



To advance global peace and prosperity through cooperative Chemical, Biological, Radiological, and Nuclear (CBRN) risk mitigation by supporting civilian science and technology partnerships and collaboration that address global security threats and advance non-proliferation



2013

ANNUAL REPORT

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STATEMENT FROM THE CHAIR OF THE STCU GOVERNING BOARD



*Eddie Maier,
Chairman of the STCU
Governing Board*

Over more than one decade, the STCU has contributed significantly to security in the region by engaging prominent scientists and engineers in peaceful activities. Canada, who decided last year to leave the Center, was one of the key players for this success story. On the behalf of the Governing Board, I would like to thank Canada for its leadership in the transformation of the Center into the modern, light and flexible structure that we have today.

During the last year, a new Mission and Vision of the Center has been approved by all the Parties. The STCU will remain on the forefront of international efforts to engage scientists with weapons related or dual - use knowledge and

their institutes in research and development activities advancing global peace and prosperity, based on closer partnership between the scientific communities from all the Parties.

It was also agreed that this partnership can nowadays expand beyond the traditional borders of the STCU. The Center can now engage in partner projects with public or private entities in numerous countries, expanding thus the commercialization potential of the activities.

The regular project funding has gradually evolved. Now most of the STCU projects are financed on a co-funding basis strengthening thereby the ownership of the work at the institutes. Half of the resources per project are now coming from Academies of Science of the STCU Countries, and we are investigating together the possibilities to open the co-funding mechanisms to other public entities from the Partner Countries.

The work of STCU has evolved during the years addressing new challenges both from a security and scientific point of view covering many areas but in particular the biotechnological and chemical sectors. The on-going work at the Ukrainian Anti-plague Station is an example of this extension of scope (the project started in Simferopol had to be redirected towards another institute in Ukraine). The Nuclear Forensics Initiative is yet another example of successful multilateral co-

operation inside the STCU framework combining support to facilities and the launch of research projects.

During the year the work for regions outside the STCU partner countries has continued to grow and number of organisations have asked for participation in partner projects. This demonstrates the added value of STCU which is perceived in many science and technology institutions. The project to contribute to the nuclear and environmental remediation after the accident at the Fukushima Dai'ichi nuclear power complex is a good example of this evolution. This activity around Fukushima has been implemented in cooperation with the ISTC and is an example of the synergy created with the work of the centre in Moscow.

The synergies between the two organizations are expected to grow to bring efficiency gains in the work of both Science Centres, in a period when the financial situations requires additional rationalization of the cost of operation of both Centres

Budgetary constraints have led to reduction in the participation of the funding Parties and has obliged the STCU management to reduce staff. Over the past months several important collaborators have left the centre. Michael Einik and his Deputies Michel Zayet and Vic Korsun have been instrumental in the further development of the Centre, in its new functions and in the changes brought to the secretariat to face the new budgetary reality. I would like on behalf of all STCU Parties to thank them for their work, their efforts and enthusiasm they have demonstrated over the years they worked at the Centre's service. I would also take this opportunity to thank Curtis Bjelajac for having accepted to take over the responsibility of Executive Director of the STCU and send all my best wishes of success in his new duties.

The situation in the STCU host country, Ukraine,

and in particular the Crimea crisis, has affected several projects managed by the Centre. As mentioned already the EU project on biosecurity and biosafety which was located in Simferopol has been relocated outside Crimea. Several other projects in Crimea may be closed soon by the funding parties. It is hoped that the situation will come back to normal in Ukraine and that the activities of the Centre will remain unaffected in the very near future.

Recently, the EU adopted a new Multiannual Financial Framework (MFF) 2014-2020. This MMF guarantees that the Instrument contributing to Stability and Peace will continue to support the STCU and ISTC. This is good news for the centres.

Last but not least, I would like to thank the representatives from all the STCU parties for their valuable contribution to the work of the various Governing bodies of the Centre.

The STCU secretariat under the leadership of Michael and now BJ has continued to prepare and execute the decisions made by the Governing Board in an efficient manner. I would like to thank the staff, especially those working in the branch offices, for all their strenuous efforts made during the past year.

STATEMENT FROM THE STCU EXECUTIVE DIRECTOR



Curtis "B.J." Bjelajac
Executive Director

It is a tremendous honor for me that STCU's 37th Governing Board has approved my appointment as STCU's sixth Executive Director. I would especially like to thank Ambassador M. Michael Einik. The leadership and hard work displayed during his tenure have spearheaded STCU's transformation. Ambassador Einik's efforts are encapsulated in the new Mission and Vision Statement, approved by the STCU Governing Board. On behalf of all staff, I wish him and his wife the best of luck in all their future endeavors.

Those of you who have worked with STCU over the last decade and a half will know that – although this is a new face making a statement as Executive Director – the face belongs to an "old hand": I have had the good fortune to serve as STCU Chief Financial Officer for almost fifteen years. During that time, I have had the pleasure of working with four different Executive Directors, as well as many highly capable Board

members. All have taught me valuable lessons in leading this unique organization; and I look forward to applying those lessons to the challenges ahead. My years of experience – working shoulder to shoulder with STCU staff – has me convinced that our team has the professionalism and confidence to implement the new Missions and Vision, as laid out by the Governing Board.

The new STCU Vision is as follows:

To advance global peace and prosperity through cooperative Chemical, Biological, Radiological, and Nuclear (CBRN) risk mitigation by supporting civilian science and technology partnerships and collaboration that address global security threats and advance non-proliferation.

The Governing Board has also approved new mission statements, which lay out how we at STCU will achieve this Vision:

- To address the global security threat of the proliferation of WMD-applicable chemical, biological, radiological and nuclear (CBRN) knowledge and materials;
- To support the integration of scientists with WMD applicable knowledge into global scientific and economic communities through national, regional, and international research collaboration;
- To develop and sustain a culture of nonproliferation and CBRN security awareness and responsibility through education, mentorship, and training;
- To promote international best practices and

security culture to mitigate CBRN security threats.

The new Vision and Mission statements maintain the STCU's critical CBRN non-proliferation objectives, while shifting the focus somewhat. This shift in focus is directed at making positive changes in mitigating CBRN threats not only at the regional level, but also the international level. Since its inception, STCU has focused its efforts on former Soviet Union countries: more specifically, on Azerbaijan, Georgia, Moldova, Ukraine, and Uzbekistan. With the expanded international focus mandated by the STCU Governing Board, STCU is looking to branch out into regions beyond these countries.

An example of this branching out was launched in 2013, with the STCU's participation in consortia that will implement three projects funded by CBRN Centres of Excellence (a European Union initiative). The three projects have a global focus; with STCU providing services in both the former Soviet Union and other regions, such as south-east Europe.

A further example of the shift to a more international focus is the Governing Board's recent approval of revised partner guidelines. This will allow organizations from outside the United States, European Union, Azerbaijan, Georgia, Moldova, and Ukraine to become STCU partners. In 2014, STCU's challenge will be to leverage this expanded market into new partner projects. We are already seeing interest from government and non-government organizations from countries such as South Korea, Switzerland, Australia, and others; these countries are interested in working with the Center, to build links with the many talented institutes and scientists that STCU has forged strong relationships with in the past 18 years.

A further example where the STCU is working in an ever-expanding international arena is our relationship with Japanese partners. STCU maintains an active role in the ongoing work to utilize the knowledge of Ukrainian experts, with experience from the Chornobyl nuclear accident, to assist with the nuclear and environmental clean-up of the accident at the Fukushima Dai'chi nuclear

power complex. On June 21, 2013, the 36th Governing Board approved three projects equally co-funded by the Global Initiatives in Proliferation Prevention of the U.S. Department of Energy (\$251,680); and the European Union (€194,438). This was in response to the Fukushima call for proposals jointly managed by STCU and its sister organization, the International Science and Technology Center in Moscow. The three projects focus on a variety of issues at the Fukushima Dai'chi site, including: volume reduction of radioactive waste; methodology for long-term radiation monitoring; and the monitoring of radioactive pollution of forest ecosystems.

Finally, on a sadder note, I will end by drawing attention to the fact that on November 6, 2013, the Government of Canada withdrew from the Agreement to Establish STCU, ending Canada's formal participation in the Center's activities. Canada's contribution began from STCU's inception, immediately after the emergence of Ukraine as an independent state. I would like to take this opportunity, on behalf of all those that have been associated with the Center, to thank the Government of Canada for its unwavering commitment to the STCU; and to thank those Canadian professionals who have worked so hard to ensure that the STCU is the success that it is today. I have no doubt that the strong bonds developed over these many years with our Canadian colleagues will lead to continued cooperation in the future.

