ISTC
INTERNATIONAL SCIENCE AND TECHNOLOGY CENTER

PARTNERING FOR GLOBAL
PEACE AND SECURITY

IMPACT

ANNUAL
REPORT
2025

WHAT WE BUILT.
WHAT IT CHANGED.
WHERE IT LEADS.

ISTC Annual Report 2025 — IMPACT

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Executive Director: Karina Anguelieva
Editorial oversight: Jordan C.S. Obry,
Strategic Communication and Public Affairs Advisor
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Executive Director

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2025 Annual Statement

Chair of the ISTC Governing Board

Ronald F. Lehman II



Continued strong support for the International Science and Technology Center (ISTC) rests on three enduring foundations. First, the Parties share important values and common goals. Second, they recognize that many of today's greatest challenges can best be addressed through international scientific cooperation. Third, each Party has benefited from that cooperation. These principles were celebrated during the ISTC's 30th Anniversary in 2024. At its 80th Governing Board meeting this year in Japan, held on the margins of Expo 2025 Osaka, Kansai, Japan, the Parties reaffirmed that the lessons learned over three decades should guide the creation of a better future.

> *The ISTC remains as important to its Parties today as ever, and the fundamental logic behind the Science Center is as compelling as when it was founded.*

More scientific work needs to be done than there are scientists to do it, and cutting-edge science is inherently international. At the same time, all science can be misused or abused. Advancing security while expanding prosperity therefore requires international cooperation. In support of these goals, the ISTC promotes responsible science through transparency, consensus, and the application of best practices. Trust among the Parties is possible because the ISTC is an intensely intergovernmental organisation with rigorous oversight and accountability. It is not a non-governmental organisation, not a contractor, and not an independent international organisation.

> *Rather, the partner governments themselves share responsibility, governance, and resources. This approach lowers costs while increasing benefits for all. If the ISTC did not already exist, it would be extraordinarily difficult to create it today, even though the need for such an institution remains urgent.*

That reality reminds us that the ISTC is often most valuable not when circumstances are at their best, but when they are at their most challenging.

The Agreement to Continue the ISTC, constitutionally ratified by all Parties, made every Party an equal member of the Governing Board, strengthened the Center's legal foundation, improved its efficiency, and broadened both its substantive mission and its geographic reach. Yet this agreement represented only one stage in the ISTC's continuing evolution, and further transitions will undoubtedly follow. The ISTC was then able to move beyond a primary focus on addressing the legacies of the past and increasingly serve as a model for future international scientific cooperation.

On behalf of the Governing Board, I wish to commend the dedicated ISTC staff who make these projects and programs possible, as well as Executive Director Karina Anguelieva for her outstanding leadership. We also express our sincere appreciation to all the Parties for their continued engagement and support, and especially to our host, the Government of Kazakhstan, for its steadfast commitment to the continued success of the ISTC.

As we look ahead, the ISTC will continue to build on three decades of experience in promoting international scientific cooperation, responsible innovation, and shared security. The challenges before us are significant, but so are the opportunities. Together, the Parties remain committed to ensuring that science continues to serve peace, prosperity, and the common good.



2025 Annual Statement

Executive Director

Karina Anguelieva



Science has always been most valuable precisely when the world makes cooperation difficult. That is not a new observation, but in 2025, it felt newly relevant.

> *The data is clear, and I have seen it in the analytical paper/report I contributed to with the Tony Blair Institute for Global Change: countries that cannot frame their own scientific problems, train their own researchers, and generate their own knowledge are structurally exposed.*

Scientific sovereignty, the capacity to participate in global knowledge on equal terms, is not a luxury. It is a condition for resilience. And it is precisely what ISTC, at its best, helps build.

International science networks are facing real pressures: shifting funding priorities, geopolitical complexity, and growing uncertainty around the multilateral frameworks that have underpinned collaborative research for decades. In this environment, organisations like ISTC serve a purpose that goes beyond any single project but to maintain the circle of trust and to bring a sense of security against common challenges and threats between institutions, between countries, between scientific communities that makes joint work possible when it would otherwise not be.

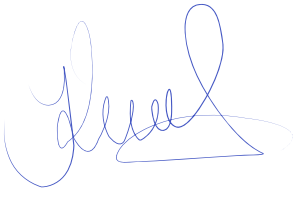
> *Looking back on my first year at ISTC, I'm thrilled to share some of our key milestones. It has been a rewarding journey to bring greater attention to our work and connect with like-minded organisations committed to creating meaningful impact.*

At Expo 2025 in Osaka, our pavilion welcomed nearly half a million visitors over six months, with the ISTC Special Day standing out as a defining moment for the Japan-ISTC partnership.In Almaty, the Future of Biosafety and Biosecurity Conference united more than 150 experts from over twenty countries around the governance challenges of artificial intelligence and synthetic biology, producing the Almaty Call for Action as a concrete result. These are just some of the milestones from a year rich in progress across all our partnerships. With the European Commission, we advanced water security in Tajikistan and delivered sanctions enforcement seminars across Central Asia. With the US State Department and Department of Energy, SNECCA's seismic monitoring network was renewed and STELLA's work on next-generation radiotherapy continued to mature. Through FIRST, meanwhile, we deepened our engagement with the region's energy transition.

Each of these is different in scale, region, and technical domain. What they share is a common logic: results that required trust built across borders, expertise that moved where it was needed, and institutions that chose to remain committed to collaboration.

The Strategic Roadmap 2024–2030 guides what comes next. Our priorities are clear: deeper capacity-building in partner countries, stronger science-industry linkages, and an ISTC that is genuinely useful to the researchers and institutions it serves.

I thank the Governing Board for their guidance, the Secretariat for their commitment, and every scientist and partner institution who worked with us this year. We are building something durable, and 2025 showed that the foundation holds. The foundations are proven, and 2026 is where we build on them.



