Catalogue of organisations conducting security related research and innovation in eastern partnership countries

Reinforcing cooperation with Eastern Partnership countries on bridging the gap between research and innovation for inclusive and secure societies

www.secure-r2i.eu

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# Table of contents

**Foreword** ........................................................................................................................................... 5

**Armenia**
- International Center for Human Development ......................................................................................... 7
- Institute for Physical Research of the National Academy of Science of Armenia ........................................ 8
- Institute of Radiophysics and Electrónica of NAS of RA ........................................................................... 9
- Nuclear and Radiation Safety Center
  - Laboratory of Radiological Measurements ......................................................................................... 10
- Yerevan Physics Institute
  - A. Alikhanian National Scientific Laboratory (AANL) foundation ....................................................... 11
- Yerevan State University
  - Physical Ecology Laboratory ............................................................................................................. 12

**Belarus**
- B-LOGIC ................................................................................................................................................. 14
- Belarusian State Technological University .............................................................................................. 15
- Belarus State University
  - A.N. Sevchenko Institute of Applied Physics Problems of Belarus State University, Laboratory of Elioniks .................................................................................................................................. 16
- Belarusian State University of Informatics and Radioelectronics
  - Marketing Department ........................................................................................................................... 17
- BELTIM SB., Closed Joint Stock Company ............................................................................................. 18
- Computer Research Institute, Open Joint Stock Company ..................................................................... 19
- DLC Multisoft ........................................................................................................................................... 20
- Estel IT Group Ltd.
  - Network Solutions Division .............................................................................................................. 21
- Holding management company «Novacom Group», LLC ......................................................................... 22
- INTIS ....................................................................................................................................................... 23
- Light Well Organization, LLC
  - Management of Software Promotion ............................................................................................... 24
- NPP Belsoft, Inc.
  - Foreign Affairs Department .............................................................................................................. 25
- Republican Unitary Engineering Research Enterprise Software Applied Systems Institute
  - Department of State Information Systems Development ...................................................................... 26
- ScienceSoft Inc.
  - Security information and Event Management Department .................................................................. 27
- SoftClub Ltd. ........................................................................................................................................... 28
- United Institute of Informatics Problems of the National Academy of Sciences of Belarus
  - Department of Intelligent Process Modelling ....................................................................................... 29
Georgia

G.Tsulukidze Mining Institute
Department of Blasting Technologies, Laboratory Explosion Protection Technologies

Georgian Technical University
N. Muskhelishvili Institute of Computational Mathematics

Ukraine

Association of the Kharkiv Interbranch Center of Ecological and Scientifically-Practical Activities “Kharkiv Ecocenter”

Cryos-Beta LTD

Emeritus Professor Mykola Bokarius Kharkiv Research Institute of Forensic Sciences

Institute of Agroecology and Environmental Management of the National Academy of Agricultural Sciences of Ukraine

Institute of Artificial Intelligence
Speech Recognition Department

Institute of Radio-Physics and Electronics of the National Academy of Sciences of Ukraine
Laboratory of Micro and Nano Optics

Ivano-Frankivsk National Technical University of Oil and Gas
Research and Development Institute of Oil and Gas Power Engineering and Ecology

Kharkiv National University of Radioelectronics

L.V. Pisarzhevsky Institute of Physical Chemistry of National Academy of Science

National Academy of Sciences of Ukraine, Institute of Applied Physics
Department of Nuclear and Physical Research

National Academy of Sciences of Ukraine, Institute of Mathematical Machines and System Problems (IPMMS)
Department of Integrated Automated Systems for Special Purposes

National Academy of Sciences of Ukraine, Institute of Technical Problems of Magnetism
Department of Physics and Technique of Magnetic Phenomena

National Academy of Sciences of Ukraine, Institute for Scintillation materials
Department for Materials Luminescent Properties Research

National Academy of Sciences of Ukraine, Institute for Single Crystals
Department of Non-Linear and Electrooptical Single Crystals, Optical Films and Coatings

National Academy of Sciences of Ukraine, O.Ya.Usikov Institute for Radiophysics and Electronics
Head Department

National University of Civil Protection of Ukraine
Department of Special Chemistry and Chemical Technology

National Technical University of Ukraine “KPI”
High Performance Computing Center

National Aerospace University “KhAI”
International S&T Project Office

Open International University of Human Development “Ukraine”
Public Organisation “Transcarpathian Association of Innovative Development and Co-Operation” (PO “TAIDC”) .......................................................... 54
Scientific and Research Institute for Providing Legal Framework for the Innovative Development of the National Academy of Law Science in Ukraine ........................................................................................................................................ 55
V. Lashkaryov Institute of Semiconductor Physics NAS Ukraine ........................................................................................................................................ 56
V.N. Karazin Kharkiv National University ...................................................................................................................................................................................... 57
Veritas Research Center ........................................................................................................................................................................................................ 58
Young Investment Group .................................................................................................................................................................................................... 59
Foreword

We would like to welcome you to the FP7 SECURE-R2I project’s *promotional catalogue of organisations conducting security related research and innovation in eastern partnership countries (EPC)*.

This catalogue has been prepared under the EU funded FP7 SECURE-R2I project: “*Reinforcing cooperation with Eastern Partnership countries on bridging the gap between research and innovation for inclusive and secure societies*”. The project lasts three years, from October 2013 until September 2016. It is being implemented by a consortium of twelve partners from across Europe and the former Soviet Union.

The overall aim of the SECURE-R2I project is to reinforce cooperation with EPC on bridging the gap between research and innovation for Horizon 2020 Societal Challenge 7 “Secure Societies”. The research domains encompassed by “Secure Societies” include ICT; Security; Nanosciences, Nanotechnologies, Materials (NMP); and Social Sciences and Humanities (SSH). These research domains also form the basis of important economic sectors in the EPC, with many potential benefits for the EU, but which also need European support to increase their exploitation. Addressing this issue, the SECURE-R2I project will assist R&D and innovation (RDI) organisations in EPC via a range of knowledge and technology transfer activities with the support of European specialists. The activities include:

- Networking between EPC organisations involved in RDI for Societal Challenge 7: It consists in mapping EPC RDI organisations and organising brokerage events to stimulate cooperation;

- Analysing the tech transfer opportunities and bottlenecks of EPC organisations involved in RDI for Societal Challenge 7: It consists in surveying these organisations and holding discussions with representatives of government, industry, government and intermediary bodies;

- Exchanging best practices in knowledge/technology transfer via a range of specific training courses and intensive summer schools in Europe;

- Twinning via Research to Innovation (R2I) pilot projects: Each EPC research partner in the consortium will twin with another consortium partner who will support them to implement a bilateral R2I pilot project;

- Providing innovation support services to selected, high-potential EPC (and European) RDI: The activities will consist in coaching and advisory services on innovation and tech-transfer.

For further information about the FP7 SECURE-R2I project, its objectives, activities, news and events, please visit secure-r2i.ru.

We hope you enjoy reading this catalogue and it helps to reinforce future cooperation in the field of security related research and innovation between organisations of EU and EPC.

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Organisations in Armenia
The International Centre for Human Development (ICHD) is one of the leading think tanks in Eastern Europe and CIS that brings together a team of 15 highly-qualified analysts and researchers with strong academic background and substantial experience in both public and private sectors committed to professional excellence and ethics.