TRANSFORMATION: NEW VISION AND MISSION

Recognizing that the global security environment is constantly evolving, but also recognizing that nonproliferation of WMD expertise from the former Soviet Union remains a vital component of this evolution, the STCU Governing Board at its 37th Meeting in Baku, Azerbaijan approved a new vision and mission statements that move STCU to its next phase as an intergovernmental organization dedicated to making a better and safer world. The cornerstone of this next era shall be equal cooperative partnership — politically and financially — among all STCU current and future members in STCU activities, i.e., all members joining forces in a combined, multilateral S&T effort focusing on contemporary, sensitive, global CBRN concerns.

The aim, therefore, would be to evolve the STCU into a more flexible, intergovernmental tool that

is useful to the constantly evolving needs of the STCU Parties - a platform for multilateral, cooperative, science-based partnerships focused on the important, but sensitive, issues of today's security environment. This transition will now be guided by a new vision and mission statements for STCU that, simply and clearly, directs STCU and its participants, staff, and stakeholders towards a new strategic direction.

Since 1995, the STCU has made significant progress toward the objectives defined in its 1993 Establishing Agreement:

- STCU is established in five former Soviet states and has engaged over 10,000 former WMD and delivery system S&T experts in collaborative, non-weapons research with peers from Canada, Europe, and the United States;
- STCU supplemental activities have helped to integrate these former Soviet military scientists into international S&T communities;
- STCU helped stabilize the financial situations of these individual scientists, focusing their talents on solving problems of national, regional, and international interest; and
- STCU has contributed to the development of a culture of responsible nonproliferation norms, science excellence, and international stan-





dards within this formerly isolated community of Soviet military scientists.

With a new vision and mission statements, the STCU shall be a catalyst for creating multilateral cooperative actions and equal partnerships which apply ex-military researchers, technicians, and similar specialists to the contemporary prob-

lems that pose security and stability risks to the STCU membership, that are politically sensitive so as to require close intergovernmental involvement, and that are in need of S&T solutions.

STCU VISION

To advance global peace and prosperity through cooperative Chemical, Biological, Radiological, and Nuclear (CBRN) risk mitigation by supporting civilian science and technology partnerships and collaboration that address global security threats and advance non-proliferation.

STCU MISSION

- To address the global security threat of the proliferation of WMD-applicable chemical, biological, radiological and nuclear (CBRN) knowledge and materials;
- To support the integration of scientists with WMD applicable knowledge into global scientific and economic communities through national, regional, and international research collaboration;
- To develop and sustain a culture of nonproliferation and CBRN security awareness and responsibility through education, mentorship, and training;
- To promote international best practices and security culture to mitigate CBRN security threats.

HIGHLIGHTS AND ACCOMPLISHMENTS

A NUCLEAR FORENSICS TRAINING EVENT, CONDUCTED IN KYIV, JUNE 3-7, 2013

From June 3 to June 7, 2013, the first training course for nuclear forensics experts from GUAM countries was held at the Kyiv Institute for Nuclear Research (KINR).

Approximately twenty nuclear forensics experts from Ukraine, Armenia, Azerbaijan, Georgia, and Moldova participated. They were trained in how to perform measurements of the characteristics of different types of nuclear materials and radioactive sources, using portable equipment for detection of radioactive and nuclear materials, during smuggling intercepts.

Experts from the Ukrainian Nuclear Forensics Laboratory (NFL) and trainers from the George Kusmycz Training Centre (in KINR) delivered lectures and held practical exercises, using real nuclear



materials and radioactive substances. The course was jointly organized by STCU and KINR in cooperation with ISTC, and with the financial assistance of the U.S. Department of Energy/ National Nuclear Security Administration's Global Initiatives for Proliferation Prevention (GIPP) Program.

STCU PARTICIPATED IN THE 16TH ANNUAL CONFERENCE OF THE EUROPEAN BIOSAFETY ASSOCIATION, JUNE 17-20, 2013

From 17 to 20 June, 2013, a delegation of Ukrainian bio-experts, supported by STCU, participated in the 16th Annual Conference of the European Biosafety Association 'Biosafety in a Changing World'; held in Basel, Switzerland.

The UAPS (Ukrainian Anti-Plague Station) participants produced a report, 'Access Control Systems at the Ukrainian Anti-Plague Station', summarising the results of STCU Project number 9800 'Ukrainian Anti-Plague Station – Security of the Existing Facility, to Improve Biosecurity Levels'. To improve bio-security at UAPS, modern video surveillance and access-control systems have been installed in the facility; in accordance with the recommendations of European bio-security experts, within the framework



of Project 9800. Today the access control system at UAPS matches up-to-date national and international requirements; this was confirmed by international bio-experts during a poster presentation and subsequent discussions.



STCU ATTENDS THE 50TH INTERNATIONAL PARIS AIR SHOW, LE BOURGET, JUNE 17-19, 2013

From 17 to 19 June, 2013, STCU participated in the world's leading aircraft and space industry event at Le Bourget; sponsoring a delegation of thirteen scientists and engineers from Azerbaijan, Georgia, and Ukraine in their attempts to develop collaborative partnerships.

The show, which drives development in the sector and is a key networking and business event for industry decision-makers, was an ideal place both to view recent aviation and aerospace innovations and to develop links.

STCU organized numerous meetings to foster partnerships between its participants and global leaders in aerospace – such as CNES, DLR,



EADS (which comprises Airbus, Astrium, Casidian and Eurocopter), Finmeccanica, MICROTURBO (SAFRAN), THALES, and ISIS (Innovative Solutions In Space BV).

STCU EXECUTIVE DIRECTOR MEETS THE VICE PRIME MINISTER OF UKRAINE, JULY 1, 2013

On July 1st, 2013, Ambassador Michael Einik (STCU Executive Director) met Vice Prime Minister of Ukraine Kostyantyn Gryshchenko, to discuss STCU's current activities and future priorities.

They discussed STCU's major projects, and its successes over the past years.

Mr. Einik shared with the Vice Prime Minister his vision of the Center's transformative potential; based on STCU's vision of creating a regional hub in Science and Technology (S&T) and Research and Development (R&D).

STCU was acknowledged to have made a significant contribution to advancing science in



Ukraine. Both parties agreed to continue co-operating on projects of mutual interest.

HIGHLIGHTS AND ACCOMPLISHMENTS

CBRN COE PROJECT 31, PRELIMINARY MEETING IN KYIV, OCTOBER 2, 2013

STCU organized and hosted, in Kyiv, a preliminary meeting of the European Union Chemical, Biological, Radiological and Nuclear (CBRN) Centers of Excellence (CoE), Project 31.

This project aims to establish a network of universities and institutes dedicated to building up specialized training materials for professional scientists and students, in order to raise their awareness of possible dual-use of chemicals.

The meeting was the first occasion for the network's regional stakeholders from Georgia, Moldova, Tajikistan, Ukraine, and Uzbekistan to consider the full scope of their own environments, against the background of the project goals and tentative implementation deadlines.



Project 31 Consortium Lead Partner from ENEA, Italy, outlined the main meeting objectives: to consolidate and expand the region's network, in order to achieve greatest efficiency in reaching project goals.

MEDICAL BIODEFENCE CONFERENCE, OCTOBER 22-25, 2013

Between 22 and 25 October, 2013, the Medical Biodefence Conference 2013 was held in Munich, Germany at the Bundeswehr Institute of Microbiology. The STCU-supported delegation consisted of specialists of the Ukrainian Anti-Plague Station (UAPS) of the Ministry of Health of Ukraine: Dr Liliya Zinich, Mrs Nadiya Pidchenko, and STCU's Senior Bio-Specialist Dr Vlada Pashynska.

Besides the plenary sessions – which addressed more general aspects of bio-defence, including a historical brief of the Soviet biological weapons program – the Conference 2013 scientific program also focused on topics of special interest, such as: Middle East Respiratory Syndrome, recent plague investigations in Madagascar and Mongolia; and issues around genomics and metagenomics issues. A number of collaborative



contacts between UAPS/STCU specialists and foreign colleagues were established, with the purpose of follow-up training of UAPS staff within the framework of the STCU project #9800 'Biosafety and Biosecurity Improvement at the Ukrainian Anti-Plague Station in Simferopol'.



STCU ORGANIZED A PROMOTION MISSION TO THE UNITED STATES, NOVEMBER 2-14, 2013

From November 2 to 14, 2013, STCU organized a mission to the U.S. to promote STCU's Partner Program; and to bring attention to engineering, technology and consulting services offered by engineers and scientists in Ukraine (and other CIS countries), through STCU.

STCU's Deputy Executive Director, Vic Korsun, met with the Ukrainian Consuls in San Francisco and in Chicago. They discussed how STCU R&D projects in partnership with American businesses, universities and government organizations are developing scientific expertise and supporting start-up companies in Ukraine.



37TH MEETING OF THE STCU GOVERNING BOARD; BAKU, AZERBAIJAN, DECEMBER 12-13, 2013

The 37th meeting of the Governing Board of the Science and Technology Center in Ukraine convened on 12 and 13 December, 2013.