Key Figures

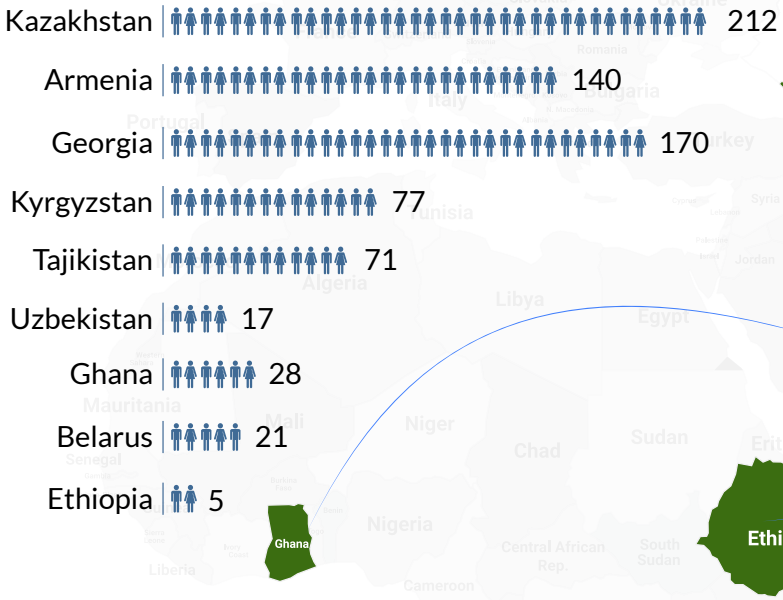
90
Active projects

62
Countries covered

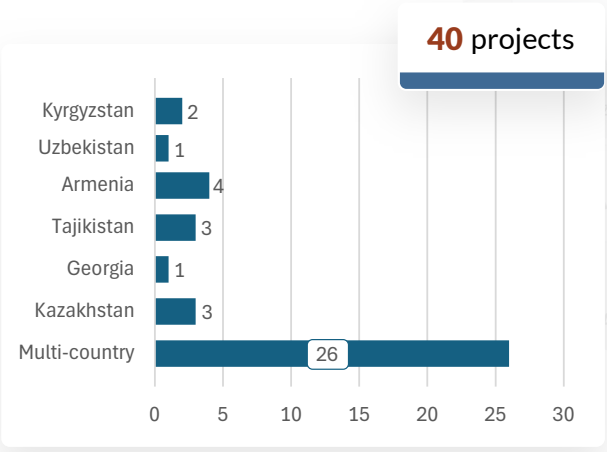
$ 67.7M
Active portfolio budget

40
Projects completed by country

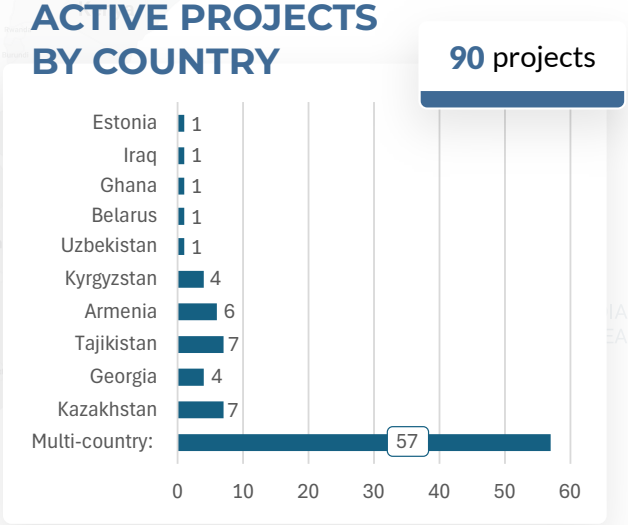
SCIENTISTS BY COUNTRY



PROJECTS COMPLETED BY COUNTRY IN 2025

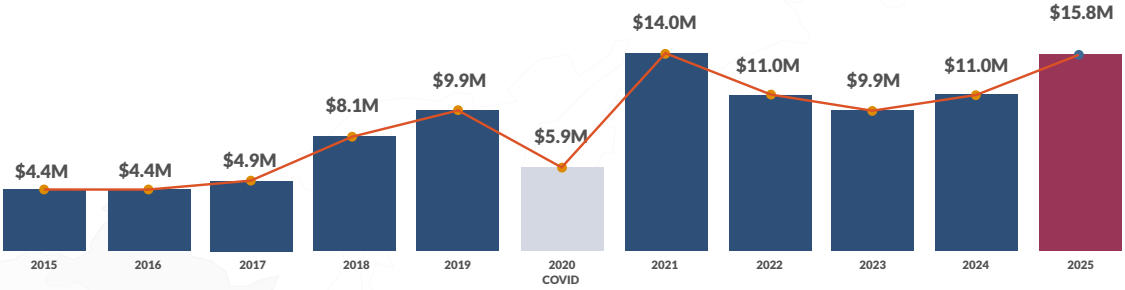


ACTIVE PROJECTS BY COUNTRY



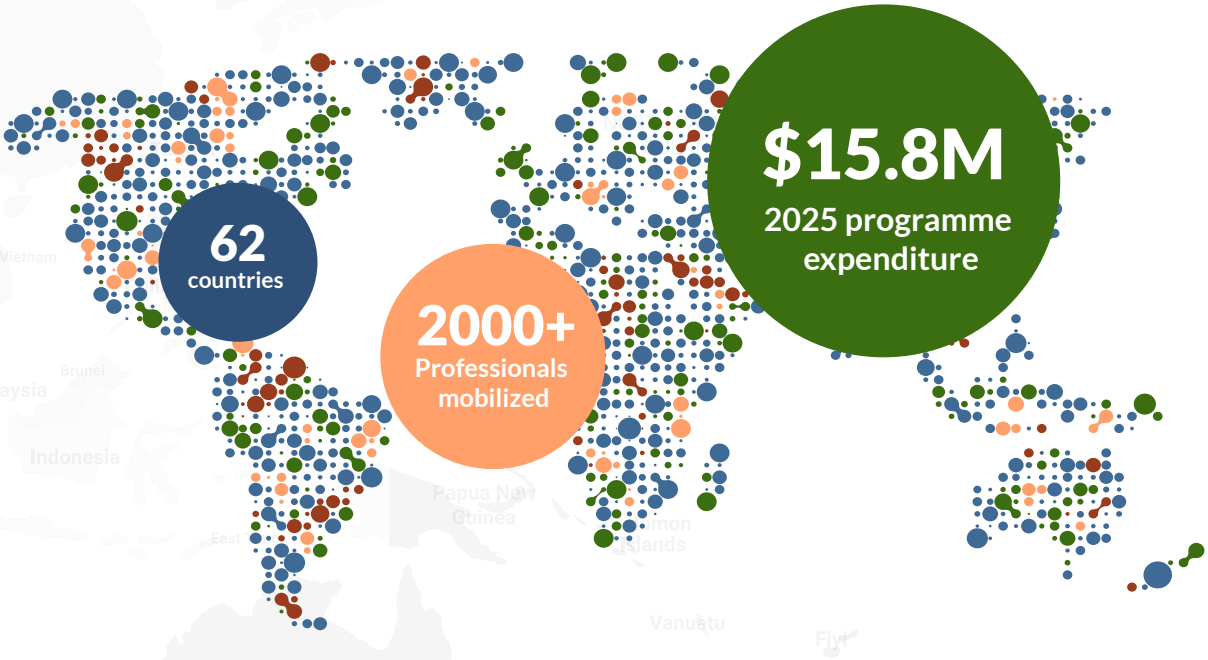
Multi-country: projects spanning several countries within a region (Caucasus, Central & Eastern Europe, Central Asia, Gulf, Middle East, South Asia).

PROGRAMME ACTIVITY TREND



USD millions · 2015–2025

GLOBAL REACH 2025



IMPACT

In 2025, ISTC deployed $15.8M in total programme activity, engaging 741 scientists across 62 countries — a significant milestone demonstrating sustained growth in the organisation's global reach and impact — advancing a safer, more secure, and sustainable world through science.

This figure reflects ISTC's founding purpose since 1992 — redirecting scientists with WMD-relevant expertise toward peaceful research, in support of non-proliferation."
Source: ISTC Strategic Roadmap 2024–2030, "Mission," p.6

SECTION 01

ISTC 2.0

From a decade of transition to the next phase of impact

In 2025, ISTC entered the operational phase of its Strategic Roadmap 2024–2030, agreed jointly with its Parties. Building on ten years based in Kazakhstan, the Center continued to support project and collaborations among its Parties and beyond to connect governments, research institutions and international partners around a changing set of security and scientific challenges.

The year marked the beginning of ISTC 2.0: a phase focused on turning shared foundations in the region into lasting global impact.



ISTC 2.0 — Investing in What Comes Next

This is not the first time ISTC has reinvented itself. Ten years ago, under then-Executive Director David Cleave, the organisation relocated its headquarters from Moscow to Astana — a decade-long chapter whose anniversary the Governing Board marked at its 80th meeting in Tokyo, at the Ministry of Foreign Affairs of Japan, in August 2025. The work of building ISTC's current mandate and regional reach rests on that foundation.

In 2025, ISTC entered the operational phase of its Strategic Roadmap 2024–2030, turning strategy into practice against a fast-changing landscape: evolving CBRN and dual-use technology risks, growing demand for science diplomacy among both member and non-member states, and the need to scale ISTC's impact to match the scope of these challenges.

"2025 marked the beginning of ISTC 2.0: important foundations were laid, while much remains to be done to turn our Strategic Roadmap into lasting regional impact. In Kazakhstan, this means supporting the country's science diplomacy and serving as a bridge between government, universities, research institutions and international partners." — Aibolat Abitbekov, Deputy Executive Director, ISTC

The organisation's public visibility grew alongside this shift, with a broader online community and new audiences in regions beyond ISTC's traditional footprint — including Africa and the Gulf — beginning to follow its work. That is not just larger but more engaged.

The year also marked the appointment of Karina Anguelieva as ISTC's first woman Executive Director, the first change of leadership in more than a decade, adding fresh momentum to this operational phase. Yet growth in scale and visibility means little without staying anchored to ISTC's founding purpose: helping countries and regions build the capacity and ecosystems to respond to emerging global challenges and threats, and translating science and technology into practice to build resilient, secure environments for citizens — including preventing risks related to CBRN.

> "ISTC is essential to preserve human security. Scientists already at an early stage of their work are made aware of its consequences. This is more than ever important given the rapid development of Artificial Intelligence."
>
> Adriaan van der Meer,
> ISTC Executive Director 2012–2016

SECTION 02

SCIENCE & INNOVATION

From scientific potential to practical impact

In 2025, ISTC helped connect frontier research with the people, institutions and international partnerships needed to carry it forward.

From AI-enabled radiotherapy and lead-free solar materials to safer water technologies and nuclear forensics, these initiatives turn scientific potential into practical solutions, while strengthening the next generation of researchers across countries.

STELLA · ENGAGEMENT & TALENT · STS FORUM · PHD GRANTS · FEMS MICROBIOLOGY · NUCLEAR FORENSICS FELLOWSHIP · RESEARCH OPEN CALL · SOLAR CELLS · WATER FILTERS



STELLA

SMART TECHNOLOGIES TO EXTEND LIVES WITH LINEAR ACCELERATORS

Nearly 70% of the world's radiotherapy machines are located in high-income countries, leaving much of the low- and middle-income world without reliable access to this vital cancer treatment, according to the International Cancer Expert Corps (ICEC). For patients, timely access to treatment can be the difference between remission and progression of their disease.

STELLA is an ICEC-led collaborative initiative developing an affordable, AI-enabled linear accelerator system designed to operate reliably in resource-constrained settings. The partnership includes CERN (European Organization for Nuclear Research), the University of Cambridge, Lancaster University, the University of Oxford, and a global network of low- and middle-income countries including representatives from 28 countries in Africa. ISTC coordinates the project, with funding from the US Department of Energy's National Nuclear Security Administration to ICEC.

BUILDING THE STELLA SYSTEM

In 2025, the STELLA team completed the project's planned deliverables. Specifications for a system architecture were developed, built around hardware and software subsystems designed for reliable operation in LMIC environments. Plans for an AI-powered predictive maintenance system to improve fault-prediction accuracy have been developed. The team also worked on the design of an integrated software ecosystem — covering operational software and clinical workflows and developed plans to expand training and mentoring programs with their African and other global experts.

Two international technical workshops, one in May 2024 and another in July 2025 at CERN in Geneva, brought together clinical experts, ministries of health, the IAEA, and LMIC partners to validate the STELLA concept design, with African collaborators confirming its relevance on the ground. The project's business strategy and commercialization roadmap has mapped a path toward industry engagement, and regulatory planning.

IMPACT

Only 10% of cancer patients in low-income countries and 40–50% in middle-income countries have access to radiation therapy, compared with 90% in high-income countries. Cervical cancer alone kills nearly 300,000 women every year in LMICs, despite being largely preventable and curable where radiotherapy is available.



FUNDER	U.S. Department of Energy (NNSA)
COUNTRIES	Network of 28 low- and middle-income countries
PERIOD	May 2024 – November 2026
BUDGET	$1.75M
KEY PARTNERS	ICEC, CERN, University of Cambridge, Lancaster University, University of Oxford
FOCUS	Health, Research & Development

FROM DESIGN TO DEPLOYMENT: INTERNATIONAL REACH AND NEXT STEPS





In 2025, STELLA moved from a research initiative to a project actively discussed within the international health and nuclear science communities. At the July 2025 workshop held at CERN, representatives from more than 15 countries — including ministers of health, IAEA officials, funders, and policymakers — reviewed the project's progress and clinical potential. STELLA was a featured presentation at the ISTC Special Day at EXPO 2025 in Osaka, Japan, Harvard's HOPE+ Global Health Catalyst Summit in September 2025, and IAEA's ICARO-4 conference in Vienna in June 2025,. In May 2025, STELLA was presented at a conference on "Developing evidence-based, cost-effective P4 cancer medicine for driving innovation in prevention, therapeutics, patient care and reducing healthcare inequalities cancer research" hosted by the Pontifical Academy of Sciences held in Vatican City.

On the industry side, there have been preliminary discussions with various companies to explore potential collaboration.



IMPACT

"STELLA is a bold, global collaboration that brings together novel engineering, AI integration, and sustainable training to re-imagine cancer care in underserved regions." — Eugenia Wendling, CEO, International Cancer Expert Corps

Engagement & Talent Support

INTERNATIONAL RESEARCHER MOBILITY

Central Asia and the Caucasus face a structural brain drain: researchers often leave for better-resourced environments abroad, while those who remain have limited access to international scientific networks. Without exposure to global forums, early-career scientists risk developing in isolation, cut off from the collaborations and visibility that shape careers. In 2025, ISTC is trying to address this directly by funding researchers' participation in high-level international events, creating connections intended to outlast any single trip.

