 kinds of prepared zeolites was clarified and their structural features and porous system were characterized. Also, the effects of thermal treatment and chemical treatment were investigated. These results were published in papers by Tsitsishvili, V., Panayotova, M., Miyamoto, M., Dolaberidze, N., Mirdzveli, N., Nijaradze, M., Amiridze, Z., Klarjeishvili, N., Khutsishvili, B., Dzhakipbekova, N., Harutyunyan, L. (2022). Characterization of Georgian, Kazakh and Armenian natural heulandite-clinoptilolites. Bull. Georgian Natl. Acad. Sci., 16(4): 115-122, and others.

Leading Institute	Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia
Participant Institutes	Armenian National Agrarian University, Yerevan, Armenia, M. Auezov South Kazakhstan State University, Shymkent, Kazakhstan
Foreign Collaborators	Benaki Phytopathological Institute, Athens (Greece); Chiba University, Chiba, Japan; Gifu University, Gifu, Japan; Indiana University, Bloomington, USA; Sofia University St. Kliment Ohridski, Sofia, Bulgaria; Swedish University of Agricultural Sciences/Department of Plant Breeding and Biotechnology, Alnarp, Sweden; University of Mining and Geology "St. Ivan Rilski", Sofia, Bulgaria
Project Duration	May 2022 - April 2025
Funding Parties	Japan
Budget	\$367,280



Preparation of natural zeolite: Georgian origin, Rkoni- CtR sector (a); Kazakhstan origin, Chankanay-CtCh sector (b); Armenia origin, clinoptilolites of Nor Kokhb deposit in Noyemberian Region (CtNK)(c)



Measurements nitrogen adsorption/desorption isotherms using ASAP 2020 Plus analyzer (Micromeritics, USA) for samples of Georgian, Kazakh and Armenian

DATABASE OF ANTIMICROBIAL ACTIVITY AND STRUCTURE OF PEPTIDES

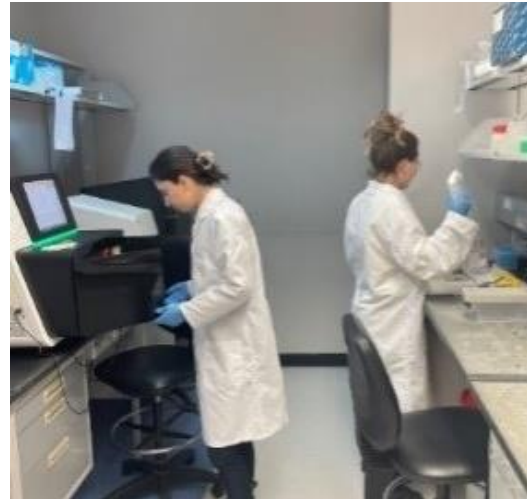
G-2102

Project Highlight DBAASP (<https://dbaasp.org>) was updated continuously, and the current version contains >20,500 entries. We have to note that approximately 4/5 of the entries were added after the initial release of the database in 2015 reflecting the recent sharp increase in interest in AMPs.

DBAASP offers prediction tools with different capabilities to be used in the design of AMP. The efficiency of the prediction tools has been tested in vitro. Tools have been described in the recently published paper (Briefings in Bioinformatics, 2022, 23(4), July, bbac233, <https://doi.org/10.1093/bib/bbac233>)

According to Google Analytics an attendance of DBAASP is permanently rising. In vitro and in vivo testing of de novo designed peptides are continuing

Leading Institute	Ivane Beritashvili Center of Experimental Biomedicine, Tbilisi, Georgia
Foreign Collaborators	U.S. National Institute of Allergy and Infectious Diseases
Project Duration	February 2014 - January 2023
Funding Parties	U.S. Department of Health & Human Services/ National Institute of Allergy and Infectious Diseases/Office of Cyber Infrastructure and Computational Biology
Project Cost	\$710,700



Master mix preparation for PCR reaction



Whole Genome Sequence Analysis

ADVANCEMENT OF MATERIAL/TECHNICAL AND REGULATION/METHODOLOGICAL FRAMEWORK FOR NUCLEAR AND RADIOLOGIC MATERIALS FORENSICS IN THE REPUBLIC OF KAZAKHSTAN

REPUBLIC OF KAZAKHSTAN

K-2400

In working on nuclear forensics advancement, analytical research methods used at the Institute of Nuclear Physics were evaluated and their efficiency was improved. The technology has been worked out for implementing nuclear forensics studies of nuclear materials using samples available at the Institute of Nuclear Physics which were subjected to special studies in the framework of combating illicit trafficking of nuclear materials. Institute specialists were trained in nuclear forensics studies of unknown uranium-containing substances according to a prepared scenario. Requirements were determined for equipping the laboratory of nuclear forensics primary control within a framework of the Nuclear Forensics Center.