The session was hosted by and held at the Academy of Science of Azerbaijan, in Baku. Officials from the European Union, Ukraine, and the USA participated in the meeting. Also present were government officials and other representatives from the U.S. Department of Energy's National Nuclear Security Administration, the U.S. Department of State, and the STCU Secretariat.

The Board approved \$503,510 USD and 778,573 EUR in science research projects; and confirmed new Partner Project activities since the 36th STCU Board of Governors in the amount of \$4,005,347 USD and 332,285 EUR.



Within STCU's Transformation Agenda, the Board also reviewed the Center's new Vision and Mission Statements; with the final text approved in January 2014.

STCU BEGINS COOPERATION WITH UNODA

STCU COOPERATES WITH THE UNITED NATIONS OFFICE FOR DISARMAMENT AFFAIRS ON RESOLUTION 1540

STCU-UNODA ROUNDTABLE ON WMD AND DUAL-USE EXPERTISE/KNOWLEDGE REDIREC- TION AND PREVENTION

17-18 April, 2013, Kyiv, Ukraine

Organized under the joint auspices of the United Nations Office for Disarmament Affairs (UNODA) and STCU, a roundtable was organized in Kyiv on April 17-18, 2013, and was a 'first cut' attempt at exploring some of the implications for building a security culture in countries which are members of the STCU Agreement; through new and effective means of collaboration.

The Kyiv roundtable itself placed an emphasis on effective practices within governments, international organizations and WMD experts; aimed at facilitating experience-exchange, and development of an effective platform for collaboration. This platform can be incrementally expanded, from being regional to international in scope. An important implication of this emphasis is that it requires a 'joint-effort approach'. In this instance, UNODA and STCU collaboration is very effective: UNODA promotes practices to prevent non-state actors from gaining access to nuclear, chemical and biological weapons and their means of delivery, as mandated by UN Resolution 1540; while STCU allows a mechanism to successfully develop and implement these practices. Events of the past decade have greatly stressed the need for non-proliferation mechanisms. These mechanisms require significant improvements, at the level of both national governments and international organizations. To name just a few of the emerging security concerns

that call for these kinds of multilateral S&T solutions, we can point to: smuggling of illicit nuclear material; radiation emergency risks; civil adaptation and emergency preparedness for climate change and other environmental risks; and security against intentional and unintentional biological and chemical threats.

Both organizations have extensive experience in WMD expertise; this experience can be shared among the roundtable participants. But, as CBRN threats continue to arise, it is also important to constantly re-evaluate where we stand, and to re-formulate our goals. STCU continues to evolve in collaboration with the G-8's Global Partnership program and Closed Nuclear City program; and has expanded into many new areas, such as bio- and nuclear forensics. These fields are subject to evolution and transformation, and partnership with UNODA is a key part of how the STCU manages this change.

Representatives from STCU Recipient countries have highlighted that more efforts must be undertaken to interdict WMD transfers; improve nuclear security; and meet requirements on controlling technology transfer. To make such improvements, an ongoing dialogue between governments, academic and educational entities and centers of excellence will help to raise awareness of CBRN threats, and facilitate the development of partnership mechanisms and linkages.

The feedback from the Kyiv roundtable suggests that such collaboration will enable governments, as well as educational and scientific entities, to take

advantage of the opportunities offered by joint UNODA and STCU activity. The various strands of the roundtable reflect all countries' interests in pursuing these opportunities. It is clear that governments have a significant role in the process, and UNODA and STCU are keen to delineate this role in the context of non-proliferation strategy and collaboration. Different strategies to pursue these objectives; pitfalls and benefits of such collaboration; the nature and implications of these strategies in our region – these are only some of the issues which need to be explored and developed.

STCU-UNODA GUAM ROUNDTABLE ON BUILDING SECURITY CULTURE

26-27 November, 2013, Baku, Azerbaijan

The second roundtable, held on November 26-27, 2013 in Baku, Azerbaijan, on 'Building Global Security Culture' was jointly organized by the STCU and UNODA. This was the second event held by the STCU and UNODA, and was aimed at enhancing prospects for the strengthening of security culture within GUAM countries. This roundtable brought together experts and high-level officials from across the region.

The main focus of the 2nd roundtable was to examine current CBRN security challenges and identify a common understanding of risks and prevention actions within the GUAM Region; as well as to develop comprehensive approaches to CBRN security culture through experts' discussions with international and regional organizations. A good addition to the Roundtable was a practical exercise for developing nuclear security culture, as suggested by Igor Khripunov. Professor Khripunov, a leading expert in CBRN security, noted that his comprehensive approach focuses on human

performance in several key 1540-related functional areas: security of relevant materials and associated facilities; strategic trade and trafficking control; cyber security; and knowledge management. These key functional areas have common roots across the four 'stovepipes' – chemical, biological, radiological, and nuclear (CBRN); but also unique features.

It is also clear that the widespread availability of relevant expertise, in an era of mass communication and globalization, has become another potential threat to global security. Therefore, under its mandate, the STCU is committed to tackling this expertise issue – by assisting with, coordinating and managing knowledge redirection programs in the GUAM Region; while closely cooperating with other international and regional partners such as UNODA, IAEA, OSCE and others.

An effective strategy to mitigate CBRN risks of criminal, accidental or natural origin requires a very high level of co-operation and co-ordination both between different national agencies as well as among countries and international and regional organizations. Any lack of harmonization of national preparedness and fragmentation of responsibilities within the regional or international network reduces the effectiveness of prevention strategies and can cause delay in response during a crisis situation.

The further implementation of CBRN security initiatives developed by the STCU, along with UNODA and other parties, will enhance international security.



STCU EXPANDS PARTNER PROGRAM

ORGANIZATIONS OUTSIDE OF THE USA AND EU NOW ALLOWED TO WORK THROUGH THE STCU

At the STCU 37th Governing Board Meeting held in Baku, Azerbaijan on December 13, 2013, the STCU Governing Board expanded the STCU Partner Program and allowed new Partners from outside of the United States and European Union to finance Partner Projects through the STCU.

Over the years, organizations from all over the world, including but not limited to Norway, Switzerland, South Korea, and Japan, have expressed an interest in working with the many talented scientists and institutes that work with the STCU. However, until December 13, 2013, these organizations had no mechanism to join the STCU as a partner, as their host countries were not members of the STCU Agreement. Thus, 2014 ushers in a new year of opportunities for the STCU partner program, and the STCU secretariat will work hard to attract part-

ners from outside of the USA and EU to capitalize on the many advantages of working through the STCU.

Since its start in 1997, the STCU Partner Program has worked with thirty-nine (39) Governmental Partners and two hundred nineteen (219) Non-Governmental Partners who have invested over \$113M USD into S&T projects in Azerbaijan, Georgia, Moldova, Ukraine, and Uzbekistan. The STCU Governing Board hopes to build on this success with its decision to open the partner program up to additional organizations.

For those organizations that are not aware of the STCU Partner Program, please see a short description of the STCU Partner Program on page 19. More detailed information can always be found on the STCU website at www.stcu.int.

STCU Announces its Partner Expansion Campaign

Partners originating from any country outside of STCU Party countries may now join STCU Expanded Partner Program

Since its start in 1997 STCU PP has brought 39 Governmental and 219 Non-Governmental Partners bringing together over \$113 million USD

STCU is ideally positioned to match an untapped supply of S&T expertise to meet your commercial, industrial and government needs

Join STCU Partner Program

The graphic features a world map background, a vertical column of national flags (including Turkey, Canada, EU, UK, Azerbaijan, Sweden, Ukraine, and USA), and a circular logo with arrows.



INFORMATION ABOUT THE STCU PARTNER PROGRAM

What is a Partner Project at STCU? It's a technical or scientific R&D project that is funded by a Partner, such as an industrial company, university or government agency at an institute or university in the countries that STCU works in, namely Azerbaijan, Georgia, Moldova, and Ukraine.

What are the advantages of running an R&D project through STCU? Because it is often difficult and costly to establish operations in Azerbaijan, Georgia, Moldova, and Ukraine, the STCU can mitigate these issues by offering the following benefits:

- Direct payments (grants) to researchers' personal bank accounts. Partner organizations realize a 30-50% tax savings for any R&D project that STCU manages, as all payments to scientists are tax-free.
- Customs clearance is provided by the STCU, with any imported items free of duties and VAT taxes.
- Host government concurrence and security review.
- Professional project management, including technical and financial monitoring.
- Transparent, international standards utilized to track the finances of all projects. The STCU is audited annually by an international audit firm, and all

audited financial statements can be found on the STCU website at: www.stcu.int/documents/stcu_inf/reports/audit/2013/

- STCU's internal technical project staff tracks the progress, schedule, and milestones of all projects, and can work closely with the partner's technical staff to ensure that the project meets all requirements.
- The partner has complete control and freedom to work directly with the institutes or universities working on the project.
- The STCU has in-depth knowledge of the R&D communities within Azerbaijan, Georgia, Moldova, and Ukraine and their capabilities, and can provide match-making assistance to assure that all the Partner's requirements are met.
- All partner's investments through the STCU support peaceful, civilian research.