SCIENCE AND TECHNOLOGY IN SOCIETY FORUM 2025

At the Science and Technology in Society (STS) Forum 2025 in Kyoto (5–7 October 2025), an annual international conference bringing together science ministers, university leaders, and Nobel laureates to discuss science policy, ISTC supported three young researchers from Armenia, Kazakhstan, and Kyrgyzstan — Dr. Emilya Titanyan (Director, Center of Innovation Research NGO, Armenia), Dr. Yerkebulan Raiymbekov (Head of the Water Quality Monitoring and Water Technologies Research Lab, M. Auezov South Kazakhstan University), and Dr. Aidai Kubanychbekova (Lecturer, Kyrgyz State Medical Academy) — to take part in the Forum's Young Leaders Program, engaging in dialogue with Nobel laureates F. Duncan M. Haldane (Physics, 2016) and Ryoji Noyori (Chemistry, 2001).

IMPACT

"Listening directly to Nobel Laureates reminded everyone that science is not only about experiments or results — it is also about passion, courage, and the belief that knowledge can make life better for people everywhere."
— Dr. Emilya Titanyan, Director, Center of Innovation Research NGO (Armenia)



FUNDER	Government of Japan
COUNTRIES	Armenia, Kazakhstan, Kyrgyzstan
PERIOD	5–7 October 2025 (STS Forum, Kyoto)
FOCUS	Research & Development, Scientific Capacity

PHD GRANTS & ACADEMIC PIPELINE

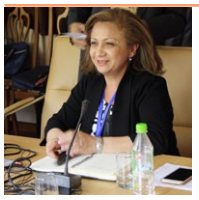
Across Central Asia, export control and dual-use science expertise has historically rested on a small group of officials with no pipeline of successors, when they retire or move on, the knowledge goes with them. ISTC's approach embeds this expertise directly into universities, funding PhD researchers who become tomorrow's professors, building a self-sustaining national capability rather than a dependency on external experts.

Under the EU-funded Targeted Initiative on Export Control of Dual-Use Materials and Technologies, three PhD grants were awarded — two in Kazakhstan, one in Armenia — while university courses were launched and are still running in Kazakhstan (ENU, Suleyman Demirel University, KBTU, Satbayev University), Kyrgyzstan (Kyrgyz National University, International University of Kyrgyzstan) and Tajikistan. In Kazakhstan, the Central Asian Institute for Development Studies (CAIDS) was founded to support these university projects; several of its members are now professors themselves.



NURZHAMAL SARSEITOVA (KYRGYZSTAN)

Nurzhamal Sarseitova (Kyrgyzstan) directs the "Strategic Trade Control, International and Customs Law" Master's programme at Kyrgyz National University, launched with support from the Targeted Initiative and the Center on Export Controls (CEC); across its first two cohorts, women's participation rose from under 20% to over 50%.



FIRUZA NASYROVA (TAJIKISTAN)

Firuza Nasyrova (Tajikistan) developed undergraduate and Master's-level courses at Tajik universities and co-authored Basics of Bioethics and Biosafety, an EU/ISTC-funded textbook (607 pages, published in Tajik) now taught at eight Tajik institutions.



EMILYA TITANYAN (ARMENIA)

Emilya Titanyan (Armenia), a PhD grantee under the same Targeted Initiative, successfully defended her doctoral thesis, "Political-Legal Analysis of Dual-Use-Related Intangible Technologies in the Scientific Environment: Case of Armenia," at the University of Liège in September 2025.



KAMSHAT SAGINBEKOVA (KAZAKHSTAN)

Kamshat Saginbekova (Kazakhstan) received one of the programme's PhD grants to research the politico-economic aspects of strategic trade control in Central Asian countries at the University of Liège, Belgium. On completing her doctorate, she established the Minor in Strategic Trade Control and Sanctions at the International School of Economics (ISE), Maqsut Narikbayev University in Astana, with the School's support, where she now teaches as a Teaching Professor, turning her own research into a course for the next generation. She continues to work internationally as a strategic trade control matter expert, including with the EU's P2P Export Control Programme and Arms Trade Treaty.

> "Receiving a PhD grant through this Targeted Initiative was not only an opportunity to conduct research but an investment in the long- term sustainability of strategic trade control education in Kazakhstan. Building on my doctoral work, I established the Minor in Trade Control and Sanctions with the support of ISE, transforming research into teaching and helping to build a new generation of specialists."
>
> — Dr. Kamshat Saginbekova, PhD grantee, Teaching Professor, Maqsut Narikbayev University

PRESENTING GEORGIAN RESEARCH TO THE WORLD: FEMS MICROBIOLOGY 2025

In July 2025, ISTC supported the participation of Davit Lazviashvili, Senior Laboratory Assistant (currently a scientific researcher) at the G. Eliava Institute's Laboratory of Microbial Biotechnology (Georgia), at the international microbiology congress FEMS Microbiology 2025 in Milan, Italy (14–17 July 2025). He presented the results of his Master's thesis, "Study of biofilm degrading ability of bacteriophages on antibiotic-resistant and biofilm-forming S. aureus strains isolated in Georgia."



During the conference, Davit held meetings and discussions with young researchers and senior scientists working in microbial biotechnology and the use of microbes to address healthcare related and environmental challenges. These exchanges gave him feedback on his research from international specialists in microbiology, and broadened his understanding of current global trends in antimicrobial resistance. His participation in the international congress once again highlighted the century-old tradition of research on bacteriophages and antibiotic resistance in Georgia. The same research line has since advanced: in December 2025, Davit and his Eliava Institute colleagues published peer-reviewed findings on phage activity against antibiotic-resistant S. aureus biofilms in the journal Viruses.

FUNDER	European Union (FPI)
COUNTRIES	Georgia
PERIOD	14–17 July 2025
FOCUS	Health, Scientific Capacity

IMPACT

"The ISTC mobility grant, supported by the EU once again meant appreciation of the work done and support for our research, which, for me, is a great motivation to continue my work with even greater effort. ... Participating in the FEMS MICRO 2025 Congress served as a major catalyst for my growth as an early-career researcher. Attending the congress enabled me to look beyond my immediate academic circle, present my findings to the international community, and gain invaluable, constructive feedback from leading experts as well as peers navigating similar research paths."

— Davit Lazviashvili, G. Eliava Institute, Georgia

FROM FELLOWSHIP TO FRONTLINE: NUCLEAR FORENSICS CAPACITY IN ARMENIA

Nuclear forensics — the science of tracing intercepted radioactive or nuclear material back to its origin — depends on a small pool of specialists worldwide, and Armenia's own capacity in this field has historically been thin. Since 2022, the ISTC International Nuclear Forensics Fellowship has been building that capacity directly, supporting Armenian researchers through graduate study and into national nuclear-safety infrastructure.

Anahit Petoyan is a PhD researcher in Nuclear Forensics at Yerevan State University and a Radiation Safety Junior Specialist at Armenia's Nuclear and Radiation Safety Center. Her doctoral research focuses on improving gamma-spectrometric measurements of uranium-contaminated swipe samples, studying how non-uniform radioactive-material distribution affects detector efficiency and measurement uncertainty.

With support from the ISTC International Nuclear Forensics Fellowship, Anahit completed her Master's degree in Nuclear Forensics (2022–2024) and continued into doctoral research. The fellowship also connected her with international experts and technical exchanges, allowing her to present her research, strengthen her skills in radiation detection and computational modelling, and apply this expertise within Armenia's nuclear-safety infrastructure.

In August 2025, she presented her research, "Towards Accurate Quantification of Non-Homogeneous Swipe Samples in Gamma Spectrometry," at the Nuclear Forensics Technical Exchange held on 20–22 August 2025 at Argonne National Laboratory (Lemont, Illinois, USA), representing Armenia alongside fellow NRSC specialists Arpi Khachatryan and Karen Haroyan.

IMPACT

"Building expertise in nuclear forensics requires international cooperation and continuous scientific exchange. The ISTC Fellowship provided both, enabling me to develop advanced technical skills while contributing to the long-term growth of Armenia's nuclear safety infrastructure."

— Anahit Petoyan



FUNDER	U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA), Office of Nuclear Smuggling Detection and Deterrence (NSDD)
COUNTRIES	Armenia
PERIOD	1 September 2024 – 31 August 2027
BUDGET	$65,700
KEY PARTNERS	Nuclear and Radiation Safety Center of Armenia, Yerevan State University
FOCUS	Nuclear · Non-Proliferation · Scientific Capacity

Research Projects (Open Call)

LEAD-FREE SOLAR CELLS, TAJIKISTAN

Conventional solar cells rely on toxic lead-based perovskite materials, posing environmental and health risks that limit safe deployment across Central Asia and other low- and middle-income regions. Before this project, Tajikistan had no laboratory capable of designing and testing safer alternatives. The project set out to develop high-performance, lead-free alternatives using cesium tin-trihalide (CsSnX3) compounds, combining Density Functional Theory (DFT) modelling, machine learning, and laboratory synthesis to overcome the stability and oxidation challenges that had previously blocked practical application.

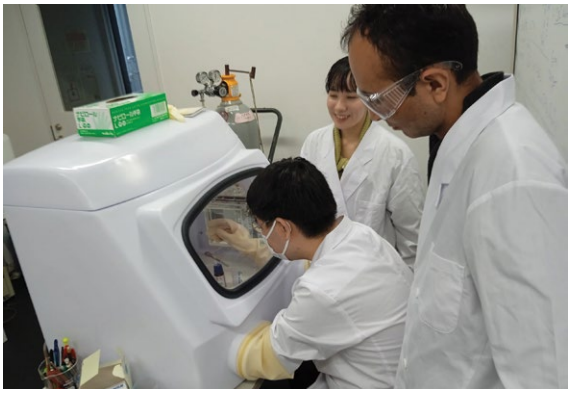
The project achieved a 25–30% increase in material lifetime and improved oxidation resistance, with prototype solar cells fabricated and tested confirming high charge carrier mobility. More than 30 DFT structural models were developed, with mechanical stability confirmed up to 30 GPa and machine learning used to screen thousands of possible compositions. The work produced more than 18 peer-reviewed publications (Scopus/Web of Science) and one registered patent for a nanocomposite based on calcium titanate.

The project also established Tajikistan's first integrated materials modelling and synthesis laboratory, and trained more than 10 young researchers. The scientific collaboration expanded beyond Waseda University's existing collaborators in Japan, resulting in several co-authored publications in peer-reviewed international journals with researchers from Estonia, China, Germany and Vietnam. By developing lead-free materials, the project contributes to UN Sustainable Development Goal (SDG) 7 (Clean Energy) and SDG 13 (Climate Action).