During its decade long history the Centre has cultivated a culture of inclusive policy making process, has developed and introduced innovative instruments effective in the regional, national and local policy environment. It has established trusted institutional relations and partnerships with the policy makers locally and regionally proving to be a reliable partner through providing quality advice, policy analysis and development services to all stakeholders including government, civil society organizations, the private sector and development partners, as well as through creating innovative policy communication tools and promoting adaptive environment for dialogue.

ICHD has been actively involved in designing and implementing a wide range of projects. It has published a substantial number of analytical viewpoints, policy briefs, articles, research papers, and books. It has trained more than 7000 professionals on a variety of themes both locally and regionally. Finally, it has initiated public awareness and participation campaigns, conducted nation-wide statistical surveys, organized numerous international conferences and business forums to enhance participatory decision making culture in Armenia and the South Caucasus.

The experts of the Center have contributed a lot towards strengthening the regional cooperation in the Caucasus. The research conducted by the Center, as well as the personal contacts of the team members with their counterparts - experts and relevant organizations at both national and regional levels - are of a great asset for the successful implementation of any project. The ICHD core team has been trained in conflict management, effective communication, negotiations and leadership skills in the United States, at the Conflict Management Group (CMG), Cambridge, MA and New School University, New York, NY. Individual experts regularly participate in professional development activities both in Armenia and abroad. The Center feels strongly about the need to pay close attention to lifelong learning and the continued search for knowledge. ICHD is also proud of the fact that a number of its former employees and volunteers currently hold high positions in various international organizations, NGOs and government institutions in Armenia and abroad.

Areas of interest (collaboration with European organizations on research and technology transfer)

Disaster-Resilience (Crisis Management; Communication Technologies and Interoperability; Ethical/Societal Dimension); Fight Against Crime and Terrorism (Law Enforcement Capabilities; Ethical/Societal Dimension); Border Security and External Security (Border Crossing Points; Supply Chain Security; External Security; Ethical/Societal Dimension); Digital Security (Privacy; Access Control; Risk Management and Assurance Models; Secure Information Sharing).

Research and Technology Development Experience


Project "Civil Society Leadership Network", jointly with partners in Ukraine, Moldova, Armenia, Azerbaijan and Georgia, since 2008

Project «The Black Sea Peacebuilding Network», jointly with NGOs from Armenia, Azerbaijan, Georgia and Moldova, since 2009.

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The Institute for Physical Research of National Academy of Sciences of Armenia (IPR-NAS) is a public research organization working in the fields of laser physics, material science and related areas. Our primary goal is reaching and maintaining excellence in fundamental research, applied developments and innovation, aiming at wealth and prosperity of our beneficiaries: Armenian science, economy, and society, as well as the Institute staff. The priorities that we set up on this way are: building strong international collaboration, increasing involvement of students in research and innovation, linkage with industry, which will assure sustainable development of the institute, increase the visibility and prestige of Armenian science, and provide dissemination and promotion of our achievements thus yielding significant socio-economic impact. Our motto is “Through excellence in research to prosperity of society”.

The Institute for Physical Research of the National Academy of Sciences of Armenia

The secure information distribution is a long-standing and central issue in our information-based society. Quantum Information Processing and Communication (QIPC) have potential to solve this problem and guarantees absolutely secure communication. QIPC belongs to basic research in IPR-NAS during the last two decades. Our scientific goal is to demonstrate lossless long-distance quantum communication both in optical fibers and in free space. This requires the development new photon sources, atom-light quantum interfaces and quantum repeaters, which allow long-distance entanglement distribution and communication at higher bit rates as compared to previous protocols, thereby alleviating the limitations on the quantum memory lifetime. The recent schemes developed in IPR-NAS have main advantage that the errors, which reduce the fidelity in the conventional communication protocols, are strongly suppressed and the long-distance interferometric stability is no longer required. These schemes enable a robust quantum repeater without long-lived quantum memories, thus providing a fast communication rate. Of fundamental importance is a production of photons entangled in well-separated temporal modes, as information encoded in these states can be transferred over significantly large distances without appreciable losses. As the carriers of quantum information are photons, which can propagate in optical fibers and free space with the corresponding appropriate wavelengths, our next goal is to develop methods that enable efficient conversion between photons at telecom and visible wavelengths.

We develop an optical imaging device, which will allow to visualize the content of envelopes/parcels hidden behind non-transparent/scattering wrapping (e.g. readout of QR code / barcode marking, lustration of envelopes, etc). The proposed technology is based on computer-controlled pixel-by-pixel spatial scanning of a low-power cw laser beam across the examined sample with simultaneous recording of scattered/transmitted signal. Following real-time software data processing, the contrast-enhanced image will appear on a monitor screen as grayscale image or 3D plot, and can be recorded as a file. The proposed technology can find particular applications for prevention of abuse with fake labeling of postal/freight packages (readout of hidden marking), revealing illegal content of letters and parcels (non-invasive lustration of postal correspondence), etc. Development of the commercialization route implies identification of market demand (target markets) and specification of particular application(s); search for existing competing technologies and identification of advantages; IP management; marketing; optimization of technology based on defined specific application(s); preparation and testing of prototype devices; defining the market strategy.

Areas of interest (collaboration with European organizations on research and technology transfer)

Fight Against Crime and Terrorism (Forensics; Law Enforcement Capabilities); Border Security and External Security (Border Crossing Points; External Security); Digital Security (Privacy; Secure Information Sharing).

Research and Technology Development Experience

European Commission, FP7
No.295025–IPERA (Integrating the Institute for Physical Research of the National Academy of Sciences of the Republic of Armenia into ERA)
No.295264–COSMA (Cohent optics sensors for medical applications)
No.310750–TheBarCode (Development of multifunctional Thermal Barrier Coatings and modeling tools for high temperature power generation with improved efficiency)
No.608906–NANOMAT–EPC (Deployment of Societally Beneficial Nano- and Material Technologies in European Partnership Countries)
No.609534–SECURE–R2I (Reinforcing cooperation with Eastern Partnership countries on bridging the gap between research and innovation for inclusive and secure societies)
No.612600–LIMACONA (Light-Matter Coupling in composite Nano-Structures)

European Commission, H2020
No.644260–INTELUM (International and intersectoral mobility to develop advanced scintillating fibres and Cerenkov fibres for new hadron and jet calorimeters for future colliders)

International Innovation Center for Nanotechnologies – JINR
No.080–193 (Obtaining and applications of metal-carbon nanocomposites and carbon nanospheres)
No.080–202 (Synthesis, structure, and magnetic properties of Fe, Fe-Ni and Ni-Cu nanoparticles for application in magnetic hyperthermia)

Volkswagen Foundation
No.VW-A108857 (Structural and Magnetic Transformations in Nickel-Carbon Nanocomposites)
NFSAT–YSSP–CRDF (Atom-molecule conversion in degenerate quantum gases via STRAP)

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The Institute of RadioPhysics & Electronics (IRPhE) was established in 1960 on the basis of the Radio Astronomy Division of the Buyrakan Astrophysical Observatory.

The main research and development areas of the Institute:
- Development of high-sensitivity microwave receivers for radio astronomy, remote sensing of the Earth, radar and communication engineering.
- Study of physical principles for generation, amplification and spectral analysis of emission in terahertz (THz) frequency band and development of functional elements and devices for communication and high-resolution microscopy in biology and medicine.
- Development of Laser-Pulse Deposition technology for growth of semiconductor nanometer-thick films and hetero-structures used in the IR detectors, solar cells and other devices.
- Study of crystal lattice imperfections effect on mechanical, electric and optical characteristics of corresponding materials.
- Theoretical study of generation and propagation of electromagnetic waves created by moving charged particles inside inhomogeneous continuous media and plasma, with applications in radio physics and particle acceleration engineering.