PROJECT ACTIVITIES

ESTABLISHING A NUCLEAR SAFETY CO-OPERATION INSTRUMENT (NSCI)

Funding countries:   Funding amount: €579,220

The 1986 Chernobyl accident, affected a large area surrounding the Nuclear Power Plant (NPP). In the most affected zone, the Chernobyl Exclusion Zone, no commercial activity is allowed; and this zone is still not suitable for human habitation. But radioactive contamination of areas adjacent to the Exclusion Zone has resulted in wider ecological problems, and affected the health of people living and working in these areas. In addition to this, socio-economic conditions in these districts have worsened as a consequence of the closure of the Chernobyl NPP.

In Council Regulation (EURATOM) No 300/2007 of 19 February 2007, establishing an Nuclear Safety Co-operation Instrument (NSCI), one of the purposes of the Instrument is stipulated as:

The establishment of effective arrangements for the prevention of accidents with radiological consequences should they occur, and for emergency-planning, preparedness and response, civil

protection and rehabilitation measures.

The European Parliament amended Item 19 08 01 03 'European Neighbourhood and Partnership financial cooperation with Eastern Europe' as follows:

This appropriation is also intended to fund research on human health and the sustainable development of Ukraine and Belarus, especially as regards improving health conditions in areas affected by the Chernobyl disaster.

The TINSOC programme for 2011 envisages pilot activities to support Ukraine in addressing health and ecological problems which are related to Chernobyl, in Ivankiv District. After the STCU-EU Contribution Agreement was signed in late 2012, the STCU Project #9805 on 'Development, training and coordination of health-related projects for protection of people living around the Chernobyl Exclusion Zone' was launched with 579,220 EUR total funding; under the management of the European Commission, DG DEVCO.

The above-mentioned sum is a part of a total 4 million EUR investment which includes support to small farms; construction of greenhouses; creation of a facility for incineration of polluted wood from the exclusion zone; as well as further research on the Chernobyl Nuclear Power Plant and the land around it. The project foresees an investment in Ivankiv District Hospital, to provide it with the



equipment necessary for: measuring the level of active materials in the human body and in food; monitoring the level of radioactive pollution among the population; preventing diseases in mothers and children via the medical monitoring of pregnancy; and creating a consulting center to inform the population about healthy nutrition.



A ceremony to mark the launch of the project was held on April 26, 2013; this was attended by Members of European Parliament namely Mrs. Corine Lepage and Mrs. Michèle Rivasi, Head of the EU Delegation to Ukraine, EU Ambassador Jan Tombinski, and Executive Director of the STCU, Ambassador M. Michael Einik.

The overall objectives of the project are stated to be:

- To support healthcare measures targeted at the population of Ivankiv District which is afflicted by the radioactive outfall of the accident at the Chernobyl NPP, improving their general quality of life.
- To achieve a reduction in the collective radioactivity dose in the population of Ivankiv District.

The following main activities are scheduled during the three years of project fulfilment:

- Carrying out up-to-date mapping of radioactive contamination in the District.
- Developing and implementing a programme for healthy, preventive and equilibrated nutrition for the population of the District.
- Creating a news and information centre for the District's population.
- Developing and starting programmes for the sanitary protection of mothers and children.

A project will be conducted to measure and register the amount of radionuclide Cs-137 in the bodies of all children aged between 1 and 18

years (5,500 – 6,000 people), all pregnant women (400 – 500), all nursing mothers (400 – 500) and all infants aged under 1 year (400 – 500) living in Ivankiv District.

The population of the Ivankiv District lacks iodine (vital to healthy body functions), due to the characteristics of local soils. Therefore, within the scope of this project, all children aged 1 to 18 years will receive dietary supplements, including algae, which will help reduce the incidence of endocrine diseases.

For all individuals, radionuclides in the body and residual iodine in the urine will be measured; and their thyroids checked by ultrasound.

Another initiative will be to develop measures to prevent illness in expectant and nursing mothers and children, in areas contaminated with radioactive elements. The project provides for orally-ingested health supplements; and regular medical checks, including diagnosis of radiation-related illness through laboratory and ultrasound technologies.

A third initiative is to create a medical resource centre, at the Central Hospital in Ivankiv District. This centre will focus on: hygiene and nutrition for the local population; best use of land, depending on radiation levels; and medical records for the local population.

PROJECT ACTIVITIES

TARGETED RESEARCH & DEVELOPMENT INITIATIVES ACTIVITY

The Targeted R&D Initiatives program completed cycles with Ukraine, Azerbaijan, Georgia, and Moldova. All together for 2013, thirty-one (31) Targeted Initiative Projects (totaling approximately \$2.49 million USD equiv.) were approved and co-funded (50%-50%) by the STCU and each of the Recipient Parties. For the STCU half of the Targeted Initiatives project co-funding (\$1.24 million USD equiv: \$328,533 USD plus 673,578 EUR), these thirty-one (31) projects engaged 167 former weapon scientists, along with 105 non-weapon scientists.

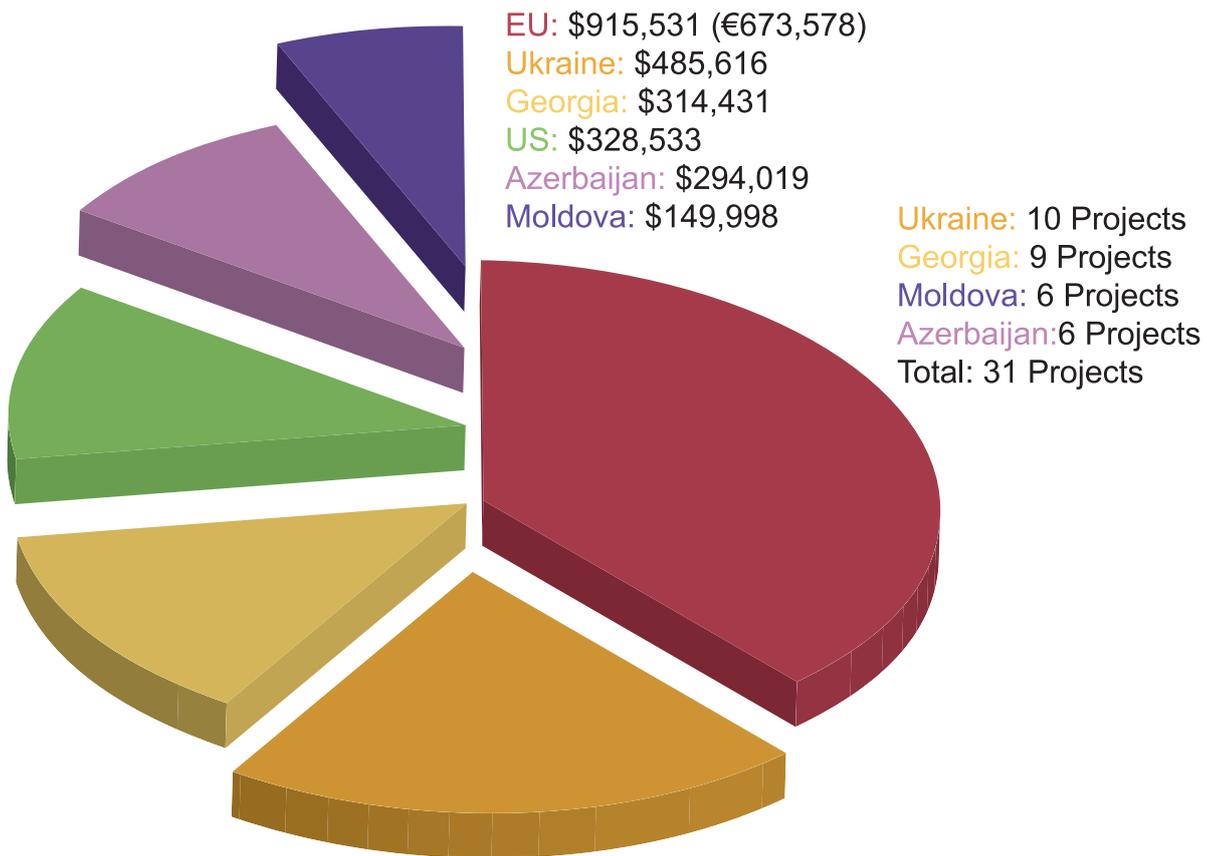
- For the ninth completed STCU-Ukraine Targeted Initiative cycle, ten (10) Targeted R&D Initiative projects were approved. The total amount of STCU funding for these ten (10) projects was \$100,000 USD plus 283,706 EUR, with \$485,616 USD in matching funds provided by the National Academy of Sciences of Ukraine.
- For the sixth completed STCU-Azerbaijan Targeted Initiative cycle, six (6) Targeted R&D Initiative projects were approved. The total amount of STCU funding for these six (6) projects was \$123,535 USD plus 125,430 EUR, with \$294,019 USD in matching funds from the Azerbaijan National Academy of Sciences.
- For the seventh STCU-Georgian Targeted

Initiative Cycle, nine (9) Targeted R&D Initiative projects were approved. The total amount of STCU funding for these nine (9) projects was \$104,998 USD + 154,085 EUR, with \$314,431 USD in matching funds provided by the Shota Rustaveli National Science Foundation.