IMPACT

"Before this support, not much equipment existed in Tajikistan. Now, basic equipment to synthesize and analyze new materials has become available (…) Significant growth of young scientists and students can be seen in both Tajikistan and Japan."

— Prof. Tomoyuki Yamamoto, Waseda University, ISTC Special Day, EXPO 2025 Osaka





FUNDER	Ministry of Education, Culture, Sports, Science and Technology, Tokyo, Japan (MEXT)
COUNTRIES	Tajikistan · Japan
PERIOD	October 2022 – September 2025
BUDGET	$590,850
KEY PARTNERS	S.U. Umarov Physical-Technical Institute, National Academy of Sciences of Tajikistan (NAST)
FOCUS	Renewable Energy · Research & Development · Scientific Capacity

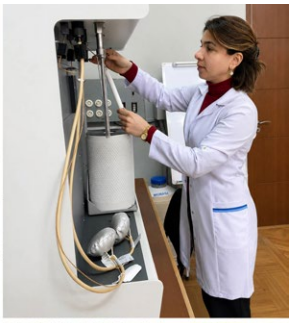
BACTERICIDAL WATER FILTERS, GEORGIA

Contaminated water remains a critical public health challenge across Central Asia and the Caucasus, where chemical disinfection is often costly or impractical to sustain. ISTC enabled a research consortium — led by Ivane Javakhishvili Tbilisi State University together with M. Auezov South Kazakhstan State University (Kazakhstan) and the Armenian National Agrarian University (Armenia) — to develop natural, non-toxic bactericidal filters by modifying zeolites sourced locally from Armenia, Georgia, and Kazakhstan, enriching them with bioactive metals capable of neutralising pathogens without chemical inputs.

Laboratory testing confirmed that the resulting filters remove E. coli, staphylococcus, and salmonella from water. Zinc-enriched Georgian heulandite proved particularly effective, reducing salmonella by a factor of 27,000. An environmental impact assessment confirmed the materials are safe for both human and animal use.

The project produced 21 peer-reviewed publications and 18 international conference presentations. A patent application for the sorbent production process has also been filed in Kazakhstan. The work included collaboration with Japanese partners at Gifu University and Chiba University. Because the production process is scalable and low-cost, it is relevant for municipal and industrial water treatment beyond the project itself.







FUNDER	Ministry of Education, Culture, Sports, Science and Technology, Tokyo, Japan (MEXT)
COUNTRIES	Armenia · Georgia · Kazakhstan
PERIOD	May 2022 – October 2025
BUDGET	$367,280
KEY PARTNERS	Ivane Javakhishvili Tbilisi State University
FOCUS	Water Safety · Environment · Research & Development

IMPACT

"Scientific substantiation of the possibility of creating effective water disinfectants without the use of expensive silver, based on local mineral resources — zeolites from deposits in Georgia, Kazakhstan, and Armenia — and the possibility of organizing the production of bactericidal adsorbents at SME represents a significant breakthrough in water safety for the South Caucasus and Central Asia."

— Vladimer Tsitsishvili, Doctor of Chemical Sciences, National Academy of Sciences of Georgia; Ivane Javakhishvili Tbilisi State University, Georgia

SECTION 03

SECURITY & NON-PROLIFERATION

From emerging risks to shared resilience

In 2025, ISTC continued to support its Parties' CBRN and non-proliferation priorities, helping countries translate shared security concerns into actions.

From critical infrastructure protection and nuclear security and safety capacity building to regional cooperation on biosafety and bio-security risks, these initiatives combine technology, institutional capacity and international partnership to build lasting resilience.

INFRASTRUCTURE PROTECTION · SITE MONITORING ·

BIOSAFETY AND BIOSECURITY CONFERENCE · FOCUS - BACAC



EU CBRN CoE Project 101

CRITICAL INFRASTRUCTURE PROTECTION

Critical infrastructure (CI) — power grids, water systems, hospitals — is only as secure as the national frameworks that govern it, and translating EU-level policy on CBRN risk into functioning national practice across 19 countries in three regions is not automatic. ISTC is the implementing partner for Project 101 of the European Union's CBRN Risk Mitigation Centres of Excellence (EU CBRN CoE) Initiative, carrying that translation from policy into concrete national action.

In 2025, ISTC conducted 14 in-country consultation visits across 3 regions, engaging more than 200 national experts from over 100 ministries and agencies. ISTC member states visited included Tajikistan (January 2025), Georgia (March 2025), Kyrgyzstan (June 2025), and Armenia (July 2025), during which national institutional and cybersecurity frameworks for CBRN critical infrastructure were reviewed, capability gaps identified, and national priorities discussed, which will guide future activities under the project. A Kazakhstan visit is planned for 2026. Furthermore, a second inter-regional meeting (Tashkent, December 2025) brought together 16 partner countries and international organisations to review progress made and discuss next steps.

ISTC team also developed and tested several novel assessment tools to assist partner countries identify gaps, and how to strengthen the protection of essential and important services:

- A national self-assessment tool to map cybersecurity governance (NICAT)
- A national self-assessment tool to map existing resilience arrangements (NIRAT)
- A national questionnaire to establish a baseline for legislative implementation of a number of international and regional legal instruments related to the management of CBRN materials and technologies, including facilities and entities (LIBAQ)

All tools align with the relevant EU's Directives on the protection of Critical Infrastructure.

Next Steps 2026: completion of all consultation visits, conduct national training workshops on identification and classification of critical CBRN infrastructure, and work in close cooperation with partner country experts on the development of guidelines and training materials for later stages of the project.





FUNDER	European Union (EU CBRN Risk Mitigation Centres of Excellence Initiative)
COUNTRIES	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iraq, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Moldova, Mongolia, Montenegro, North Macedonia, Pakistan, Serbia, Tajikistan, Ukraine, Uzbekistan
PERIOD	September 2023 – June 2028
BUDGET	$7.5M
KEY PARTNERS	Relevant stakeholders in partner countries
FOCUS	CBRN, Non-Proliferation

CAIRN

RADIOLOGICAL & NUCLEAR LEGACY SITE MONITORING

Central Asia carries a significant legacy of Soviet-era radiological and nuclear sites — former uranium mining and processing facilities across Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan — that pose long-term environmental and security risks with no unified way to monitor them. CAIRN develops a digital platform integrating early warning systems and digital twins to help national authorities monitor and manage these legacy sites.

The Norwegian Radiation and Nuclear Safety Authority (DSA Norway) is funding the project as part of Norway's wider international engagement on nuclear security and non-proliferation. The project is implemented in parallel to EU CBRN CoE project P101 (page 16) and is an example of Norwegian and EU priorities aligning and put into action through the ISTC.

In 2025, ISTC conducted consultation visits in Kyrgyzstan, Tajikistan, and Uzbekistan, identifying national priorities and potential pilot activities in each; Kazakhstan engagement was prepared for 2026.

Furthermore, the implementation of two key activities was initiated:

- Use of satellite-based remote-sensing technique (InSAR) that compares radar images of the same location taken at different times to monitor ground movement. Five priority uranium legacy sites in Kyrgyzstan were assessed. (contractor: Geospatial Insight (United Kingdom).
- Development of a virtual model (digital twin) existing infrastructures, so operators can visualize, analyze, and predict risks. Aim is to create a pilot digital twin of a nuclear facility for one of the partner countries as proof of concept and support the partner countries to enhance the IT and operational security of such facilities (contractor: Starion/ Nexova (Belgium).

IMPACT

For the first time, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan are developing a shared regional approach to monitoring and strengthening the resilience of radiological and nuclear sites through InSAR, cyber-risk assessment, and digital twins.

Coming in 2026: Regional cybersecurity training for operators and oversight agencies of uranium mine tailings and processing facilities. Training of partner countries in InSAR monitoring to assess stability of nuclear mine tailing sites and support risk monitoring by themselves. Pilot project in Kyrgyzstan integrating soil-sample, drone and satellite-based data to enhance monitoring of nuclear mine tailing sites. Launching of digital twin in one of the partner countries.



FUNDER	Radiation and Nuclear Safety Authority (DSA Norway)
COUNTRIES	Kazakhstan · Kyrgyzstan · Tajikistan · Uzbekistan
PERIOD	December 2024 – December 2027
BUDGET	€1M
KEY PARTNERS	Kyrgyzstan: Ministry of Emergency Situations, Tajikistan: Nuclear, Radiological, Chemical and Biological Safety Agency. Uzbekistan: Ministry of Emergency Situations and the Industrial, Radiation and Nuclear Safety Committee. Kazakhstan: National atomic and industrial bodies overseeing regional legacy sites.
FOCUS	Nuclear, Radiological, Environment

Focus

THE FUTURE OF BIOSAFETY AND BIOSECURITY CONFERENCE

Advances in AI-driven biotechnology, synthetic biology and genetic engineering are lowering the barrier to pathogen manipulation faster than governance frameworks can adapt. The Biological Weapons Convention (BWC) marked its 50th anniversary in 2025 still without a binding verification mechanism — a gap that makes regional and international cooperation an increasingly important complement to global governance.

ISTC, together with the Biosafety Association for Central Asia and the Caucasus (BACAC) and the German Society for International Cooperation (GIZ), convened the global biosecurity community in Almaty on 14–16 October 2025 to address these challenges directly and produce a concrete roadmap for action. The Future of Biosafety and Biosecurity Conference brought together more than 150 experts from over 20 countries across three days, including seven pre-conference workshops on AI and biorisk, disinformation, biosecurity governance, risk assessment, and biosafety protocols.

High-level speakers from BACAC's member states across Central Asia and the Caucasus, alongside the wider international biosafety community, discussed emerging bioterrorism risks and new threats, current challenges in biosafety and biosecurity risk management, disease surveillance and epidemiology, and the effects of climate change on these risks. Participants adopted the Almaty Call for Action, a strategic roadmap for international cooperation on AI, synthetic biology, and biosecurity governance.

The conference marked a double milestone: the BWC's 50th anniversary, and ISTC's tenth year of activity in Kazakhstan, and was covered by media articles and national television.



IMPACT

"International cooperation is the glue that holds us all together, and an organisation such as ISTC is a great example of how so many countries need to work together to face these global problems and challenges."