The main directions of the pilot projects are:
- Development and manufacture of Short-Range microwave radar for vehicle and human detection
- Development of automated anti-hail gun control system via clouds monitoring
- Development of biological and/or medical purpose microwave non-contact cardio and pulmonic activity detection for life monitoring under earthquake rubble
- Development of RF matching systems for plasma etching

Areas of interest (collaboration with European organizations on research and technology transfer):
Border Security and External Security (Border Crossing Points; External Security).

Technologies and services for “Secure Societies”:
- Low-noise and/or high-power microwave technology
- Digital signal processing technology
- Radiometric and radar technologies
- Technology for effective delivery of high power RF energy.

Research and Technology Development Experience
National: Department of Defence, Border Security System
International: USA, Europe, Canada
ISTC, INTAS Projects;

NATO Project:
SIP-973559 “Supersensitive high-Tc superconducting multijunction Josephson devices for environment investigation and biomagnetic applications”

INTAS Projects:
INTAS-2001-0809 “Dynamics and non-equilibrium transport in advanced superconducting structures”
INTAS-1940 “Current transport and high frequency interactions in high- Tc superconducting multijunction Josephson structures”

Continuous Waves Oscillator of Sintesized Frequency Signals. Radar exitation.

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The Nuclear and Radiation Safety Centre (NRSC) was established in 2002. Its primary goal is to support the Armenian Nuclear Regulatory Authority (ANRA) in the areas of nuclear and radiation safety and radiological measurements.

Main directions of NRSC:

1. Nuclear Safety Direction
   - Neutronics and nuclear fuel group
     - Reactor core model
     - Neutron-Nucleus interactions XS library development
     - Criticality calculations
   - Thermal-hydraulic group
     - Thermal-hydraulic analysis for DBA and BDBA
     - Severe accident analysis
     - Confinement thermal-hydraulic analysis including hydrogen, aerosol and isotope behaviour
     - Radiological consequences analysis
   - Risk Assessment group
     - PRA models development (internal IEs, external and internal hazards)
     - PRA models application and risk-informed decision-making
     - Fire propagation and heat-transfer modelling

2. Radiation Safety Direction
   - Development of regulatory documents in the field of radiation safety and security, radioactive waste management and decommissioning
   - Workplace and source monitoring
   - Personal radiation monitoring
   - Environmental monitoring
   - Orphan sources search and identification
   - γ-spectrometry
   - X-ray device testing, quality control
   - Shielding calculations
   - Assessment of radiological consequences of releases of radionuclides to the environment
   - Upgrade of security systems of organization’s that are using ionizing radiation sources.

The main research activities for “Secure Societies”:
- Modelling
- Shielding calculations
- Radiological consequences analysis
- Methodologies development
- Regulatory documents development
- Radiological measurements capabilities development
- IT development.

Areas of interest (collaboration with European organizations on research and technology transfer):

- Disaster-Resilience (Crisis Management); Fight Against Crime and Terrorism (Forensics; Urban Security); Border Security and External Security (Border Crossing Points); Digital Security (Access Control; Secure Information Sharing).

Technologies and services for “Secure Societies”:
- Environmental Monitoring (α, β, γ and neutron measurements, γ spectrometry)
- Nondestructive assay (NDA)
- Orphan ionizing radiation sources search and identification activities
- X-ray quality assurance and quality control measurements for the diagnostic and therapeutic units
- IT support
- Organization and conduction of the trainings, seminars and workshops in the field of nuclear and radiation safety and security

Research and Technology Development Experience

National:
- TACIS, INSC: Enhancement of the safety assessment capabilities of the Armenian Nuclear Regulatory Authority (ANRA) for licensing of Medzamor 2 safety improvements and decommissioning activities
- GTRI, PNNL, ORNL
- US DOE NNSA. International Nuclear Safeguards Engagement Program, INSEP Armenia Nondestructive Assay (NDA) Training Course

International:
- ASTM, Inc. ARIS development; ISTC. Project P461 “Enhancing National Capabilities and Expertise in Nuclear Forensics”

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The Yerevan Physics Institute (YerPhi) was founded in 1944 as a branch of Yerevan State University by brothers Abraham Alikhanov and Artem Alikhanian. Later two high-altitude Cosmic Ray Stations were erected on Mount Aragats (3,200 m) and Nor Amberd (2,000 m) leading pioneering cosmic ray research. The construction of a 6GeV electron synchrotron accomplished in 1967 became an important landmark in the history of institute. After collapse of Soviet Union, YerPhI continued research in the fields of high-energy physics and astrophysics in Armenia and worldwide on world biggest accelerators and cosmic ray detectors. Now YerPhI got status of A. Alikhanyan National Laboratory.

Research activities for “Secure Societies”:
- The comprehensive monitoring and prediction of potentially dangerous processes in the magnetosphere and atmosphere of the Earth.
- Development and maintenance of weather and space weather observing systems;
- Assurance of consistent geophysical research at the world-class level;
- Development and implementation of a program to create networks of high technology sensors and facilities for data transfer, storage, analysis, forecasting and now casting

Areas of interest (collaboration with European organizations on research and technology transfer):
- Disaster-Resilience (Disaster Resilience and Climate Change; Communication Technologies and Interoperability).

Technologies and services for “Secure Societies”:
- World-wide networks of particle detectors for monitoring of space weather.
- Armenian geophysics networks of field meters and lightning detectors for forewarning on climate change.
- Method of removing radioactive aerosols of new quantitative filters on the basis of modified super-thin basalt fibers makes 94.6 to 98.2 %, which is comparable to the IAEA requirements for standard quantitative filters used in contamination control zones

Research and Technology Development Experience

National: projects funded by the government of Armenia
International:
1. NATO Networking Infrastructure, “Computer network for real-time data transfer using wireless connections”.
2. NATO Collaborative Linkage Grant, “Construction of reliable data acquisition system for modern Astroparticle Physics experiments”.
3. NATO Collaborative Linkage Grant, “Investigations of the air-shower development in the primary energy region of PeV”.
4. CRDF Cooperative Grant Program, “Patterns of Gene Expression in Normal and Neoplastic Tissues and Associated Statistical Problems”.
5. ISTC, “The Development and Implementation of Applied Neural Information Technologies”.
6. ISTC A216, “Detection of the Neutron Flux from the Solar Flares at the Aragats Cosmic Ray Observatory”.
8. ISTC, “Development of a Prototype Detector System for Space Weather Monitoring and Forecasting World-Wide Network”.
9. ISTC, “Development of Regional Communication Network in Armenia”.
10. ISTC, “Planetary Space Weather Research and Forecasting by Networks of Hybrid Particle Detectors measuring neutral and charged fluxes”.
11. ISTC sustainability project “Applied” cosmic ray physics”.
12. EUROPEAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT (EDARD), “Development and installation of the new hybrid particle detectors for the creating world-wide network aimed on the space weather research”.
13. EUROPEAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT (EDARD), “Correlated measurements of the disturbances of geomagnetic field and changes of secondary particle fluxes at Aragats-Space Environmental Center (ASEC)”.