- For the fifth STCU-Moldovan Targeted Initiative cycle, six (6) Targeted R&D Initiative projects were approved. The total amount of STCU funding for these six (6) projects was 110,357 EUR, and \$149,998 USD in matching funds from the Academy of Sciences of Moldova.



FUNDING SOURCES FOR NEW 2013 TARGETED INITIATIVES PROJECTS



SUCCESS STORIES

STCU PROJECT #5402. OPTICAL, PHOTOELECTRICAL AND STRUCTURAL ANALYSIS OF $\text{Cu}_2\text{ZnSn}(\text{Se}_{1-x}\text{S}_x)_4$ AND $\text{W}_x\text{Mo}_{1-x}\text{S}_2$ FOR PHOTOVOLTAIC APPLICATIONS

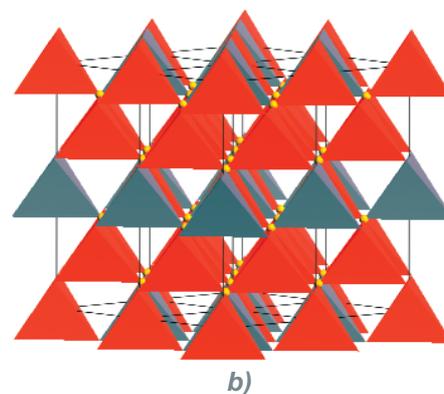
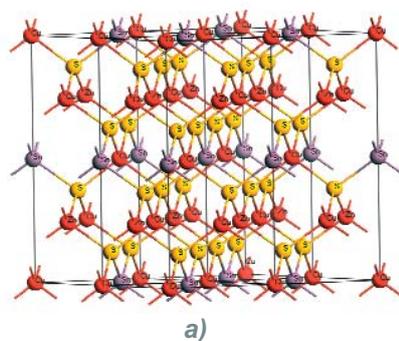
Funding countries:   Funding amount: \$49,994

One of the major problems in Moldova is a lack of conventional energy sources. Nearly 98% of the total energy consumption in the Republic of Moldova comes from imported fuel. This challenge can partly be solved through the use of renewable energy, namely photovoltaic conversion of solar energy. The Republic of Moldova has a rather high solar radiation density: a 1 m² area gets up to 3.5 kWh/day. The average amount of sunny weather reaches 2,180 hours annually.

Reductions in the cost of solar cells can be achieved by employing low-cost fabrication technologies, using low cost elements – such as Cu, Zn, Sn, S, Se. This project proposes reductions in the cost of photovoltaic technologies; an important step for the development of sustainable, domestic energy sources in Moldova.

A good number of basic studies have been carried out on the bulks and single crystals of both $\text{Cu}_2\text{ZnSn}(\text{Se}_{1-x}\text{S}_x)_4$ and $\text{W}_x\text{Mo}_{1-x}\text{S}_2$ solid solu-

tions; deducing the relationship between the growth processes and physical properties of these materials. The next step for development of photovoltaic energy in the Republic of Moldova (RM) – and a step towards creating high efficiency, low cost, non-toxic, thin-film, clean photovoltaic devices – would be the development of the growth technology of CZTS (chemical substance $\text{Cu}_2\text{ZnSnS}_4$) thin films by low-cost and easy-scalable spray pyrolysis methods. A greater understanding is needed of the structural, optical, luminescent, and transport properties of $\text{Cu}_2\text{ZnSnS}_4$ thin films; as well as an understanding of the development of the growth technology of CZTS-based solar cell heterostructures; and data on the solar energy conversion efficiency of CZTS-based solar cells. This knowledge will help to understand the physics of these materials and heterostructures and give routes to designing technologies for growing structurally perfect films and devices on the basis of such knowledge.



Ball-and-Stick (a) and Polyhedron (b) presentations of the $\text{Cu}_2\text{ZnSnS}_4$ structure

STCU PROJECT #P524. CHARACTERIZATION OF IONOSPHERE WAVEGUIDE PROPAGATION, BY MONITORING HAARP HF TRANSMISSIONS IN ANTARCTICA

Funding countries:   Funding amount: \$70,000

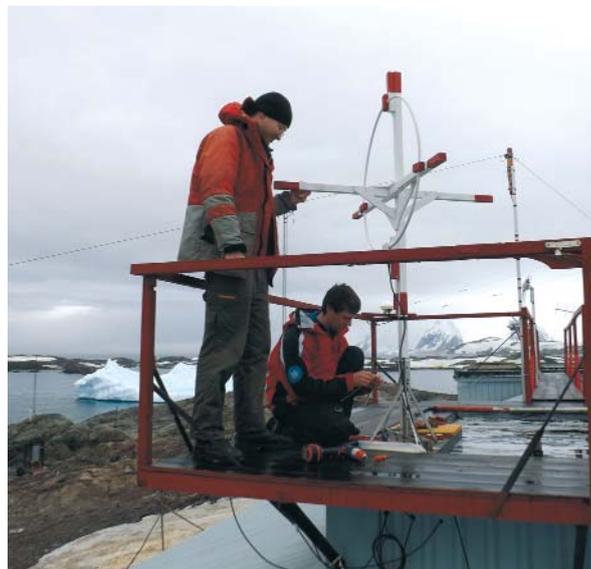
A new system for monitoring changes in the Earth's environment caused by our civilization's technological activity has been developed by the Institute of Radio Astronomy, National Academy of Sciences of Ukraine. The Project was aimed at experimentally investigating the possibility of exciting the ionospheric interlayer duct channel, using powerful radiation waves from the heaters HAARP (Alaska, USA) and EISCAT (Tromsø, Norway), as well as from HF broadcasting stations RWM (Moscow, Russia) and CHU (Ottawa, Canada).

Most attention was paid to analyzing the possibility of exciting the interlayer ionospheric waveguide, which supports super-long range HF propagation, with a small amount of attenuation. To monitor the radiation a compact-sized receiving complex was developed which is capable of measuring the signal intensity and spectral characteristics in an off-line automatic mode. Two facilities of this kind have been constructed in the course of the Project fulfillment. One of these was deployed in Ukraine in 2012 – at the low-frequency observatory managed by IRA NASU (at Martova village, Kharkiv province); while the other was installed at the Ukrainian Antarctic station 'Akademik Vernadsky', in 2013.

In addition, similar receiving complexes were involved in project-related measuring campaigns. A chain of receiving and transmitting sites made it possible to simultaneously investigate probe signal propagation along radio paths of various lengths: specifically, quasi-vertical (less than 100 km), mid-range (up to 3,000 km) and super-long-range (from 10,000 to 16,000 km).

In a number of cases signal strengthening was detected for the super-long-range radio links (Alaska-Antarctica and Northern Scandinavia-Antarctica); this effect can be regarded as a result of waveguide propagation. To explain the mechanisms of waveguide excitation, and ex-

traction of the radio wave energy from it, the effect of aspect-sensitive scattering of signals by natural and artificial field-aligned irregularities of the ionospheric plasma was considered as the basic model. A pioneering feature of the developed theoretical model is the account of regular ionospheric refraction. Aspect-sensitive contours in the ionosphere and on the Earth's surface have been calculated for all the transmitting



Mounting of the receiving HF antenna in Antarctica at the station "Akademik Vernadsky" (March, 2013).

and receiving sites, under current ionospheric conditions. As planned, a software package has been developed for the remote control of receiving complexes and visual representation of the measurement results in real-time through the internet.

The results obtained during the project fulfillment have been published in two scientific papers and reported at several international meetings in the USA, Puerto Rico, and Ukraine.

SUCCESS STORIES

STCU PROJECT #5364. GIS-BASED MODELING OF MODERN TECTONICS AND ALPINE EVOLUTION OF THE EAST-CAUCASUS/SOUTH CASPIAN GEODYNAMIC SYSTEM

Funding countries:   Funding amount: \$99,778

The aim of the project was the creation of a comprehensive and reliable picture of the structure of the geological environment and alpine evolution of the project region; based on the latest geo-systematic approaches to their reconstruction.