— Andrew Weber, Senior Fellow, Council on Strategic Risks; former U.S. Assistant Secretary of Defense for Nuclear, Chemical & Biological Defense Programs

ORGANIZERS	ISTC + BACAC + GIZ + NSCEDI + NCB-Almaty
PERIOD	14–16 October 2025, Almaty
SUPPORT	Ministry of Foreign Affairs of Kazakhstan · Ministry of Health of Kazakhstan · EU CBRN Risk Mitigation Centres of Excellence (CoE)

BACAC - BIOSAFETY ASSOCIATION FOR CENTRAL ASIA AND THE CAUCASUS

Biosafety and biosecurity capacity across Central Asia and the Caucasus had historically developed largely in silos, with national laboratories, health authorities, and research institutions working in isolation and no shared regional platform for coordination or expertise exchange. Sustainable biosecurity requires more than one-off training: it requires an institutional network with a long-term mandate.

BACAC, the Biosafety Association for Central Asia and the Caucasus, was established with ISTC's support to fill that gap. In 2025, the platform was revitalised, with the Almaty conference marking a new milestone in building stronger regional networks among laboratories, health institutions, and international organisations.

BACAC's members and partners span Armenia, Georgia, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Ukraine, Uzbekistan, and beyond, represented at the conference by national health ministries, academies of sciences, and biosafety experts. A BACAC member meeting held at the conference, chaired by Hendrik Visser of ISTC, focused on the future of biosafety education and training.

Scientific sessions covered regional epidemiology, including zoonotic diseases such as Yersinia pestis and Crimean-Congo haemorrhagic fever, the effects of climate change on disease patterns, and antimicrobial resistance, presented by experts from Georgia, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, and Ukraine.

IMPACT

"The Almaty Call for Action represents a tangible step toward collective responsibility in addressing the challenges of biotechnology and artificial intelligence."

— Damira Ashyralieva, President, BACAC

The conference also marked the closure event for the GIZ German Biosecurity Programme, completing a multi-year partnership and marking the transition to its next phase, and included a tour of the NSCEDI laboratory, part of Kazakhstan's national biosafety infrastructure.

FOUNDED	with ISTC support
REGION	Central Asia + Caucasus
KEY PARTNERS	GIZ · WHO Europe · EU CBRN Centre of Excellence · UNICRI · STCU
PRESIDENT	Damira Ashyralieva

PRECA: Preparedness for Mass Gatherings

Mass gatherings bring real benefits to Central Asia, but COVID-19 exposed how quickly they can threaten public health. Before 2021, national capacity across the region to manage food and water safety, chemical incidents, and coordinated public health command and control at large events varied widely, highlighting the need for an established regional network linking the six participating countries.

PRECA (EU CBRN CoE Project 087 — "Preparedness and Response for Mass Gatherings and Other Health Threats in Central Asia") helped address these challenges by strengthening national capacities and supporting closer regional collaboration.

Funded by the European Union and implemented by ISTC, in cooperation with the UN Interregional Crime and Justice Research Institute (UNICRI), from March 2021 to May 2025 across Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, and Uzbekistan, the project trained health and emergency officials through a train-the-trainer model: over 100 master trainers formed in Tashkent in 2022 went on to deliver national-level training across all six countries, reaching a final tally of 1,656 people.

Regional Working Groups, composed of national specialists and supported by EU experts, jointly developed and published



IMPACT

"By connecting health and emergency specialists across Central Asia, the PRECA project strengthened national capacities and created a sustainable regional network that will continue to support safer public events and more coordinated responses to public health emergencies."

— Bakhtiyor Gulyamov, Former Head of the EU CBRN Centre of Excellence Regional Secretariat for Central Asia

guidance documents on food safety, water safety, chemical incident response, and Poison Information Centres. These documents provide practical recommendations to help relevant authorities and other stakeholders prepare for and manage large-scale mass gatherings. They promote more consistent approaches across participating countries, serve as reference materials for training and operational planning, and, in several countries, may support the future development of national procedures, policies, and legislation. Poison Information Centres were a particular focus. ISTC helped extend access to the United Kingdom's TOXBASE toxicology database to clinical toxicologists across all six partner countries, and the first Poison Information Centre in the region — 'KazToxBase' — was inaugurated in Astana on 6 June 2024, with Pakistan, Uzbekistan, and Kyrgyzstan now working to establish their own.

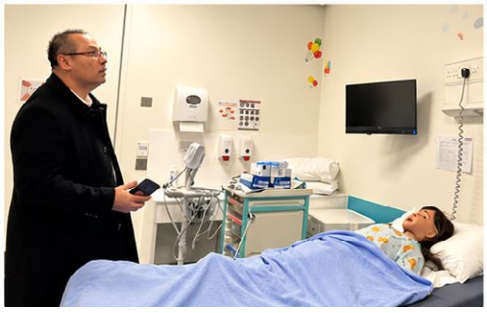
The project also delivered a Risk and Media Communication training for 66 experts across the region, and on 21–22 May 2024 ran a regional tabletop exercise simultaneously across six capitals to test coordination under a shared mass-gathering scenario. As the project closed, delegates from partner countries travelled on EU study visits to Dublin (February 2025) and Berlin (March 2025) to see European food, water, chemical, and crisis-communication practices firsthand.

FUNDER	European Union (EU CBRN Risk Mitigation Centres of Excellence Initiative)
COUNTRIES	Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Uzbekistan
PERIOD	March 2021 – May 2025
BUDGET	€3.5M
KEY PARTNERS	UN Interregional Crime and Justice Research Institute (UNICRI)
FOCUS	Water and Food Safety · Chemical Health











CBRN Emergency Medicine in the Gulf Region

Frontline health responders — doctors, nurses, paramedics and civil defence personnel — are the first line of defence in a chemical, biological, radiological or nuclear (CBRN) incident, yet across the Gulf region specialised, hands-on emergency medicine training has traditionally depended on expertise brought in from outside the region for each course.

Since 2019, the European Union's CBRN Risk Mitigation Centres of Excellence (EU CBRN CoE) initiative has enabled a regional training framework across Gulf Cooperation Council (GCC) countries, delivered by Norway's National Unit for CBRNE Medicine (Anders Dybwad, Yvonne Lao, Erik Tordhol, Stian Pettersen, Mark Salter) and cascading from joint Train-the-Trainer courses into national delivery.

In 2025, this train-the-trainer approach reached its intended outcome. Newly certified national Master Trainers in Kuwait, the United Arab Emirates (UAE) and Oman delivered their first national CBRN Emergency Medicine courses independently. Kuwait trained 22 professionals and the UAE trained 30. Oman trained 25 participants who completed the course, with a further 40 senior stakeholders reached through an accompanying national symposium in Muscat. In total, 77 professionals were trained through national courses across the three countries in 2025.

This marks a shift from capacity building to capacity ownership. Doctors, nurses, paramedics and civil defence personnel are now trained locally, using the methodology and curriculum introduced through the programme, reducing reliance on external expertise for future courses.



FUNDER	European Union (EU CBRN Risk Mitigation Centres of Excellence Initiative)
COUNTRIES	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates
PERIOD	August 2024 – December 2027
BUDGET	€770,000
KEY PARTNERS	Norway's National Unit for CBRNE Medicine
FOCUS	Emergency Response, CBRN, Health

IMPACT

"Preparedness becomes sustainable when knowledge stays in the country. By empowering national trainers, this programme has created a lasting capability that will continue to strengthen CBRN emergency preparedness long after the project ends."

— Andrew Proudlove, Team Leader, P82; Managing Director, ABXL

Radiochemical Laboratory, Iraq

Radiological emergency response depends on national laboratories able to detect and analyse radioactive materials quickly and reliably — a capacity Iraq needed to strengthen in both fixed and mobile analytical equipment, in support of the country's long-running Nuclear Site Decommissioning Programme.

Funded by the European Union through the Instrument for Nuclear Safety Cooperation (INSC) and implemented by ISTC with contractor Almurbat Company for General Trading and Contracting Ltd., the project delivered stationary and mobile radiochemical laboratory equipment to the Central Laboratories Directorate at the Al-Tuwaitha Nuclear Research Center, under Iraq's Ministry of Higher Education and Science and Technology.

EQUIPMENT DELIVERED INCLUDED:

- Gamma spectrometry systems for radionuclide identification
- A whole-body counter for personnel dose assessment
- Portable radionuclide identifiers for rapid field screening
- A dedicated mobile laboratory vehicle, extending analysis to sites far from Al-Tuwaitha
- Ground-penetrating radar for locating buried radioactive sources

Valued at more than €3.15 million, the project is strengthening Iraq's ability to characterise radioactive waste, monitor environmental and personnel exposure, and determine compliance with international storage and disposal standards — supporting the country's decommissioning programme in line with IAEA recommendations.



IMPACT

The mobile laboratory — built on a dedicated 4x4 vehicle — lets Iraqi specialists analyse radioactive waste on site, rather than transporting samples back to a fixed facility for testing.



FUNDER	European Union – Directorate-General for International Partnerships (DG INTPA), Instrument for Nuclear Safety Cooperation (INSC)
COUNTRIES	Iraq
PERIOD	2016–ongoing
BUDGET	€3.15M+
KEY PARTNERS	Iraq's Ministry of Higher Education and Scientific Research (MOHESR)
FOCUS	Radiological, Nuclear, Scientific Capacity

Surveillance of Tick-Borne and Bacterial Infections

Kyrgyzstan is one of several Central Asian countries where natural foci of tick-borne infections — including Crimean-Congo haemorrhagic fever, tick-borne encephalitis, and Q fever — pose a constant threat to human and animal health. Before this project began, epidemiological surveillance was concentrated on livestock-rearing areas, while state nature reserves, national parks, and high-altitude pastures — natural pathogen reservoirs also frequented by local communities and tourists — remained largely understudied, limited by difficult access, harsh terrain, and the scale of fieldwork required.

ISTC enables a collaborative research programme at the Institute of Biotechnology of the National Academy of Sciences of the Kyrgyz Republic, in Bishkek, to close that gap. Funded by the French Ministry of the Armed Forces under the G7 Global Partnership, implemented by Expertise France and carried out with the Institut de Recherche Biomédicale des Armées (IRBA), France, as foreign collaborator, the project systematically surveys ticks, small mammals and livestock across Kyrgyzstan, with particular attention to detecting Crimean-Congo haemorrhagic fever virus, tick-borne encephalitis virus, and the bacterium responsible for Q fever (Coxiella burnetii). The results map pathogen distribution across natural foci, assess transmission risk to humans, and build a scientific foundation for strengthening the national epidemiological surveillance system.