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The Physical Ecology Laboratory was established on the basis of the group of X-ray structural analysis and lyotropic liquid crystals.

**Purpose of the laboratory:**

- Investigation of the influence of natural radiation (ultra-violet (UV) rays, earth magnetic field, etc.) on biological systems.
- Investigation of the influence of anthropogenic radiation (EHF, cell phone, microwave, radio and television, etc.) on biological systems.
- Radioactive liquid wastes treatment by modified natural absorbents (zeolite, bentonite and atomite).
- Protection from exposure to EHF and UHF waves.

**Research activities for “Secure Societies”:**

Electronic nose based on multi-enzymes biosensor for remote detection of explosives. The aim of this pilot project is to study and create a remote device for the detection of explosives based on multi-enzymes biosensor with high selectivity. For the construction and design of the device, as a biological carrier, enzymes immobilized biomembranes will be used, and as a recording device, generators based on a flat-coil.

**Research areas of the proposed projects:**

- Ensure the greatest enzyme activity to explore and find the optimal enzyme and lipid bilayer.
- As the enzyme-substrate interaction enthalpy of the system is changed, a certain amount of energy as heat is emitted or absorbed, so the objective is to provide the highest sensitivity and selectivity of the recording device.

In both cases, significant changes of the generator frequency (of the order of a few kHz) take place.

Thus, by recording the change in frequency of the generator, we determine the presence and amount of the substance to be detected. Using the appropriate enzyme selectivity and high sensitivity generator, the amount of substance in the concentration range – 10⁻⁶ m⁻³ can be determined.

Research in this area will allow for 1.5-2 years to develop integrated devices - "Electronic nose/tongue" that are sensitive to many substances and reusable.

Our research team has created a device for detecting trace (minor) amounts of phenol (10⁻⁶m⁻³).

**Areas of interest (collaboration with European organizations on research and technology transfer):**

Disaster-Resilience (Ethical/Societal Dimension); Fight Against Crime and Terrorism (Urban Security); Digital Security (Trust eServices).

**Technologies and services for “Secure Societies”:**

To detect small amount of phenol, a biosensor device based on a generator with a flat-coil was investigated, designed and implemented technologically.

For radiation injury (gamma- and X-rays), we propose an effective method for determining the extent of damage and control of further consequences. For this purpose, the degree of crystallization and structural changes in erythrocyte membranes of human blood, caused by radiation damage (gamma- and X-rays) were used.

On the basis of the data obtained, a patent for "A method of early diagnosis of the severity and outcome prediction of acute radiation injury" was applied.

**Research and Technology Development Experience**

**National:** Ministry of Educational and Science of Armenia, The study of structural changes in the Lyotropic Liquid Crystals under the influence of electromagnetic field.

**International:** USA, Europe: ISTC Projects:
1) "DNA and Chromosome Alteration Caused by Newly Synthesized Potential Antitumor and Carcinogenic Compounds. Comparison with Radiation Effects".
2) "Obtaining of Monocrystallic Oxidic and Chalcogenidic Films by Way of Chemical Transportation of Crystallic Compounds”

A combination of the biosensor and LDC (Texas Instruments)
Organisations in Belarus
The main activity is the design, development, implementation and maintenance of high-tech solutions for banks and enterprises, billing systems for housing and communal services and other service providers, retail payment systems, remote maintenance, cash and settlement systems in the retail trade and services.

Research activities for “Secure Societies”:

Implementation of remote private banking for banks and organizations

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster Resilience and Climate Change (Communication Technologies and Interoperability); Fight against Crime and Terrorism (Urban Security); Digital Security: Cybersecurity, Privacy and Trust (Trust eServices)

Technologies and services for “Secure Societies”:

- Customer identification system
- The introduction of digital signature
- Provision of electronic services through various media access through the use of modern network infrastructure
- Development of systems for remote maintenance

Research and Technology Development Experience

National:

a) The National Bank of the Republic of Belarus
b) Automated Information System single settlement and information space
BSTU is a modern, prestigious, and dynamically developing educational and scientific centre of the Republic of Belarus, which applies innovation technologies of international standard in its activities. The researchers of the University take an active part in over 130 research projects within 35 scientific-technical programs of different levels. The BSTU training system is based on the following principles: profound professional knowledge and skills, integrated professional development, high mobility and social responsibility of future specialists. Over its 80-year history, Belarusian State Technological University has been a top-ranked training and research centre. Today BSTU is recognized as a leading higher educational institution in the field of forestry, chemical and printing industries in the Republic of Belarus. The University is a basic higher educational institution of the CIS in the field of forestry and forest industry as well as a full member of the International Centre for Forestry and Forest Industry. The BSTU researchers annually publish over 2000 papers and articles on the results of their R&D projects and apply for more than 80 patents. The University participates in international exhibitions and fairs with more than 500 exhibit items. BSTU annually holds about 20 international conferences and workshops. The University collaborates with 119 foreign educational and research centres within cooperation agreements.

Research activities for “Secure Societies”:

Disaster Resilience and Climate Change:
Main research trends include analysis of carbon balance and the role of forests and marshes in regulation of carbon balance; environmental challenges of reducing industrial hazards, processing of anthropogenic waste; environmental safety.
Privacy; Access Control; ICT in Critical Infrastructure Protection; Secure Information Sharing:
Main research trends include methods and software of data transformation (coding, encrypting, hashing, neurocrypting) to provide reliable and safe sharing of private information through communication channels.

Areas of interest (collaboration with European organizations on research and technology transfer):
Disaster-Resilience (Disaster Resilience and Climate Change); Digital Security (Privacy; Access Control; ICT in Critical Infrastructure Protection; Secure Information Sharing).

Technologies and services for “Secure Societies”:
Disaster Resilience and Climate Change
Development of technology and automated system of subject interpretation of damaged forest stands based on space survey
Privacy Policy; access control; security of critical infrastructures by ICT; safety information dissemination;

Development of suitable solutions for practical use methods about safety methodology of confidential information transmission based on the elements of the theory of redundant coding, encryption and neural network technology.

Research and Technology Development Experience

National:
• “Research and development of materials and technologies for synthesis of continuous reinforced sheet molding compound with thermoplastic bonding matrix”, Hanwha L&C Co Ltd (Republic of Korea)
• “Development of technology and scientific basis of polycomponent fertilizers with specific features synthesis for sierozemic soil”, M.Auezov South Kazakhstan State University (Republic of Kazakhstan)
• “Development of composite materials foundry-bending technology based on aluminium matrix with the use of carbonaceous feed”, Karaganda State Industrial University (Republic of Kazakhstan)

International:
• “Baltic Landscape in Change – Innovative Approaches Towards Sustainable Forested Landscapes” (Baltic Sea Region Programme)
• “Environmental Governance for Environmental Curricula” (Tempus)
• “Reformation of the Curricula on Built Environment in the Eastern Neighbouring Area – CENEAST” (Tempus)
• The Water Harmony project (Norway-Eurasia Program)
IAPP BSU is the base of the Belarusian State University for scientific research, training and qualification of the teaching staff in physics, computer science, scientific instrumentation, electronics, acoustics and chemical technology. Main directions of research are:

- Spectroscopy and luminescence of condensed and gaseous media, including plasma.
- Study of ultrasonic and electromagnetic waves in various media.
- Research on the interaction of high-energy radiation with solids.
- Research and development of new X-ray optical elements.
- Development of information and analytical technologies.
- Aerospace research and instrument.