A prototype of the Nuclear Forensics National Library was created using the analytical signatures of the samples. Statistical processing of the studied samples was performed according to the analytical

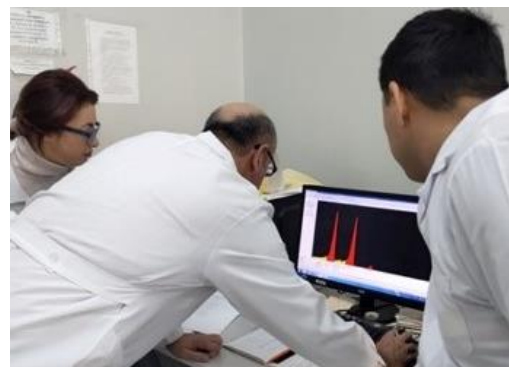


Visual inspection of a sample delivered for nuclear forensics examination

results. It has been established that statistical processing makes it possible to promptly obtain information about the identity of a studied sample and a standard. The Seminar on Nuclear Forensics was held for specialists from the National Nuclear Center to get acquainted with the methodology and technology adopted at the Institute for nuclear forensics studies of nuclear materials samples.

Project participants took part in the International Seminar on Combating Smuggling of Nuclear Materials and the IAEA Technical Meeting where a report was developed covering results obtained during implementation of the ISTC Project K-2400 and on plans for establishing a Nuclear Forensics Regional Center at the Institute.

Leading Institute	Institute of Nuclear Physics under the Ministry of Energy of the Republic of Kazakhstan
Foreign Collaborators	U.S. Lawrence Livermore National Laboratory
Project Duration	February 2018 - April 2023
Funding Parties	U.S. Department of Energy's Nuclear, Smuggling, Detection and Deterrence Program
Budget	\$690,000



Specialists of the National Nuclear Center of the Republic of Kazakhstan practice the alpha-spectrometric studies

DEVELOPMENT OF A NATIONAL NUCLEAR FORENSICS LIBRARY IN THE REPUBLIC OF KAZAKHSTAN AS A SYSTEM FOR IDENTIFICATION OF NUCLEAR AND OTHER RADIOACTIVE MATERIALS AND SAMPLES EXCHANGE

KZ-2540

Project Highlight The key goal of the Project is the development and extension of a national nuclear forensics library in Kazakhstan as a system for identification of nuclear and other radioactive materials. As part of the Project, various material testing studies of nuclear material samples are conducted: Fuel pellets for research reactors with different enrichment, as well as fragments of a fresh fuel block with high enrichment (90% in U-235) of the IGR research reactor. Moreover, work is underway to choose and verify formal rules, develop a concept of the database, which will be a basis for the national library of nuclear forensics in the Republic of Kazakhstan. A team of software designers will implement comparison and searching algorithms for verifying the samples of the national nuclear forensics library

Leading Institute	Republican State Enterprise “National Nuclear Center of the Republic of Kazakhstan”, Kurchatov, Abai Region, Kazakhstan
Foreign Collaborators	Lawrence Livermore National Laboratory CA, U.S.
Project Duration	September 2021 - August 2023
Funding Parties	U.S. Department of Energy, NNSA through NSTC
Budget	\$650,000

For instance, a microstructure analysis of fuel sample surfaces allows us to get better understanding of uranium oxide grain distribution, which is a characterizing feature for a test sample. In this case, a histogram of size distribution of uranium oxide grains evidences the fact that a major part of grains for a pellet with enrichment of 6.7% in ²³⁵U is 3÷4 μm, a pellet with enrichment of 12.7% in ²³⁵G is mainly shifted to a range of 5÷6 μm. Volume fraction of bright inclusions, probably nitride ones, for pellets “6.7” and “12.7” is 7% and 10%, respectively.