Since the project's launch, research teams have carried out field expeditions across the Chuy, Issyk-Kul, Osh and Batken regions, collecting more than 1,713 ticks, 191 small-rodent and bat samples, 202 bovine serum samples, and samples from 16 yaks for pathogen screening. The Institute has installed dedicated laboratory equipment for the work, including PCR and ELISA systems, and has procured Oxford Nanopore sequencers (MinION, PromethION) to bring next-generation sequencing capability in-country.

To achieve broader geographical coverage of the study areas, the project timeline was extended by nine months, through November 2026.

Serological testing (ELISA) has already confirmed exposure to several of the targeted pathogens: one CCHF-positive case in cattle, 106 Q fever-positive samples (99 livestock, 6 bats, and 1 rodent), and one SARS-CoV-related positive case in rodents. While genomic sequencing of these findings is the next step, the newly acquired Nanopore platform gives the Institute the infrastructure to characterise these pathogens in-country and feed the results into Kyrgyzstan's national early-warning system.

IMPACT

Serological testing has confirmed Kyrgyzstan's first documented cases of Q fever, CCHF, and a SARS-CoV-related virus in wildlife and livestock, turning years of fieldwork into the country's first evidence base for these pathogens.



FUNDER	French Ministry of the Armed Forces (through Expertise France)
COUNTRIES	Kyrgyzstan
PERIOD	March 2024 – November 2026
BUDGET	$295,433
KEY PARTNERS	Institute of Biotechnology of the National Academy of Sciences of the Kyrgyz Republic (Bishkek); Institut de Recherche Biomédicale des Armées (IRBA), France
FOCUS	Health, Research & Development, Scientific Capacity

LABPLUS Africa

LABPLUS Africa made a significant contribution to strengthening health security and epidemic preparedness across West and Central Africa by reinforcing the role of the Institut Pasteur de Dakar (IPD) as a regional centre of excellence for diagnostics, genomics, training and laboratory networking. The project supported the upgrading of laboratory infrastructure, the expansion of diagnostic and genomic surveillance capacities, and the deployment of quality management systems through External Quality Assessment programmes implemented in numerous African countries. It also strengthened biobanking capacities, with more than 100,000 biological samples securely managed under internationally recognised quality standards, while advancing genomic capabilities through high-throughput sequencing technologies and the sequencing of over 1,000 viral genomes. Human resource development was another key achievement, notably through the establishment of a regional training centre and specialised training programmes in diagnostics, biosafety, genomics and epidemic preparedness.

Throughout the project, ISTC monitored progress on the construction of the training centre at IPD, worked with Praesens Care to determine how the new laboratories would be used, and verified that the equipment delivered was being put to appropriate use. ISTC also worked to raise the initiative's visibility across the region.

The project further promoted digital innovation through the deployment of interoperable laboratory information systems and digital laboratory solutions, thereby improving surveillance and data sharing. Regional preparedness was enhanced through the expansion of sentinel surveillance networks, the deployment of mobile laboratory capacities and stronger collaboration between national public health institutions, research centres and international partners.

In addition, LABPLUS Africa supported operational research activities, including the Mombasa study in Kenya, which generated evidence to improve surveillance strategies, laboratory diagnostics and preparedness for emerging infectious diseases under real-life conditions. Through these combined efforts, the project established sustainable capacities and long-term partnerships, significantly strengthening outbreak detection, response and resilience across partner countries.





FUNDER	European Union (FPI)
COUNTRIES	Kenya, Senegal
PERIOD	2020-2025
BUDGET	€10M
KEY PARTNERS	Institut Pasteur de Dakar; Praesens Care, Jomo Kenyatta University (JKUAT)
FOCUS	Health, Research & Development, Scientific Capacity

IMPACT

The project reinforced the Institut Pasteur de Dakar as a regional centre of excellence for diagnostics, genomics, training and epidemic preparedness. It strengthened regional surveillance, outbreak response and laboratory capacities while fostering sustainable partnerships with international organisations and African public health institutions.

SECTION 05

ENERGY & RESILIENCE

From critical resources to long-term resilience

ISTC's energy and resilience projects help link scientific capacity with the infrastructure and evidence partner countries need for long-term security.

The 2025 portfolio spans environmental remediation and water security, advanced nuclear-energy planning, transboundary monitoring and Earth observation, supporting partners as they manage shared resources, advance nuclear technologies and build stronger action plans for future resilience.

FIRST PROGRAM · WATER PROJECT · WATER MONITORING · WATER SECURITY



FIRST Program: Building Foundations for Responsible SMR Deployment

The ISTC is an intergovernmental organization headquartered in Astana, with member states across Europe and Asia. ISTC serves as an implementing partner of the U.S. Department of State's Foundational Infrastructure for Responsible Use of Small Modular Reactor (SMR) Technology (FIRST) program, administered through the Bureau of Arms Control and Nonproliferation, Office of Cooperative Threat Reduction.

The FIRST Program supports partner countries considering advanced nuclear technologies in developing the capabilities needed for their safe, secure, and responsible use, consistent with the highest standards of nuclear safety, security, and nonproliferation. As an implementing partner, ISTC coordinates and supports the delivery of technical assistance, capacity-building, training, and other program activities in cooperation with national institutions, international technical experts, technology providers, and other implementing partners. Through these efforts, ISTC helps strengthen technical expertise, institutional and regulatory capacity, and the qualified workforce needed to support informed decision-making on advanced nuclear energy.

TRAINING INFRASTRUCTURE

ISTC expanded practical training infrastructure to support long-term SMR workforce development. One of the major milestones was the January 2025 opening of the NuScale Energy Exploration (E2) Center at the School of Nuclear and Allied Sciences in Accra in partnership with Ghana Atomic Energy Commission. Equipped with advanced SMR simulation technology, the Center provides hands-on education and training for nuclear professionals and serves as a regional training resource. Following its opening, the technical support phase commenced to support continued operation and training activities.

ISTC also advanced development of a regional SMR Classroom Simulator at the Institute of Nuclear Physics in Almaty, engaging Holtec International and WSC Inc., a Curtiss-Wright company, to develop and supply the system. Preparatory work focused on technical coordination, facility readiness, and arrangements for installation. Once operational, the simulator will provide students and nuclear professionals with practical exposure to SMR systems and operations and serve as a regional platform for education, training, and technical cooperation. Highlighting the broader significance of this investment in training infrastructure, the U.S. Embassy in Kazakhstan described the facility as "a critical step in developing the workforce to expedite U.S. SMR deployment with trustworthy vendors who meet the highest nuclear security, safety, and nonproliferation standards." — U.S. Embassy in Kazakhstan, 22 December 2025.



INSTITUTIONAL AND WORKFORCE CAPACITY

ISTC strengthened institutional and workforce capacity through targeted, locally driven initiatives. Under the FIRST partner-led projects initiative, national institutes developed and implemented 22 projects around their own priorities. Activities covered regulatory and technical analysis, curriculum development, radioactive waste and spent fuel management, site studies, and stakeholder engagement. All projects were completed on schedule, culminating in a Capstone Event in Vienna in November, where participating institutions presented results, exchanged lessons learned, and discussed next steps with nuclear energy experts from the United States and Japan.

ISTC also supported specialized workforce development. Ten Armenian specialists completed the two-week Modeling, Experimentation, and Validation Summer School at Oak Ridge National Laboratory, gaining practical exposure to advanced nuclear modeling, thermal-hydraulics, reactor safety, and research facilities.

ISTC engaged the Hobart Institute of Welding Technology based in Ohio, USA and the American Welding Society to launch a phased Train-the-Trainer program aimed at establishing sustainable national capacity for nuclear-grade welding training, qualification, and certification in Ghana.

TECHNICAL, FINANCIAL, AND REGULATORY ADVISORY SUPPORT

ISTC expanded specialized technical, financial, and regulatory support through Sargent & Lundy (S&L) and Numark Associates. In Armenia, S&L provided technical advisory services supporting potential SMR deployment, including workshops on procurement and bid evaluation, revision of the SMR Pre-Feasibility Study, and development of a New Build Plant Technical Specification. The revised study was presented to national stakeholders in October, while the draft technical procurement specification was completed and submitted for expert review.

S&L also provided financial advisory services to Bulgaria to support informed SMR planning and investment decisions. Activities included workshops and consultations on financial sustainability, comparative technology costs, preliminary economic assessments, financing structures, and business models, tailored to national priorities.

ISTC and Numark delivered tailored regulatory training for nuclear authorities in Czechia and Romania, covering Boiling Water Reactor (BWR) reactor technology fundamentals, supply-chain verification and vendor qualification, graded approaches to regulation, SMR reactor system design and operation, and plant safety analysis. The training strengthened regulators' technical capacity to assess advanced reactor technologies, apply risk-informed and performance-based regulatory approaches, oversee nuclear supply chains and vendor qualification, and evaluate key design and safety considerations relevant to future SMR licensing and regulatory oversight.

Across these activities, ISTC provided an implementation platform that connected national institutions with U.S. technical expertise, technology providers, and academic partners. Through this cooperation, FIRST initiatives are translated into practical capacity—from technical and financial advisory support and regulatory development to workforce training and advanced training infrastructure. With several activities continuing into 2026 and a new line of effort for nuclear energy newcomer countries launched in October 2025, the program continues to broaden its reach and build foundations for responsible nuclear energy development.

IMPACT

"This new facility is a critical step in developing the workforce to expedite U.S. SMR deployment with trustworthy vendors who meet the highest nuclear security, safety, and non-proliferation standards." — U.S. Embassy in Kazakhstan, official statement, 22 December 2025

FUNDER	U.S. Department of State, Bureau of Arms Control and Nonproliferation, Office of Cooperative Threat Reduction (ACN/CTR)
COUNTRIES	Eight partner countries with activity in 2025, across Africa and Eurasia
PERIOD	2021–2026 (nine awards)
KEY PARTNERS	Ghana Atomic Energy Commission; Institute of Nuclear Physics, Almaty; NuScale Power; Holtec International; WSC Inc. (Curtiss-Wright); Sargent & Lundy; Numark Associates; Oak Ridge National Laboratory; Idaho National Laboratory; American Welding Society; Hobart Institute of Welding Technology
FOCUS	Energy security, nuclear safety, security, and nonproliferation

Taboshar/Istiklol Water Project

The International Science and Technology Center (ISTC) implemented this European Union-funded project in partnership with G.E.O.S. Ingenieurgesellschaft mbH, supporting Tajikistan's efforts to improve environmental safety and access to safe drinking water in Istiklol (formerly Taboshar).