Research activities for “Secure Societies”:

IAPP BSU has developed, created, carried out the installation and entered into production of automated systems of radiation and meteorological monitoring (ARMM-1,2,3,4) on the territory of the Republic of Belarus in the zones of influence of nuclear power plants (NPPs) of neighboring countries. Today, there are 27 points of automatic radiation and meteorological monitoring in the border towns of neighboring countries with nuclear power plants created by IAPP BSU. Laboratory staff also developed hardware, software and computer centres of district, regional and national response and decision-making. They are linked by telecommunication channels using radio frequency resource and telephone lines. ARMM-1,2,3,4 operate in automatic mode with the display operational information in real time on electronic maps of servers these centres.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Disaster Resilience and Climate Change; Critical Infrastructure Protection); Digital Security (Privacy; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

The automated system for radiation and meteorological monitoring is a network of automatic measurement points to be placed in the controlled area, along with response centres having different levels of hierarchy, interconnected by various channels of digital data transmission. The technical characteristics of measuring instruments and hardware-software systems, designed and certified as a means of measurement in Belarus, exceed known foreign counterparts at significantly lower comparative costs.
BSUIR is a major scientific, educational and innovation centre, providing training for high-tech industries and the development of highly sought products in the market of science and technology. Research and development activity performed at the University conform to the profile of training and are done in the following main areas:

- Radioequipment and systems
- Transmission and processing of information systems
- New information technologies and management systems
- Micro-and nanoelectronics
- New advanced materials, energy-saving technologies
- Certification, diagnosis and test elements, devices and systems
- Methods of modelling and optimization in electronic systems and devices
- Socio-economic and environmental problems of social development
- Information and education technologies in education;
- Beam Technology and Equipment
- Automation of industrial processes and energy.

Research activities for “Secure Societies”:

- Hydroacoustic communication equipment.
- Electromagnetic radiation absorbers for, the biological and special facilities information protection.
- Specialists training of in the field of information security.

Areas of interest (collaboration with European organizations on research and technology transfer):

**Disaster-Resilience** (Communication Technologies and Interoperability).

**Technologies and services for “Secure Societies”:**

"Priboy-R" speech information protection device designed to protect speech information leakage through the acoustic and vibration channels of space beyond the secured zone.

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**Research and Technology Development Experience**

**National:** Scientific and Manufacturing Republican Unitary Enterprise "Scientific and Research Institute of Technical Information Protection": State Scientific and Technical Program "Information Security-2."

**International:** The Commission of the European Communities, Brussels, Belgium:

"The strategic partnership between Ukraine, Belarus and the European Union in the field of information and communication technologies."

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**Speech information security device “Priboy-R”**

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The BELTIM SB Company is the leading system integrator in the Republic of Belarus in the field of applying innovative technologies to secure and protect information. Having started its activity in 1996, the company has been developing continuously, enriching the staff and improving in the technical and professional way. Actually BELTIM SB. joins professionals of the high level who have the high practical work experience. Usually experts speak technical English. Our workers take part in developing the normative law data base of the Republic of Belarus in the field of information security, they became familiar and work with the Russian and foreign normative documents. The company possess the own production base, the unique technical and technological designs.

Our Company has been working in the information protection market for more than thirteen years. Several work directions have been formed during this period of time: computer system security including protection from unauthorized access to the resources and antiviral protection; corporate network security; development of access control systems; protection of oral information inside premises and communication channels; consulting services. Our special attention is paid to the promotion of advanced technologies, therefore we offer training courses for our clients.

BELTIM SB. guarantees confidentiality, completeness and a high quality of job about information protection.

Applying the wide experience and intellectual potential of our experts, our modern software and hardware allow our customers to solve problems of information protection and complex security.

Research activities for “Secure Societies”:

The company possesses experience in designing and applying the integrated security systems in the large Belarusian industrial enterprises. We work closely with the Russian companies recognised as the proved leaders in the security market.

BELTIM SB. takes part in realizing the common program "Protection of the common information resources of Belarus and Russia".

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection; Communication Technologies and Interoperability); Digital Security (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Research and Technology Development Experience


Projects in the field of information security.
The company has a high scientific and technical potential, modern testing base, experimental equipment and computer-aided systems to carry out scientific research, developmental and technological works in the field of above listed activities.

Integrated management system (IMS) acts in the company, including Quality Management System. Quality Management System of research, production and service of electronic devices, computers, cash-terminals and special computer systems, software development and technical support meet the requirements of STB ISO 9001-2009.

The company has a set of standards which supports existing system and determines interaction of departments inside the company, including the order of works executions during production of high-technological products.

The company has its own testing base and computer security and certification centre, which is accredited by the National Certification System of the Republic of Belarus for the right to carry out various types of tests, including certification. Scientific and technical activities of the company are directed to create new type of hard- and software products for the implementation of information processing technologies at the national economy and state power structures.

The company is the leading organization in the Republic of Belarus in development and production of computer equipment for severe operating conditions, supercomputers (cluster) configurations and passenger automation for Minsk Metro.

**Research activities for “Secure Societies”:**

- Development and production of information technology devices (IT-technology), including computing and automated workstations, devices and modules either for dual-use or severe operating conditions;
- Development and production of radio frequency identification tools (RFID-technology);
- Development and production of access control systems, power supply systems and devices; means of technical protection of information, including cryptographic technologies and digital signature application.

The company carries out activities related to dual-use production:

- Development and modernization of means weapons and military equipment;
- Performance of research, developmental, technological and other works for production of information protection devices;
- Industry secure.

**Areas of interest (collaboration with European organizations on research and technology transfer):**

**Fight Against Crime and Terrorism** (Urban Security); **Border Security and External Security** (Border Crossing Points; Supply Chain Security); **Digital Security** (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

**Technologies and services for “Secure Societies”:**

Macrotechnology "Electronics". Critical technologies: production of information displaying devices; production of data transmission systems; production of computing, special computer systems and equipment for them, including contactless system of information readout.

Macrotechnology "Production of communications, computing and software tools; high-performance systems, data processing and transmission technologies. Critical technologies: development of integrated enterprise management and automation of technological processes, operation of integrated systems for information activities in business and administrative procedures; operation of technical and software systems of information secure and control of its secure; development and operation of supercomputers; RFID-technologies.

Macrotechnology "Production of new materials for industry and health service". Critical technologies: production of materials for micro- and nano electronics.

Macrotechnology "Advanced weapons systems and military equipment". Critical technologies: basic military and dual-use technologies.

**Research and Technology Development Experience**

**National:** The Union state STP "Development and operation in states - Union state members of high-tech computer technology based on multiprocessor computing systems (code "Triada") approved by Enactment of the Council of Ministers of the Union State no.29 of October 29, 2005, and other projects.

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*The basic turnstile model for fare.*
Multisoft company was founded in 2000. We are engaged in designing and implementing solutions for the creation of data networks, designing electricians in residential and administrative buildings, designing and selling equipment for security and surveillance, performing commissioning. We offer our customers integrated network solutions.

The company's team - a team of creative, enthusiastic people who are able to implement all the client’s ideas and are owning the new technologies and developments in the field of IT. Our experts individually suited to each client, taking into account the peculiarities of certain enterprise.

Research activities for “Secure Societies”:

Research in the field of information security. Design and construction of IT-systems “Safe City”.