The project goals were to compile models of the geological environment; geo-dynamic reconstruction of events in the alpine tectonic-magmatic cycle; analysis of correlation and dependence between modern geodynamic and exogenous processes; tectonic analysis; and forecasting of local hydrocarbon potential.

The project region covers the territories of the Azerbaijan Republic, its national sector of the Caspian Sea and relevant features of neighboring countries (taking into account the region's complex geological structure).

The following outcomes, based on critical analysis and summarization of geology-geophysical data, were produced as a result of the project's implementation:

- Summary and interpretation of geology-geophysical data on the territory of Azerbaijan; conducted field studies of selected objects; final data was presented in the form of a computer database.

- Production of geology-geophysical data analysis and summary; and compared these results to existing geological maps; allowing the production of geological environmental models.

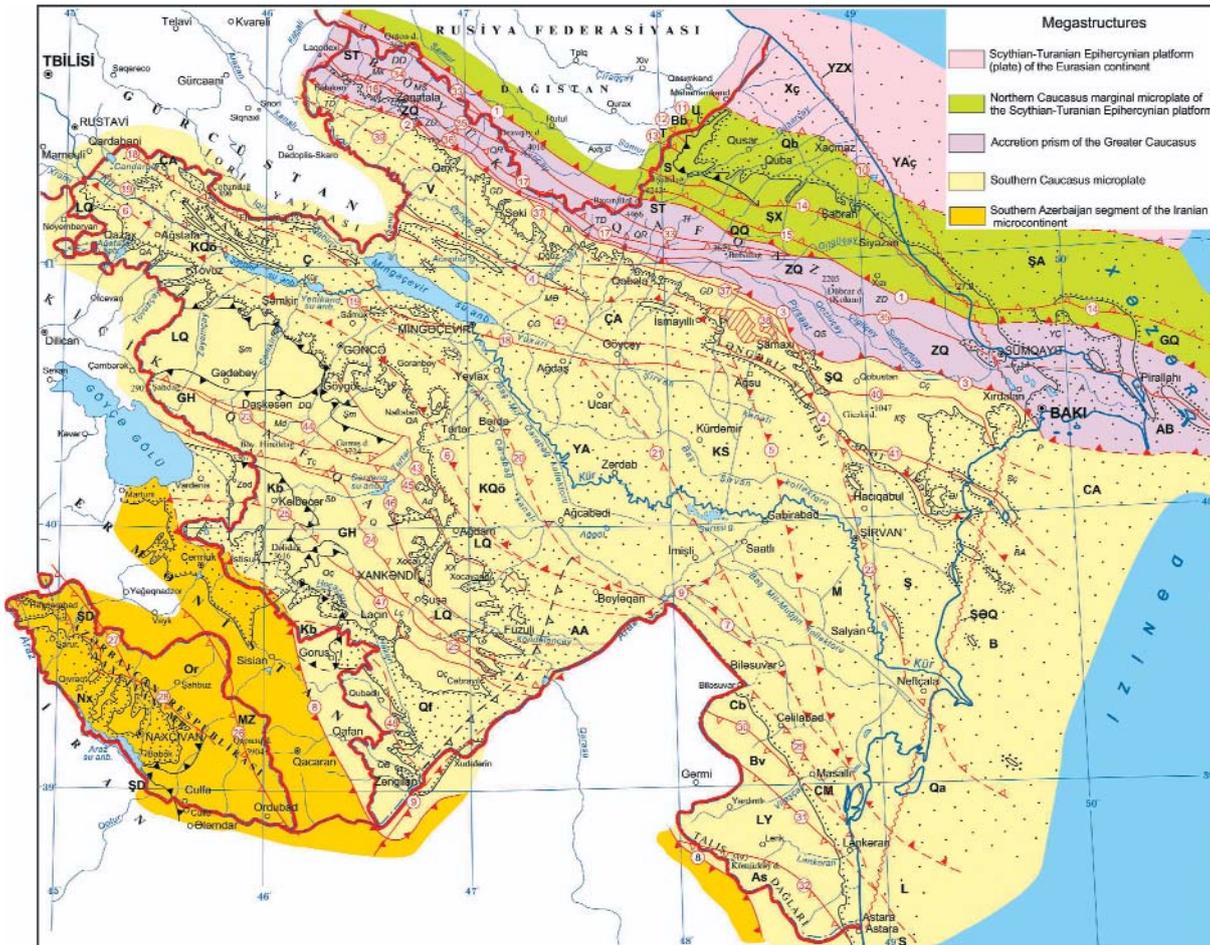
- Geology-geophysical data analysis and models were used as databases for space-time reconstruction of the project region's tectonic-sedimental evolution processes: resulting in palinspatic schemes grouped by phases and stages of alpine tectogenesis.

All project outcomes of the analysis and summary of data on tectonic and lithofacial conditions of the formation of mineral deposits (solid minerals and hydrocarbons) were presented on a 1:1000000 scale forecast-minerogenic map of Azerbaijan, on a geodynamic basis.

This tectonic map of Azerbaijan and adjoining territories will be used as an integral part of a different tectonic map of the Caucasus, jointly developed by Swiss, Russian, Azerbaijani, Georgian and Armenian specialists within the framework of a SCOPES-funded (Switzerland) international project.

Seismotectonic maps of the Azerbaijani part of the Greater Caucasus will be used by the GeoEcological Monitoring Center of the Ministry of Ecology and Natural Resources and the Republic's Center of Seismic Services (Azerbaijan National Academy of Sciences).

Taking into consideration interest expressed by different state authorities; private companies; research and education institutions, the 1:500000 scale tectonic map of Azerbaijan and its adjoining territories will be prepared for mass publication at Baku Cartographic Factory.



Borders of structure

- Tectonic borders between megazones (a-outcropping, b-buried)
- Tectonic borders between zones (a-outcropping, b-buried)
- Tectonic borders between subzones (a-outcropping, b-buried)
- Lithology-stratigraphic borders (a-outcropping, b-buried)
- Conditional borders (a-tectonic: YZX-Yalama-Zarat-Khirdalan)
- Quaternary complex and borders of its spreading
- Basgal tectonic nappe and borders

Territorial map of Azerbaijan

SUCCESS STORIES

STCU PROJECT #5800. NANO-ENCAPSULATION OF ANTI-TB DRUGS FOR TARGETED DELIVERY

Funding countries:   Funding amount: €38,516

Tuberculosis is one of the world's deadliest infectious diseases; killing 1.5 million people worldwide, each year.

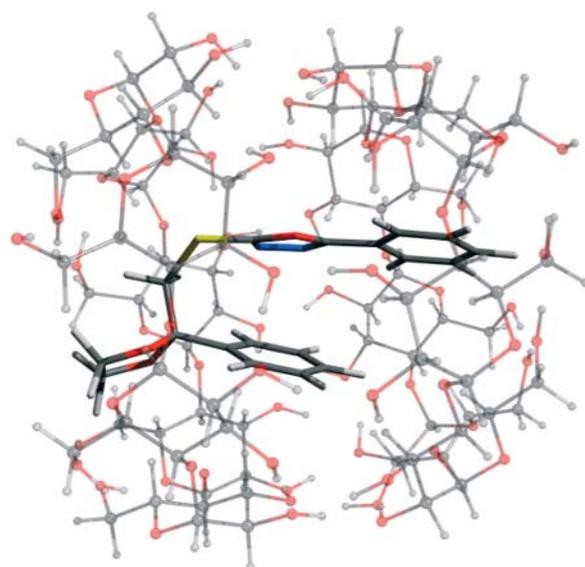
Major problems connected with tuberculosis treatment are: strong side effects of the majority of existing anti-tuberculosis drugs; long duration of treatments; high drug dosages; unpleasant organoleptic properties; and high frequency of administration. These factors very often cause, in the patient, lack of compliance with the treatment. This fact, in association with low bioavailability and insufficient enantiomeric purity of some anti-tuberculosis drugs, can lead to the development of TB in drug-resistant (DRTB), multiple drug-resistant (MDRTB), and extensively drug-resistant (XTRB) forms.

The group of scientists involved in this project proposed to obtain new, nano-encapsulated anti-tuberculosis remedies; with higher efficiency and fewer side effects than existing drugs. The project resolves existing problems by identifying new, active anti-tuberculosis substances that are encapsulated in cyclodextrins. Cyclodextrins promote the penetration of anti-tuberculosis substances into mycobacterial cells. The nano-encapsulated drugs are loaded into alginate-chitosan microparticles, which help them penetrate into macrophages infected with *M. tuberculosis*.

Preliminary results from biological tests on anti-mycobacterial activity of the obtained sub-

stances and systems have demonstrated that anti-tuberculosis efficiency of these substances change in association with different cyclodextrins. Thus, β -cyclodextrin, one of the naturally occurring cyclodextrins, seems to enhance antituberculosis activity of the associated oxadiazole derivative; while sulfobutyl ether of β -cyclodextrin does not have this influence.