At the same time, taking into account the data resulted from material testing study of uranium-containing samples, a team of IT designers created a prototype of a national nuclear forensics library in the Republic of Kazakhstan. In addition, the tasks of collecting data in the library are also solved, and algorithms for searching material on comparable parameters among those recorded in this database are developed.

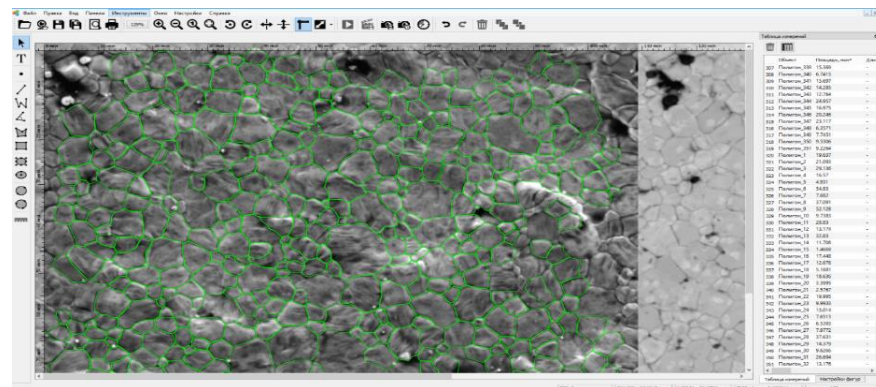


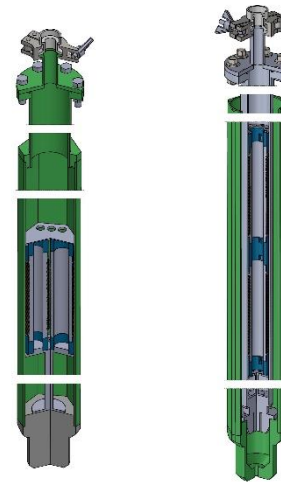
Figure 1 Defining a size of uranium dioxide grains

STUDY OF THE RADIATION RESISTANCE OF CABLES WITH MINERAL INSULATION

KZ-2715

The project started from April, 2022, funded by Japan. It is planned to investigate the radiation resistance of two types of mineral-insulated cables (MgO and Al₂O₃) under a high temperature environment, through irradiation experiments using the research reactor WWR-K. Computer simulation of neutron and temperature distribution was carried out for the design of the irradiation device.

Leading Institute	Institute of Nuclear Physics (INP) of the Ministry of Energy of the Republic of Kazakhstan
Foreign Collaborators	Japan Atomic Energy Agency (JAEA)
Project Duration	April 2022 - September 2024
Funding Parties	Japan
Budget	\$330,800



Two design options of irradiation device to be installed in the research reactor WWR-K.



Mineral-insulated cables to be installed in the irradiation device for neutron irradiation experiment.



















THE EUROPEAN UNION CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR RISK MITIGATION CENTRES OF EXCELLENCE PROJECT 87 – PREPAREDNESS AND RESPONSE FOR MASS GATHERINGS AND OTHER HEALTH THREATS IN CENTRAL ASIA (PRECA)

We love Mass Gatherings, and they can have real benefits. However, COVID-19 reminded us that they can threaten human health. With more and more people moving around Central Asia, we can expect an increasing number of Mass Gatherings and events that might strain the preparedness and response capacities of the governments in the region. The preparation for Mass Gatherings requires considerable organization and coordination to protect and safeguard public health. The PRECA project aims to cooperate with stakeholders in Central Asia to strengthen and empower Mass Gathering Public health preparedness and response by:

- Improving Infection Prevention and Control (IPC) at Mass Gatherings by enhancing the safety of food through food hygiene training (Food Safety Work Package) and the safety of water through water quality testing and protection of sources (Water Safety Work Package).
- Guarding against chemical threats to Mass Gatherings by developing Poison Information Centers in each Partner Country (Chemical Safety and Poisons Information Work Package).
- Ensuring that Public Health Command, Control and Communication (C3) systems provide rapid, regular, and transparent communications (C3 Work Package).
- Ensuring that Mass Gatherings' stakeholders are properly resourced to meet the task by delivering the right equipment to Partner Countries.
- Development of exercises to test plans and delivery of six national exercises at the end of the project (Testing and Exercising Work Package).