Areas of interest (collaboration with European organizations on research and technology transfer):

Digital Security (Access Control; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

Complete solutions for the security of information systems

Research and Technology Development Experience

National:
Minsk city hall

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"Estel IT Group" was established in September 2004. The main activities are:

- Information networks of varying complexity: from local home with Internet access – due to distributed corporate networks, including the information highway system and interworking.
- Information systems for industrial, computing, engineering and other tasks of varying complexity.
- Protecting information on the professional level.
- Information protecting on the professional level from protecting electronic document management and secure access to the Internet – due to the introduction of software and hardware to protect the entire enterprise information system, remote networks and databases, including training and support.
- Communication systems: from small offices telephones - to intelligent communication systems that combine voice information, data and video.
- Power supply: planning and installation of turnkey networks and power supply systems (lighting) premises and facilities of almost any complexity.

Research activities for “Secure Societies”:

- Creation of corporate information systems using a relational database in client-server environment.
- Design and development WEB server, WEB- application development for the organization of information interaction with corporate information systems.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Communication Technologies and Interoperability); Digital Security (Access Control; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

- Anti-virus protection;
- Network security, including prevention system (IPS) Intrusion;
- Software or hardware routers to access control (ACL, VLAN);
- Content filtering system Protection against unauthorized access;
- Monitoring of security incidents;
- Backup data warehouses, ensuring uninterrupted supply of computer equipment;
- Failure recovery and work continuity; clustering, load balancing and hot backup. Cryptographic Protections architecture building and security management based on public key (PKI / CA);
- Technology of virtual private networks (VPN);
- Disk encryption;
- Electronic digital signature (EDS);
- Instrumental analysis of security.

Research and Technology Development Experience

National:
Integrated Security Computer Information System data centre "Automated system of financial settlements Ministry of Finance of the Republic of Belarus"

Integrated security information network The MinGAS - State Unitary Enterprise (is specialized in design, construction, reconstruction, modernization and service of city gas networks).

Local area network "Minsk Printing Factory"

Automated system “Operational technical accounting utilities and facilities "Technical Department of Minsk City Executive Committee

Automated control system for urban passenger transport Minsk Public Transportation Authority

"Workplace external user telecommunications network treasury system with rights of an information security" Ministry of Finance of the Republic of Belarus

Integrated Security Computer Information System Central Depository of the Republic of Belarus

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The Limited Liability Company “Holding management company Novacom Group” is a resident of Hi-Tech Park Belarus, a Fellow of The scientific and technological Association “Infopark”, and a Gold Partner of the Oracle Corporation. It has a license from the Analytical Centre under the President of the Republic of Belarus for the right to perform work and render services for technical information protection, including cryptographical methods with digital signature. The company has also researcher code named GFIL. Software engineering processes, deliveries and maintenance are certified as compliant with the standard CT& ISO 9001-2009, DIN ISO 9001:2008.

Limited Liability Company “Holding management company Novacom Group” has a wide experience of successful work with public control and administration authorities, ministries, departments and other organizations subordinated to the Government of the Republic of Belarus, and also with large for-profit business organizations. Specialists of the Limited Liability Company “Holding management company Novacom Group” received authorized education and have been certificated in the technologies "Microsoft", "Oracle", "ABBYY", the electronic document flow systems "DELO", "Directum", the systems of product life cycle support "Lotsia PDM", "T-Flex DOCs", the corporate information protection "InfoWatch", the system "1C:Enterprise", the information system "Wonderware".

Research activities for “Secure Societies”:

1) Description and systematization of information;
2) Engineering the company standards, the projects of provisions, technical rules, technical codes of the established practice and other documents defining requirements, rules of building, using or operating of information resources of the company;
3) Engineering the specialized functional complexes as a part of information systems, monitoring products of information security and audit services, expert systems in the field of information security and data exchange, software certification;
4) Determination of the requirements for information security, engineering the security targets (protection profiles), information systems actions for certification as compliant with the standard on compliance to requirements of laws and regulations;
5) Methodical documents.

Areas of interest (collaboration with European organizations on research and technology transfer):

Digital Security (Privacy; Access Control; Risk Management and Assurance Models; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

The company performs work and renders services for technical information protection, including cryptographical methods with digital signature (implementation, software and hardware assembly of cryptographical information security; engineering, creating the information security systems on IT-data; certifying the external form of the electronic document on paper) according to native and international standards in the field of information security.

Research and Technology Development Experience

National: Ministry of Taxes and Assessments of the Republic of Belarus: “Software and hardware suite engineering for creating and maintaining a common information database of the controlling (regulatory) authorities. It includes data about checking subjects and their risk group on the basis of the State register of payers (other obligors)”.

Ministry of Labour and Social Protection of the Republic of Belarus:

1. “Research and developmental works according activity 62 “Creating an electronic employment service on the basis of integration and development of information resources and electronic services by means of creating a data portal” of the National service development program in the sphere of information and communications technologies 2011-2015.”
2. “Research and developmental works according activity 61 “Development of the state information system of social protection, including creating the Web portal of social protection” of the National service development program in the sphere of information and communications technologies 2011-2015.”
3. “Research and developmental works according activity 60 “Engineering and implementing an automated information system of Social Protection Fund in rendering electronic services in the sphere of professional pension insurance and personal record-keeping” of the National service development program in the sphere of information and communications technologies 2011-2015.”

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The Intis company was founded in 1992 and since that time has implemented projects aimed at the development and production of scientific and technical products and software in the field of industrial electronics, informational systems, client terminals and POS systems, protection of information and communications. The specialists of the enterprise perform the complete cycle of the works on a new product creation and organising its production, which includes:

- Development of optimal and balanced conception of new product based on practical knowledge in various fields of modern electronics and programming – circuitry, opportunities and latest achievements in the field of electronic components, microprocessor technics, data transfer protocols, operating system resources;
- Product design simultaneously on several levels – circuitry, microprogramming, protociling, operating systems and application tasks - in order to achieve optimal balance between processing speed, energy consumption, functionality, reliability, technological effectiveness and final cost of the product or system;
- Development of complexes and technical means of cryptographical protection of information;
- Secure information systems design;
- Production of prototypes, experimental batch or small series of product on the enterprise’s own production base;
- Development of sets of technical, technological, exploitation and repair manuals;
- Replication of product on request under the trademark of Intis or the client’s trademark;

The enterprise has its own supply channels of components and informational support, which allows developing the highest technical quality level products, using the latest achievements in microelectronics with the guarantee of the product quality.

The company carries out its activities in the following fields: embedded electronic systems, terminals for customer service, cash registers and fiscal units, video terminals, and information systems, networks and data collection GSM, data protection and software cryptography - from concept to production.

Research activities for “Secure Societies”:
Secure distribution of information, secure electronic services, access control.

Areas of interest (collaboration with European organizations on research and technology transfer):
Disaster-Resilience (Critical Infrastructure Protection; Communication Technologies and Interoperability).

Technologies and services for “Secure Societies”:
Hardware and software protection stored and transmitted data.
Structural analysis of the video for the purposes of access control.

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LWO LLC was established in 2008. The company specializes in the development, implementation and maintenance of software for financial organizations and large corporate clients. LWO LLC is a resident of High-Tech Park, a member of the Scientific and Technological Association "Infopark". The company sets up and maintains the processes of management of the quality in the field of development and maintenance of software in accordance with international standards STB ISO 9001, DIN EN ISO 9001. LWO company has the certificate for technical protection of the information, including cryptographic methods, including the use of digital signature. Among the implemented projects of the company are the complete packages of effective banking (financial) solutions that can be classified by the following groups:
- Functional modules for corporate bank business;
- Functional modules to provide retail banking business;
- Functional modules to build a prudent, management and analytical reports;
- Functional modules to optimize and improve the efficiency of banking operations;
- Modules for the construction of self-service banking and remote sales channels.