Istiklol (formerly Taboshar), located in the Sughd Region of Tajikistan, is one of the legacy uranium mining sites in Central Asia where remediation activities have been undertaken to address environmental and public health risks associated with past uranium production. For decades, contaminated mine water reached local communities at up to 50 times the World Health Organization (WHO) toxicity limit, and was still used for drinking, livestock, and irrigation.

The Water Treatment Facility at Taboshar/Istiklol, addressed this specific risk through a resilient, gravity-fed engineering solution that requires no chemical treatment. ISTC implemented the project, funded by the EU via the Instrument for Nuclear Safety Cooperation (contract INSC 2018/402-647), working with G.E.O.S. Ingenieurgesellschaft mbH, the Ministry of Industry and New Technologies (MINT) as national beneficiary, and the municipal water utility of Istiklol City as the future operator of the facility.











The solution pairs two pipelines: a 4.975 km diversion pipeline and infiltration well near Adit No. 6 that carries contaminated mine water away from residential areas, and a 15.412 km fresh-water pipeline bringing spring water from the Chat-Souf and Urta-Souf springs to the city's reservoirs, complete with sand traps and inspection and valve chambers.

The facility was officially inaugurated on 4 December 2025 in Istiklol, with around 100 participants including the EU Delegation, the Ministry of Industry and New Technologies, local authorities, implementing partners, and the local community. It is the first EU-funded pilot of its kind for a uranium legacy site in Central Asia, reducing exposure for approximately 15,000 residents.



FUNDER	European Union (EU) – Directorate-General for International Partnerships (DG INTPA), Instrument for Nuclear Safety Cooperation (INSC)
COUNTRIES	Tajikistan
PERIOD	2018–2025
BUDGET	€3,065,924
KEY PARTNERS	Ministry of Industry and New Technologies of the Republic of Tajikistan (MINT) · G.E.O.S. Ingenieurgesellschaft mbH · Istiklol City Administration and Municipal Water Utility
FOCUS	Water Safety · Environment · Radiological

IMPACT

"For the first time, we have a reliable system that protects our neighbourhoods from contaminated water and provides a dependable supply of clean spring water." — Kayum Makhmudzoda, Chairman of Istiklol City Administration, 4 December 2025

Transboundary Water Monitoring

Central Asia's transboundary rivers carry a legacy of Soviet-era uranium mining and metallurgical pollution: Kazakhstan alone holds more than 230 million tonnes of uranium tailings, and Kyrgyzstan has 49 tailings sites. The region's last comprehensive monitoring effort, the "Navruz" programme, ended in 2009, leaving a decade-long gap in understanding how contamination was evolving.

The project (project TJ-2409), titled "Hydrochemistry Monitoring and Risk Assessment of Mining & Uranium Tailing in Transboundary River Watershed of Central Asian Countries," reassessed contamination dynamics across four Central Asian countries a decade on. It is EU-funded and led by the Institute of Water Problems, Hydropower Engineering and Ecology (IWPHEE), Academy of Sciences of Tajikistan, under project manager Anvar Kodirov, in parallel with the Earth Observation project on the opposite page (TJ-2412), which tracks land and water resources across the same basins from space.

The project spans four countries. Fieldwork has covered the Kara-Balta, Toktas and Sary-Koo river basins shared by Kyrgyzstan and Kazakhstan, and the Maily-Suu River shared by Kyrgyzstan, Kazakhstan and Uzbekistan, together with a dedicated sampling campaign in the Zarafshon River basin in Tajikistan. Phase 1 (October 2020–March 2021) surveyed the Kara-Balta basin for toxic elements and natural radionuclides near its uranium tailings. Phase 2 extended sampling to the Toktas and Sary-Koo rivers. Phase 3 returned to Kara-Balta, added the Maily-Suu River together with the project's first vegetation and aquatic-animal samples, and included Uzbekistan's first set of soil, water and sediment samples. The consolidated Phase 2 & 3 technical report, completed 25 April 2025, presents these findings, and is being extended with dedicated radioactive measurements around Khujand, Tajikistan, following installation of a new gamma sensor there. In total, 225 environmental samples — water, soil, and bottom sediment — were analysed using X-ray fluorescence, neutron activation analysis, inductively coupled plasma mass spectrometry, and gamma spectrometry, confirming elevated uranium, thorium, lead, and molybdenum near legacy tailings.

These results form the scientific and technical baseline for ISTC's Water Radiation and Heavy Metals Monitoring System (WRHMMS).



IMPACT

This project re-established Central Asia's transboundary contamination baseline 15 years after the original "Navruz" programme, directly enabling the launch of a new regional early-warning system.

FUNDER	European Union (FPI)
COUNTRIES	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan
PERIOD	2019–2026 (Phases I–III); Phase 3 report April 2025
BUDGET	$861,422.80
KEY PARTNERS	IWPHEE (Tajikistan) and regional partner institutes
FOCUS	Water Safety, Radiological, Environment

Earth Observation for Transboundary Water Security

Managing water shared across borders starts with data everyone can see. Central Asia's smaller transboundary tributaries — vital sources of irrigation and drinking water across the Amu Darya and Syr Darya basins — had no common record: riparian countries each held fragmented, national-only files, making coordinated planning nearly impossible.

Since 2019, this EU-funded project (project TJ-2412, supported by the European Commission's Service for Foreign Policy Instruments) has been led by the Institute of Water Problems, Hydropower Engineering and Ecology (IWPHEE) in Tajikistan, bringing together partner institutes in Kazakhstan, Kyrgyzstan and Uzbekistan alongside technical support from Deltares and the University of Twente, with ISTC coordinating implementation. Together with the hydrochemistry monitoring under TJ-2409 on the opposite page, this work builds the region's most complete picture yet of transboundary water quality and land use.

Phases I and II combined satellite remote sensing, GIS analytics and hydrological modelling to assess water and land resources across the Amu Darya basin and its Surkhandarya and Karatag tributaries, building a shared technical picture where none existed before.

In 2025, this work delivered MaJISYS, a shared regional database platform that lets partner countries enter and access water observations through a common system rather than separate national records. Connection details for the platform's database were finalised on 15 January 2025, ahead of the associated Delft-FEWS forecasting pilot's deliverables in March and May 2025.

Phase III is extending this monitoring to the Syr Darya basin, working jointly with ISTC's TJ-2409 hydrochemistry project under WRHMMS, feeding radiation and heavy-metals data into MaJISYS, laying the groundwork for a follow-on regional water-security initiative (ref: PR-206).

In June 2025, ISTC and IWMI convened a training workshop in Tashkent with TIIAME (Tashkent Institute of Irrigation and Agricultural Mechanization Engineers), "Leveraging Earth Observation for Sustainable Water Resource Management," bringing Deltares and IWMI specialists together with regional partners to build hands-on capacity with the new tools.



IMPACT

The project is compiling the Amu Darya basin's first GIS- and Earth-Observation-based atlas of transboundary water and land resources, turning scattered national datasets into one shared decision-support tool.

FUNDER	European Union (FPI)
COUNTRIES	Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan
PERIOD	2019–2025 (Phases I–III)
BUDGET	$1,063,292.76
KEY PARTNERS	IWPHEE (Tajikistan) · American University of Central Asia (Kyrgyzstan) · Basin Water Organization "Amu Darya" (Uzbekistan) · Taraz State University (Kazakhstan) · International Water Management Institute (IWMI) · Deltares · University of Twente
FOCUS	Water Management, Environment, Disaster Risk Management

SECTION 06

EXPO OSAKA

From global visibility to deeper partnership

ISTC's participation in Expo 2025 Osaka was a named milestone of the Strategic Roadmap 2024–2030 — an opportunity to connect with new audiences and partners.

Through the ISTC Pavilion and ISTC Special Day, scientists, policymakers and partners from Japan and the region came together, while the Governing Board's presence in Japan marked ten years since the Secretariat's move to Astana and thirty years of Japan-ISTC cooperation.



ISTC PAVILION · ISTC SPECIAL DAY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NO ENTRY

EXPO 2025, OSAKA, KANSAI, JAPAN

THE ISTC PAVILION

EXPO 2025 Osaka brought together 158 countries and regions and seven international organisations as official participants, plus 17 domestic pavilion exhibitors — a global stage where a modest intergovernmental organisation can easily go unnoticed. ISTC's participation in EXPO 2025 Osaka, Kansai, was designed to change that.

From 13 April to 13 October 2025, ISTC maintained a continuous presence at its pavilion in Osaka for the full six-month run of the Expo, themed around science for a safer, more sustainable world. Over that period, the ISTC pavilion welcomed 497,317 visitors, making it ISTC's largest single investment in international visibility in 2025.

The pavilion also became a venue for high-level diplomatic engagement. The pavilion received delegations from ASEAN and individual member states, Senegal, and a delegation from Switzerland, alongside daily visits from other official participants' governmental delegations. The International Organization Pavilion, where the ISTC pavilion was located, welcomed a visit from Their Majesties the Emperor and Empress of Japan. ISTC also welcomed delegations from Hiroshima and Osaka Prefectures, with Hiroshima Governor Hidehiko Yuzaki visiting the ISTC Secretariat in July 2025, and held meetings with the Japan Atomic Energy Agency (JAEA), the Korea Atomic Energy Research Institute (KAERI), and Japanese partner universities. Yet the pavilion's greatest achievement was reaching ordinary Japanese visitors directly, through daily public engagement, quizzes, and project information.





IMPACT

PAVILION THEME:

"Crossroads Between Science & Security" - co-creating a safer, more secure, and sustainable world

DURATION	13 April – 13 October 2025 (6 months)
VISITORS	497,317

ISTC SPECIAL DAY

Within its six months at EXPO 2025, ISTC set aside a single day to bring thirty years of Japan-ISTC scientific partnership into full view.

The Special Day followed ISTC's 80th Governing Board Meeting, held in MOFA, Tokyo, on 25–26 August 2025 and marking the tenth anniversary of the Secretariat's relocation to Kazakhstan, with Kazakhstan's Minister of Science and Higher Education, Sayasat Nurbek, in attendance.