NUMBER OF PEOPLE TRAINED UNDER PRECA PROJECT IN 2022

P87 PRECA NUMBERS OF PEOPLE TRAINED in 2022

	 KAZAKHSTAN	 KYRGYZSTAN	 MONGOLIA	 PAKISTAN	 TAJIKISTAN	 UZBEKISTAN	TOTAL
 WEBINARS – RAISING AWARENESS – INTRODUCTION TO P87 PRECA	22	15	17	10	16	23	103
 TRAIN THE TRAINER WORKSHOP							
 FOOD SAFETY TRAIN THE TRAINER (TTT) WORKSHOP	4	4	4	4	4	4	24
 WATER SAFETY TTT WORKSHOP	3	4	3	4	4	4	22
 CHEMICALS AND POISON INFORMATION CENTRES TTT WORKSHOP	4	4	4	4	4	5	25
 PUBLIC HEALTH C3 TTT WORKSHOP	3	4	4	4	4	4	23
 TOXBASE TRAINING	17	3	20	6	5	22	73
 NATIONAL TRAINING EVENTS							
 FOOD SAFETY	25						25
 WATER SAFETY							0
 CHEMICALS AND POISON INFORMATION CENTRES	24				24		48
 PUBLIC HEALTH COMMAND CONTROL & COMMUNICATION C3							0
							343

PRECA PROJECT ACCOMPLISHMENTS IN 2022

PRECA project introduction Webinar, online



Train the future Trainers Workshop for 94 experts from Partner Countries (April 2022 in Tashkent, Uzbekistan)



National Training Workshops by newly trained Trainers from Kazakhstan (October 2022 in Almaty, Kazakhstan) and Tajikistan (November 2022 in Dushanbe, Tajikistan)



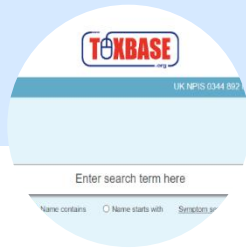
TOXBASE Training for clinical toxicologists from Partner Countries (October 2022, Almaty, Kazakhstan (training recording is available))



Regional Working Groups (RWG) for each Work Package were formed. Each RWG has one representative from each Partner Country. All five RWGs meet regularly on a monthly basis (online).



TOXBASE (International Poison Information Centres' chemical database) access was granted to clinical toxicologists from all Partner Countries.



The World Health Organization (WHO) has officially agreed to become an observer on the Project and will work with PRECA in the development of Poison Information Centres throughout the region.



The World Bank's International Finance Corporation's (IFC) Food Safety Advisory Program has also become an observer on the Project and has shared some food safety resources.



SEISMIC NETWORK EXPANSION IN THE CAUCASUS AND CENTRAL ASIA

KYRGYZ REPUBLIC

KR 2452

Project Highlight During 2022 participating countries started the installation of a new seismic station - 6 stations from 10 planned have been installed in Kyrgyzstan, 11 sites from 12 planned have been installed in Kazakhstan, 10 stations were installed in Armenia, and drilling jobs for 4 future sites were conducted in Tajikistan. The analysis of data from new seismic stations shows the reduction of seismic noise level by approximately 10 dB at the upgraded stations, that indicates about quality of conducted jobs. In 2023 the work on stations installation will be continued.



Leading Institute Institute of Seismology NAS KR, Bishkek, Kyrgyzstan

Foreign Collaborators Lawrence Livermore National Laboratory, Livermore, CA, U.S. IRIS PASSCAL Instrument Center

Project Duration October 2019 - December 2023

Funding Parties U.S. Department of Energy/National Nuclear Security Administration

Budget \$3,100,324



HYDROCHEMISTRY MONITORING AND RISK ASSESSMENT OF MINING & URANIUM TAILING IN TRANSBOUNDARY RIVER WATERSHED OF CA COUNTRIES – TAJIKISTAN, KYRGYZSTAN, KAZAKHSTAN AND UZBEKISTAN (PHASE 1, 2, 3)



REPUBLIC OF TAJIKISTAN

TJ-2409

The project is dedicated to obtain an improved understanding of the environmental contamination in the land-water-ecosystem of the Syr-Darya River and Amy-Darya River basins to assess these contamination, samples bottom of water. The main goal of the proposed project is to conduct radio-ecological, hydro-chemical and geochemical investigation of the extent pollution in transboundary areas of Central Asian river Basin (Syr-Darya and Amu-Darya Rivers and its tributaries), where the main uranium, gas and gold mining industries are concentrated. To study the dynamics of changes in contamination by comparing the data obtained in the course of this project.