Research activities for “Secure Societies”:

Research activities are focused on the study of existing technologies for the secure exchange of information and data protection systems, as well as the creation of new methods and approaches for information security. Active participation in the development of means of technical and cryptographic protection of information, their installation and commissioning.

Areas of interest (collaboration with European organizations on research and technology transfer):

**Digital Security** (Privacy; Access Control; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

Development, installation and commissioning of cryptographic and technical protection of information. Creation of software and hardware-software systems with the above-mentioned security means.
NPP Belsoft Inc. is the leading developer and supplier of business applications, products and services based on Information and Communication Technologies in the Republic of Belarus. High competences of NPP BELSOFT, Inc. are confirmed by more than 20 years of experience in the realization of complex large-scale projects, wide range of services in consulting, design, implementation and maintenance of complex solutions for IT-infrastructure, information systems, data centres, unified communications, software and applications. The company realizes projects for customers from different spheres: education, medicine, energy supply, transport, banks and government. NPP Belsoft, Inc. has implemented more than 1000 large projects. Many of the most innovative IT products in Belarus were implemented by NPP Belsoft, Inc.

Research activities for “Secure Societies”:

- Machine vision for manufacturing quality control of medical preparations;
- Complex of technical equipment and programs for object automatic control;
- Alternative energy supply systems for high-risk objects;
- Solar panels and wind-powered generator;
- Machinery vibration monitoring for accident prevention;
- Heating units dispatching in housing sector;
- Ecological and environmental safety monitoring systems;
- Access control systems;
- CCTV and situation room systems;

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection; Communication Technologies and Interoperability); Fight Against Crime and Terrorism (Law Enforcement Capabilities; Urban Security); Border Security and External Security (Border Crossing Points); Digital Security (Access Control; ICT in Critical Infrastructure Protection; Secure Information Sharing).

Technologies and services for “Secure Societies”:

- Production of hardware and software complexes of integrated security systems and situational centres;
- Production of IP-video surveillance cameras;
- Design and production of multi-functional controllers of engineering building systems with possibility to unite them in a single monitoring centre;
- Design and delivery of equipment for multi-functional conference halls and meeting rooms;
- Design and delivery of videoconferencing systems;
- Design and production of costumer flow management;
- Design and delivery of automatic fill-time surveillance systems and mobile guard and intelligence posts, which perform target detection and tracking by continuous video, thermal imaging, radar surveillance to detect and prevent violations;
- Design and delivery of emergency services calls systems on a single number “112”;
- Single dispatch services organization for receiving, processing emergency calls from public on single access number and distribution between security services;
- Equipment design for inter-district situational centers creation.

Research and Technology Development Experience

National: Conception of education system informatisation in Belarus until 2020.
The main activities of the Institute:

- Software engineering;
- Creation of e-government infrastructure;
- Development of electronic government and commercial services;
- Maintenance of previously developed information systems;
- State registration of information systems and information resources and maintain the public registry;
- Outsourcing of government information systems;
- Implementation of projects to create business application software;
- Integrated automation of public sector accounting;
- Development of international cooperation;
- Implementation of projects to build information resources and databases creation;
- Provision of scientific and technical information services in the field of informational support on the activities of the Institute;
- Research and creation of automated corporate organizational and economic management for governments and other organizations;
- Organization and participation in the Inter-ministerial Commission for acceptance into service software, computer hardware, information resources, technologies and systems, computer and communication networks;
- Development of automated systems to collect baseline data, analysis and performance evaluation of computerisation conditions in the Republic of Belarus.

Research activities for “Secure Societies”:

The main activity of the Institute is the creation, development and maintenance of automated systems for state administration bodies, state enterprises and organizations. In the framework of creation of information resources and systems the Institute develops information security systems. To perform this type of work the Institute obtained the license for technical protection of information, including cryptographic methods, including electronic digital signature use.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection; Communication Technologies and Interoperability); Digital Security (Access Control; ICT in Critical Infrastructure Protection; Trust eServices).

Technologies and services for “Secure Societies”:

Web applications and decisions GWT; Business intelligence. Solutions based on Oracle, other methods and tools to build informative reports about the current situation; the tools used for information onversion, storage, analysis, modeling, delivery and tracing during working on tasks associated with decision making based on actual data.

National: Administration of the President of the Republic of Belarus. The project "To develop and implement an automated information system of maintenance of the activity of the Administration of the President of the Republic of Belarus, to form the information resources that provide information support for decision making, including modernizing of the local area network and the Internet-site of the Administration of the President of the Republic of Belarus».

Ministry of Justice of the Republic of Belarus. Projects: «To develop the Unified state register (USR) of the Republic of Belarus, including information about relevant cadastres and registers, formed by state authorities, including development and implementation of the unified state register of legal entities and individual entrepreneurs; to develop a concept and pilot project of USR»; «Development of the automated information system of the Unified state register of legal entities and individual entrepreneurs of the Republic of Belarus (AIS USR Development)».

Securities Department of the Finance Ministry of the Republic of Belarus. The project "To develop and introduce an automated accounting system of functioning of the securities market".

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ScienceSoft Inc. is one of the most experienced IT services providers in Eastern Europe. The company’s highlights include about 400 experienced professionals, ISO 9001 certified processes and over 20 years of market experience. ScienceSoft has been a member of Belarus Hi-Tech Park since 2006 and an IBM PartnerWorld member since 2010.

ScienceSoft service offerings embrace custom software development, mobile application development, software testing, IT infrastructure management, Business Intelligence, Customer Relationship Management systems and Loyalty programs.

Our services in the area of security information and event management include consulting, solution design and implementation (including anti-fraud solution), integration with all the customer’s infrastructure and support services.

The global client base exceeds one hundred companies, from small businesses to Fortune 500 multinationals in over 25 countries.

Research activities for “Secure Societies”:
Correlation analysis for timely threat and risk detection in Banking and Telecommunications in order to prevent fraudulent activities.

Areas of interest (collaboration with European organizations on research and technology transfer):

Digital Security (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:
Discovery of threat cases in Banking and Telecommunications, using IBM Security QRadar SIEM; architecture design, deployment and configuration of anti-fraud solution

Research and Technology Development Experience

National and International:
Self-financing, “Fraud protection in Banking and Telecommunications”.

Other projects: Online gaming platform, Solution for media agencies, Dinamics CRM for media, Music store etc.

The full list of the projects implemented by the company is available on the website: http://www.scnsoft.com/projects

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For over 20 years, the SoftClub group of companies has specialized in software development for the banking and finance industries.

SoftClub team now exceeds 430 people, including 370 technical specialists.

Quality assurance is certified to DIN EN ISO 9001:2008.

SoftClub’s customers are banks, financial organizations, public sector organizations, and IT companies in Russia, Belarus, the Ukraine, Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan, Germany, Cyprus, USA, Sweden.

During three consecutive years 2011, 2012, and 2013 SoftClub has been included in Software Magazine’s Software 500 ranking of the world’s largest software and service companies.