On 27 August 2025, the ISTC Special Day opened at the EXPO National Day Hall with a flag-hoisting ceremony and opening remarks from H.E. Ikuina Akiko, Parliamentary Vice-Minister for Foreign Affairs of Japan, and Executive Director Karina Anguelieva. This was followed by an official ceremony recognising four national research teams working on Japan-funded ISTC projects — Armenia (antimicrobial resistance), Georgia (thermoelectric materials), Kazakhstan (nuclear safety), and Tajikistan (solar materials) — a unique award ceremony for young researchers from the region. Kakita Yasuyoshi, Senior Deputy Minister of Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), addressed the ceremony and presented the awards alongside Governing Board Chairman Ambassador Ronald F. Lehman II. Representatives from each team — Anna Mkrtchyan (Armenia), Natia Margiani (Georgia), Asset Shaimerdenov (Kazakhstan), and Dilshod Nematov (Tajikistan) — delivered remarks on behalf of their colleagues.

IMPACT

"The International Science and Technology Center, ISTC, can be considered a pioneering achievement in science and technology diplomacy. Its successful efforts represent a remarkable example of international cooperation." — Prof. Kotani Motoko, Executive Director, RIKEN; Science and Technology Co-Advisor to the Minister for Foreign Affairs, Japan; ISTC Special Day, EXPO 2025 Osaka, 27 August 2025

PUBLIC PANEL: " NEW APPROACH TO SUSTAINABILITY"

In the afternoon, ISTC convened a public panel event at the same venue, "New Approach to Sustainability: Why International Collaboration in Science & Technology is Crucial for the Future of Our Planet?", drawing more than 100 participants. Following an opening address by Ambassador Ronald F. Lehman II, the first session — Strengthening Global Partnership for Security and Sustainability through Science and Technology, moderated by Maria Rosa Sabbatelli (European Commission) — opened with a keynote from Prof. Kotani Motoko (Executive Director, RIKEN) and featured Dr. Deguchi Tomonori (ArkEdge Space), Nina Wendling (International Cancer Expert Corps, presenting STELLA), Prof. Ishii Naoko (University of Tokyo), and Prof. Yamamoto Tomoyuki (Waseda University). The second session — Nuclear Technology and Future Energy: Challenges and Perspectives for Peace and Prosperity, moderated by Ryan Taugher (U.S. Department of State) — opened with keynote addresses from JAEA President Koguchi Masanori and KAERI President Han-Gyu Joo, and featured Prof. Takeda Masatoshi (Nagaoka University of Technology) and Dr. Kanat Baigarin (Nazarbayev University). Executive Director Karina Anguelieva delivered the closing remarks.



COUNTRIES	Armenia, Georgia, Kazakhstan, Tajikistan
PERIOD	27 August 2025 EXPO OSAKA

SECTION 07

PROJECTS COMPLETED

Delivering impact that lasts

ISTC concluded 18 projects in 2025, spanning nuclear forensics and security, biosafety and biosecurity, export control, and applied research, delivered with partners across Armenia, Georgia, Kazakhstan, Tajikistan, Uzbekistan and beyond.



Projects Completed in 2025

ISTC CONCLUDED 18 PROJECTS IN 2025

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18 Completed Projects

6 Partner Countries

25+ Partner Organisations

2025 Jan-Dec

Completed in January 2025

Code	Project	Founder	Key result
K-2400	Advancement of Nuclear Forensics Activities in Kazakhstan	US DOE/NNSA	Established analytical techniques and laid ground-work for a National Nuclear Forensics Library at the Institute of Nuclear Physics, Almaty.
PR-141	WINS Special Report – Nuclear Security 2.0	US DOE/NNSA	Delivered an analytical report on the evolving nuclear security landscape following Russia's war in Ukraine.

Completed in March 2025

Code	Project	Founder	Key result
KZ-2538	Microbiological Moni-toring of Anthrax Cattle Burial Grounds, Northern Kazakhstan	Expertise France	Screened 160 soil samples; confirmed Bacillus an-thracis in two, informing continued site monitoring.
KZ-2715	Radiation Resistance of Mineral-Insulated Cables	Japan MEXT	Validated cable performance under high-tem-perature reactor irradiation; published in Nuclear Instruments and Methods in Physics Research B.

Completed in April 2025

Code	Project	Founder	Key result
PR-128	Nuclear Forensics Fel-lowships – Armenia and Tajikistan	US DOE/NNSA	Supported four fellows' training and participation in international nuclear forensics conferences.
PR-143	Launch Event for Voices of Ukraine, Volume 1	US DOE/NNSA	Organized the Vienna launch, where five nuclear-sector workers shared their wartime experiences.
PR-151	Maximizing Peaceful Nuclear Uses for Sus-tainable Development	US DOE/NNSA	Convened a Wilton Park workshop aligning nuclear security and development priorities, including the SDGs.

Completed in August 2025

Code	Project	Founder	Key result
PR-207	US–Kazakhstan Trade Data Analysis and Control Policy Meetings	US DOE	Brought 10 senior Kazakhstani officials to Washington, D.C. for interagency engagement on export control practices.
PR-210	Training of Trainers Workshop on Biosafety and Biosecurity	GHD|EMPH-NET	Certified laboratory and public health trainers in Bishkek and Osh.
PR-156 & PR-125	Upgrading the CBRN Forensics Laboratory, Dushanbe	US DOE/NNSA	Installed and commissioned forensic analytical instrumentation; laboratory inaugurated October 2024, attended by the President of Tajikistan.
PR-133	Armenia Regional Commodity Identification Training	US DOE	Trained customs officers at four Armenian customs houses on export control and controlled-items identification.
PR-190	Strengthening National Guidelines for Biorisk Management	Health Security Partners	Delivered two regional workshops in Almaty and Astana for 56 participants from Kazakhstan, Kyrgyzstan and Tajikistan.
PR-184	Source Removal and Decommissioning Plan – GUBE-6000 Irradiator, Uzbekistan	US DOE/NNSA (ORS)	Delivered a full technical plan for safe source removal and building decommissioning; physical removal not yet carried out.

Completed in October 2025

Code	Project	Founder	Key result
PR-148	Strengthening Biosafety and Biosecurity Best Practices	Health Security Partners	Delivered in-person training in Tajikistan and Kyrgyzstan for laboratory and IT professionals.
GE-2506	Bactericidal Zeolite Filter Materials for Water Purification	Japan MEXT	Selected zinc-modified zeolites for real-world use; submitted a patent application and published 21 peer-reviewed articles.
TJ-2782	Supporting Tajikistan's Implementation of the Biological Weapons Convention	UK MoD / US DoD (CTR)	Supported adoption of a governmental decree empowering Tajikistan's CBRN Safety and Security Agency.
PR-181	Procurement and Installation of Scanning Equipment, Georgia	US DoS (ISN/ECC)	Completed preparatory and procurement work before the project was suspended.
GE-2776	Enhancing Thermoelectric Performance of Cobalt-Based Oxide Materials	Japan MEXT	Achieved efficiency gains in thermoelectric materials; produced three peer-reviewed publications.

Projects Completed in 2025

18 Completed Projects

6 Partner Countries

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Completed in January 2025

K-2400 US DOE/NNSA

Advancement of Nuclear Forensics Activities in Kazakhstan

Established analytical techniques and laid groundwork for a National Nuclear Forensics Library at the Institute of Nuclear Physics, Almaty.

PR-141 US DOE/NNSA

WINS Special Report – Nuclear Security 2.0

Delivered an analytical report on the evolving nuclear security landscape following Russia's war in Ukraine.

Completed in March 2025

KZ-2538 Expertise France

Microbiological Monitoring of Anthrax Cattle Burial Grounds, Northern Kazakhstan

Screened 160 soil samples; confirmed Bacillus anthracis in two, informing continued site monitoring.

KZ-2715 Japan MEXT

Radiation Resistance of Mineral-Insulated Cables

Validated cable performance under high-temperature reactor irradiation; published in Nuclear Instruments and Methods in Physics Research B.

Completed in April 2025

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Supported four fellows' training and participation in international nuclear forensics conferences.

PR-143 US DOE/NNSA

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Organized the Vienna launch, where five nuclear-sector workers shared their wartime experiences.

PR-151 US DOE/NNSA

Maximizing Peaceful Nuclear Uses for Sustainable Development

Convened a Wilton Park workshop aligning nuclear security and development priorities, including the SDGs.

25+ Partner Organisations

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Completed in August 2025

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US–Kazakhstan Trade Data Analysis and Control Policy Meetings

Brought 10 senior Kazakhstani officials to Washington, D.C. for interagency engagement on export control practices.



PR-210 GHD|EMPHNET

Training of Trainers Workshop on Biosafety and Biosecurity

Certified laboratory and public health trainers in Bishkek and Osh.

PR-156 & PR-125 US DOE/NNSA

Upgrading the CBRN Forensics Laboratory, Dushanbe

Installed and commissioned forensic analytical instrumentation; laboratory inaugurated October 2024, attended by the President of Tajikistan.

PR-133 US DOE

Armenia Regional Commodity Identification Training

Trained customs officers at four Armenian customs houses on export control and controlled-items identification.

PR-190 Health Security Partners

Strengthening National Guidelines for Biorisk Management

Delivered two regional workshops in Almaty and Astana for 56 participants from Kazakhstan, Kyrgyzstan and Tajikistan.

PR-184 US DOE/NNSA (ORS)

Source Removal and Decommissioning Plan – GUBE-6000 Irradiator, Uzbekistan

Delivered a full technical plan for safe source removal and building decommissioning; physical removal not yet carried out.

GE-2506 Japan MEXT

Bactericidal Zeolite Filter Materials for Water Purification

Selected zinc-modified zeolites for real-world use; submitted a patent application and published 21 peer-reviewed articles.

Completed in October 2025

TJ-2782 UK MoD / US DoD (CTR)

Supporting Tajikistan's Implementation of the Biological Weapons Convention

Supported adoption of a governmental decree empowering Tajikistan's CBRN Safety and Security Agency.

PR-181 US DoS (ISN/ECC)

Procurement and Installation of Scanning Equipment, Georgia

Completed preparatory and procurement work before the project was suspended.

PR-148 Health Security Partners

Strengthening Biosafety and Biosecurity Best Practices

Delivered in-person training in Tajikistan and Kyrgyzstan for laboratory and IT professionals.

GE-2776 Japan MEXT

Enhancing Thermoelectric Performance of Cobalt-Based Oxide Materials

Achieved efficiency gains in thermoelectric materials; produced three peer-reviewed publications.

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