Leading Institute Institute of water problem, Hydropower and Ecology of the National Academy of Sciences of Tajikistan

Supporting Institutes Institute of Nuclear Physics of the National Nuclear Center of the Republic of Kazakhstan; Central Asian Institute for Applied Geosciences of the Kyrgyz Republic; International Center for Biosaline Agriculture for Central Asia and Caucasus, Tashkent, Uzbekistan; Institute of Biology of the National Academy of Sciences of Kyrgyz Republic

Foreign Collaborators U.S. Department of the Interior, U.S. Geological Survey

Project Duration December 2019 - April 2024

Funding Parties European Union

Budget \$576,830

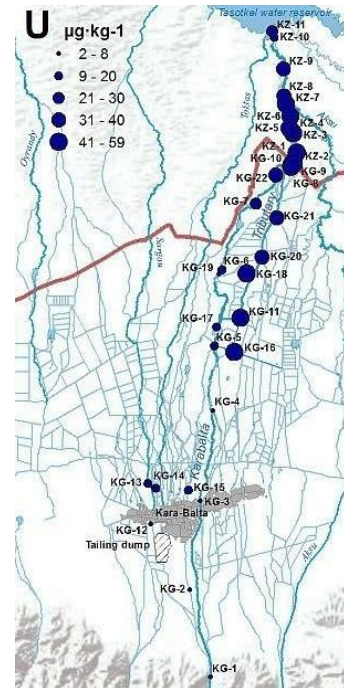
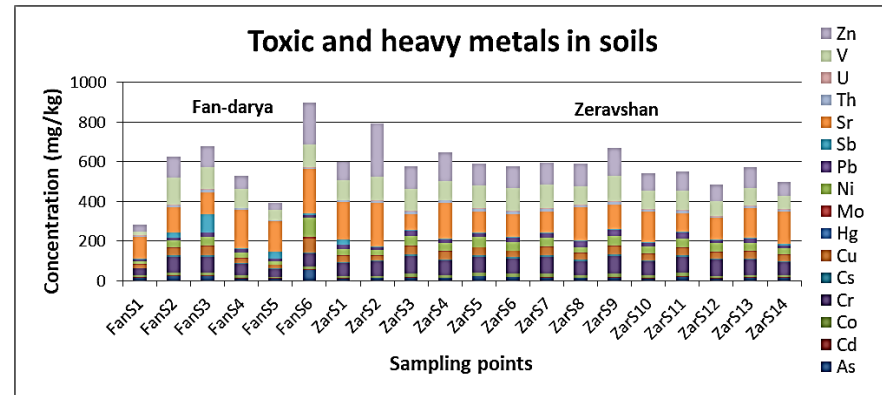


Figure 1. Concentration of toxic elements in the soil samples for rivers Fan-darya and Zeravshan

Figure 2. Content of chemical elements in the water samples collected in the basin of the Karabalta river on the territories of Kyrgyzstan and Kazakhstan

LIST OF PROJECTS COMPLETED IN 2022

Project No	Short title	Lead Institute	Funding by	Collaborator Country
A-2390	Radio frequency timer for keV electrons	A.I. Alikhanyan National Science Laboratory	EU, Japan	Romania, Germany, Japan, UK
G-2414	Dirofilaria spp. in Georgia and Armenia	International Association Veterinarians Sans Frontiers – Caucasus	EU, Japan	Italy, Spain, Japan, USA
KR-2398	Central Asia Seismic Hazard Assessment and Bulletin Unification	Institute of Seismology, NAS	Partner	Canada, USA
KZ-2516	Study of New Type Element of Beryllium Reflector	Ministry of Energy of the Republic of Kazakhstan / Institute of Nuclear of Physics	Japan	Japan
KZ-2539	Building Capacity on Multilateral Verification of Nuclear Disarmament	National Nuclear Center of the Republic of Kazakhstan	Partner	UK
PR-113	Assessing the Impact of the Amended Convention on the Physical Protection of Nuclear Material on States Parties	The Vienna Centre for Disarmament and Non-Proliferation (VCDNP)/ Middlebury Institute	Partner	USA
PR-122	Ensuring Effective Nuclear Energy Regulation and Security in the MENA Region	Middle East Institute for Security (MESIS)	Partner	USA

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