This observation can be explained by the fact that sulfobutyl ether of β -cyclodextrin molecule is charged due to the presence of sulfobutyl ether groups that make it less suitable for cholesterol complexation in comparison to unsubstituted β -cyclodextrin. Thus, cholesterol complexation by cyclodextrins plays a key role in the penetration of anti-tuberculosis compounds through mycobacterial cell wall.





STCU PROJECT #P467. DEVELOPMENT OF SiGe PHOTOVOLTAIC AND OPTOELECTRONIC DEVICES

Funding countries:    Funding amount: \$490,000

The development of new technologies in radiation security and aerospace engineering requires an increase in the lifetime and stability of wide-range infrared detectors.

In optimum modes, defined in the course of investigations during this project, experimental samples of the heteroepitaxial structures $\text{Si}_{1-x}\text{Ge}_x$ ($x < 0,03$)/SiGe monocrystalline substrates Si-Ge:B were obtained.

Technological work on the creation of photovoltaic active elements on SiGe heterostructures was carried out; and their characteristics were determined.

In heteroepitaxial structures with a high concentration of electrical current carriers in upper layers, photovoltaic characteristics have been demonstrated to have an efficiency of solar energy transformation into electrical equal to 10 to 11%.

It has been demonstrated that a p-n junction fabricated on substrate $\text{Si}+0,25\text{at.}\% \text{Ge:As}$ ($\sim 10^{18} \text{cm}^{-3}$), by implantation of B ions, is characterized by in-

tensive photosensitivity maxima at 1.4 and 1.6 to $1.7 \mu\text{m}$; this shows possibilities for changing in near IR area critical wavelength values of photosensitivity maximum of p-n junctions on SiGe/p-Si-Ge structures.

An analysis of this research shows opportunities to increase the efficiency of photovoltaics and the photosensitivity of IR detectors, based on Si-Ge alloys. By increasing Ge concentration in substrates up to 10 to 15at.% and in heterostructures up to 20 to 30at.% it is possible to develop highly efficient solar elements and photosensitive detectors for near and medium ranges of IR irradiation.

Based on these project results, a joint Georgian and Ukrainian team (Sokhumi Institute of Physics and Technology and Kharkiv Institute of Physics and Technology) are ready to produce highly efficient radiation hard solar radiation elements and sensitive IR photodetectors for 1.0 to $2.0 \mu\text{m}$ wavelength areas, based on Si-Ge with low Ge content.



George Darsavelidze, Dr Guram Bokuchava, Iasha Tabatadze – Lead Scientists; Koba Kormakhidze – Engineer

FINANCIAL ACTIVITY

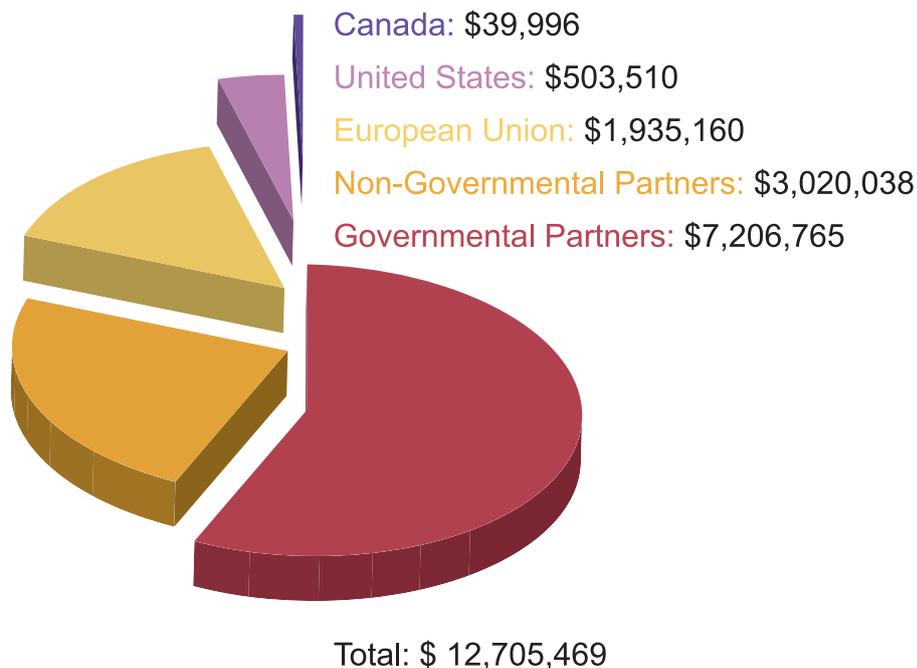
2013 saw a significant decrease in the amount of new STCU project funding compared with 2012. In 2013, the STCU Governing Board approved just over US \$12.7 million in new projects, a decrease of approximately US \$5.0 million in total new project funding compared with 2012. The slump in total new project funding in 2013 ended a resurgence in STCU funding which began in 2011 (US \$18.15 million) and continued in 2012 (US \$17.69 million). The 2013 funding was in line with the funding amounts the STCU received in years just prior to those years (2009 and 2010), when the amount of funding was US \$13.91 million and US \$12.91 million, respectively.

slumped compared to 2012, but this was not surprising, as 2012 was a historic year for the STCU that saw the largest amount of partner project funding ever received in the STCU's history (US \$15.1 million). The US \$10.2 million of new partner project funding in 2013 was almost US \$5.0 million less than that received in 2012; however, on a historical basis was still quite robust (4th highest in STCU history). In 2013, new project funding from all partner organizations represented 80.5% of the total amount of new STCU project funding. This percentage illustrates the continued importance that partners play in project funding at the STCU.

New partner project funding in 2013 also

For the second time, external auditors from KPMG Baltics SIA audited the financial man-

NEW PROJECT FUNDING IN 2013 BY SOURCE:

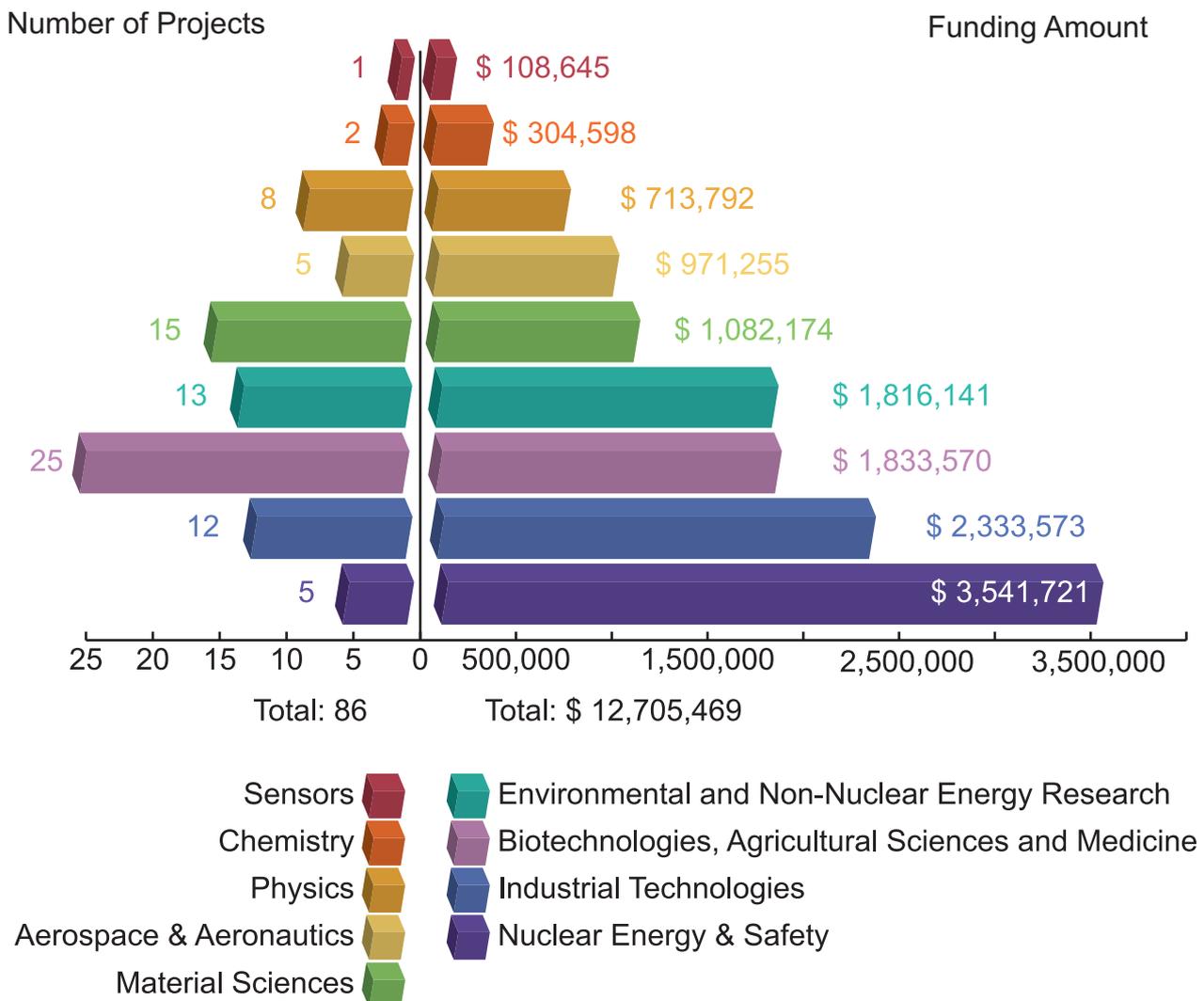




agement and accounting systems, as well as the system of internal controls for both the operations of the STCU administration and STCU-funded projects. The results of this audit can be found on the STCU's website at:

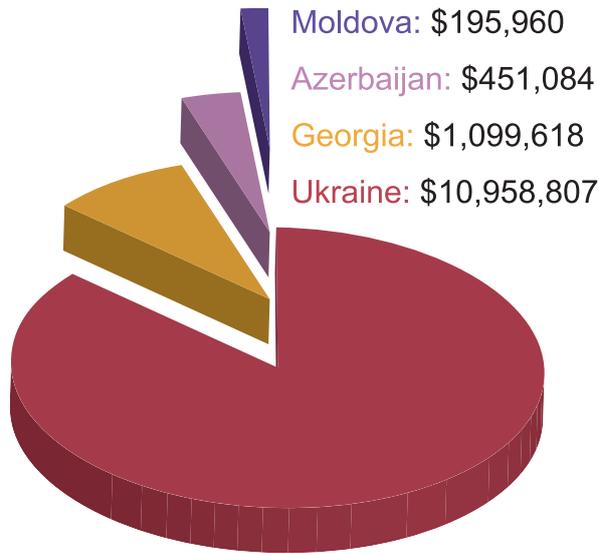
www.stcu.int/documents/stcu_inf/reports/audit/2013/. Some weaknesses were identified in conjunction with the December 31, 2013 financial statement audit and will be corrected during the course of 2014.

NEW PROJECT FUNDING IN 2013 BY PRIMARY TECHNICAL AREA:



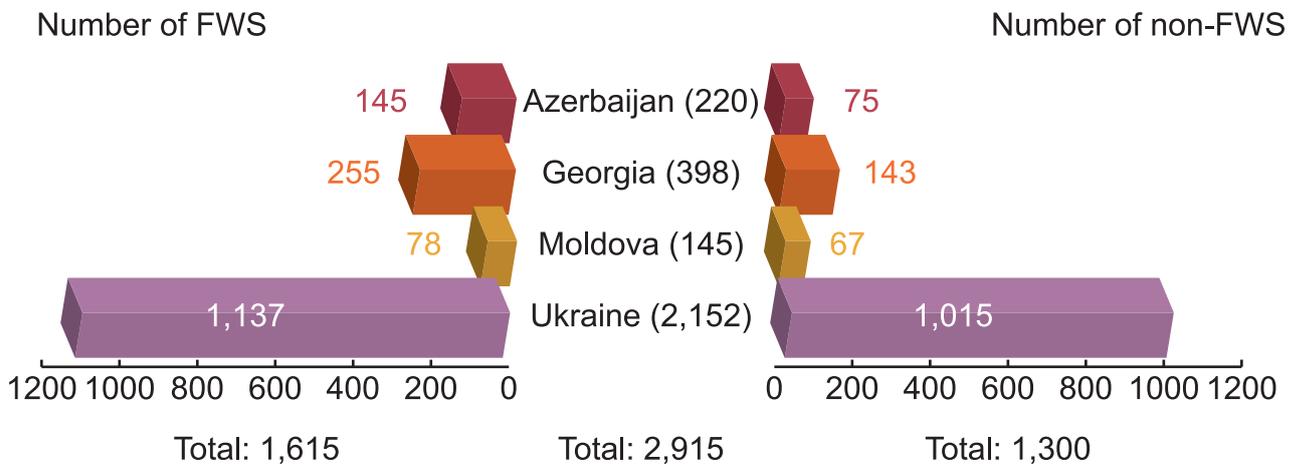
FINANCIAL ACTIVITY

NEW PROJECT FUNDING IN 2013 BY LOCATION OF RECIPIENT ORGANIZATION:



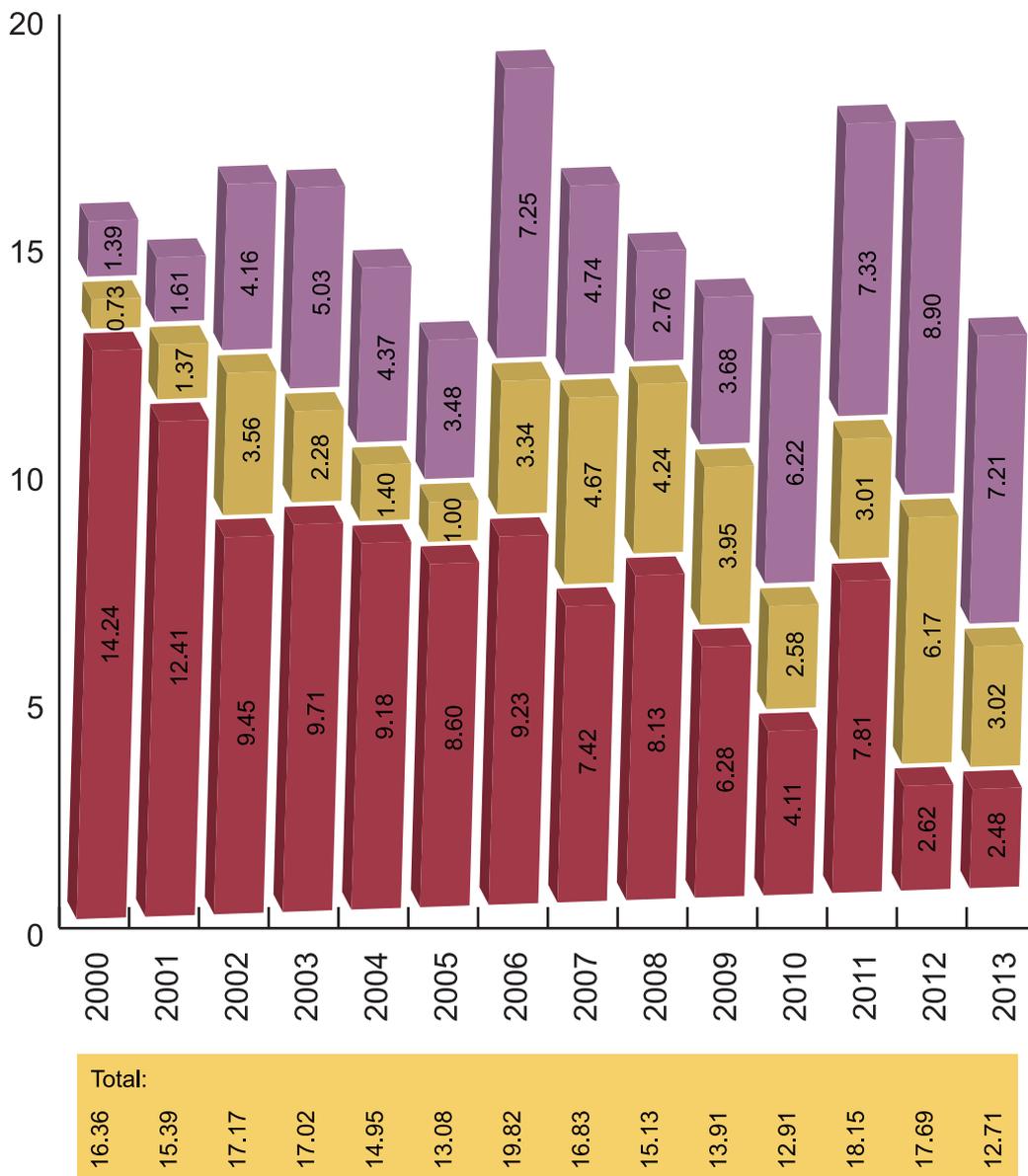
Total: \$ 12,705,469

PARTICIPANTS REDIRECTED ON NEW STCU PROJECTS DURING 2013 BY LOCATION OF RECIPIENT ORGANIZATION:





NEW REGULAR/PARTNERSHIP FUNDING, 2000-2013 (FUNDING IN MILLIONS USD):



Regular Projects
 Non-Governmental Partner Projects
 Governmental Partner Projects

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