Research activities for “Secure Societies”:

- Self-security - secure production processes of software development, “internal or private information security”.
- Security Products - built-in software (information systems) processes to ensure information security and self-protection.
- Security Services - consulting services for the implementation, validation and certification of secure information processing.

Areas of interest (collaboration with European organizations on research and technology transfer):

Border Security and External Security (Supply Chain Security); Digital Security (Privacy; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”:

Integrated bank system «SC-BANK NT» is based on security technology of common information space and a modern platform ORACLE DBMS and provides automation of operation, accounting, management and analysis activities of multivisional bank.

Protected software complex «SC-CHECK» is designed to minimize the threat of legal, financial and reputational risks by providing information about individuals and entities engaged in financial and other operations, as a result of verification of the persons with a database of individuals and entities World Check (screening), built on the basis of the lists of sanctions of Global Objectives Limited.

Research and Technology Development Experience

National: Information systems for various applications. Various projects funded by:
- The National Bank of the Republic of Belarus;
- Ministry of Communications and Informatisation of the Republic of Belarus;
- Ministry of Finance of the Republic of Belarus;
- State Customs Committee of the Republic of Belarus;
- 30 state and commercial banks in the Republic of Belarus;
- Republican Unitary Enterprise “Belpochta”;
- RUE “The Republican Central Securities Depository”;
- Open Joint Stock Company “Centre of Banking Technologies”;
- JV “Mobile TeleSystems”;
- JSC “Development Bank of the Republic of Belarus”;

International: SoftClub performs contracts for the implementation of automated banking systems abroad in three banks in Turkmenistan and one in Kyrgyzstan. The central bank and the regulator - the National Bank of the Kyrgyz Republic became a client in the Kyrgyz Republic. The contract was signed in the framework of the project on modernization, financed by the World Bank.

In Turkmenistan the SoftClub executes contracts with GKBT “Turkmenbashii” (State Bank, mainly serving industrial and retail sector) and MAB “Garagum” on the implementation of information automated banking systems SC-BANK NT.

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The United Institute of Informatics Problems of the National Academy of Sciences of Belarus is a State Scientific Organization located in Minsk. It was created in 2002 by merging several Belarusian IT research and development organizations. The main research directions of the institute are:

- Computer-aided design (CAD/CAM/CAE)
- Processing and recognition of signals, images and speech
- Geo-information systems
- Input and output of audio-visual information
- Operations research and discrete optimization
- Information security
- Decision support systems
- Bio- and medical informatics
- Computer networks and telematics
- Supercomputing and grid computing
- Information management

Research activities for “Secure Societies”:

The United Institute of Informatics does research in the fields of information security, communication security, information security auditing, secure electronic document management, electronic government, monitoring of secured objects.

The technologies developed at the Institute include instruments for emergency monitoring, devices and software for cryptographic applications, automated information security audit systems, secure electronic document management systems for state and private bodies, an electronic voting system and a system for information support of local councils.

Areas of interest (collaboration with European organizations on research and technology transfer):

- Disaster-Resilience (Disaster Resilience and Climate Change; Critical Infrastructure Protection; Communication Technologies and Interoperability)
- Fight Against Crime and Terrorism (Forensics; Law Enforcement Capabilities; Urban Security)
- Border Security and External Security (Border Crossing Points; Supply Chain Security; External Security)
- Digital Security (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices)

Technologies and services for “Secure Societies”:

- “Guarantor” electronic voting system.
- Automated information system “Local Councils”.
- Expert system for information security auditing.
- Expert system for evaluation of security profiles and security assignments.
- National automated system for electronic customs declaration.
- “Electronic Document” software package.
- “Monitoring-NS” software and information package for emergency monitoring.
- Cryptographic hardware and software, including high-performance systems.

Research and Technology Development Experience

National: UIIP has completed and is involved in a large number of national research projects. The most important national research programs and projects undertaken by the UIIP are State Program of Scientific Research “Scientific foundations and instruments of information and aerospace technologies”, State Scientific and Technological Project “Information Technology” (funded by the National Academy of Sciences of Belarus) and “National program for expedient development of ICT services for 2011–2015” (funded by the Ministry of Communications and Informatisation of the Republic of Belarus).

International: Projects funded by the EC:

- FP7 “SECURE-R2I” on reinforcing cooperation between EU and Eastern Partnership Countries (EPC) on tech-transfer for inclusive and secure societies.
- FP7 “ORIENT-PLUS” (“Linking European and Chinese Research Infrastructures and Communities”).
- FP7 “GN3” (“Multi-Gigabit European Research and Education Network and Associated Services”).
- FP7 “SCUBE-ICT” (“Strategic Cooperation In Ukraine, Belarus and EU In Information And Communication Technologies”).
- FP7 “BalticGrid-II” (“BalticGrid Second Phase”).

Projects funded by the Union State of Russia and Belarus: Russian-Belarusian Scientific and Technological Program “Cosmos-NT”.

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Organisations in Georgia
The G. Tsulukidze Mining Institute (TMI), formerly the Institute of Mining Mechanics of the Georgian Academy of Sciences, was founded in 1957. The institute consists of 4 departments, 6 laboratories and one centre.

The Mining Institute has close international scientific collaboration with research centres and Institutes of EU Countries: Germany (Clausthal University of Technology), Greece, Netherlands, Poland, Spain, Bulgaria, Czech Republic; USA (Los-Alamos National Laboratory, US Army Research Laboratory, Lawrence Livermore National Laboratory, Georgia Institute of Technology, South Dakota School of Mines and Technology, University of San Diego); Russia (Semenov’s Institute of Chemical Physics in Chernogolovka, Institute of High Pressure, Novosibirsk Institute of Hydrodynamics); Ukraine (Institute of Nature Management Problems and Ecology National Academy of Sciences of Ukraine, Dnipropetrovsk, Paton’s Institute of Electrical Welding, Dnipropetrovsk State Design Bureau “Yuzhnoye” etc.), etc.

Research activities for “Secure Societies”:

The project “Design of Integrated Wireless System for the Detection of Accidental and Terrorist Explosions and Fires in Critical Infrastructure” aims to design and develop a prototype of an integrated wireless system for reliable and timely identification of explosions and/or fires in critical infrastructure sites and generation and transfer of a signal to protection and response systems or units.

In case of necessity the system will have ability to have internet connection for notification of alarm/trouble/supervisory events.

The system to be designed shall contain the following elements:

- A module of sensors for the identification of explosions, fires, smoke and methane;
- A module for the identification and generation of an emergency signal;
- An emergency signal transmission module;
- An emergency signal receiving module with internet connection.
- A power supply module.

The research will yield the following key findings:

- Identification software development, improved method for encoding generated and transmission of generated signals;
- Development of an integrated detector design for explosion, fire, fume and explosive gases and prototype production

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection).

Technologies and services for “Secure Societies”:

System for Protecting People from Accidental and Terrorist Explosions in Underground Structures.

The new high-speed suppression system activated at the command of the initiation signal produces tailored dispersing water mist with droplet sizes in the range of 25-400 micron along selected sections of a tunnel.

Video-clip: [www.vimeo.com/19792318](http://www.vimeo.com/19792318)

The development of the presented protective system was sponsored by NATO’s Public Diplomacy Division in the framework of “Science for Peace”.

Research and Technology Development Experience


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The Institute was founded in 1956 as a research institute of the Georgian Academy of Sciences. In 2011 it merged with Georgian Technical University.

Research departments: Computational Methods, Probabilistic and Statistical Methods, Mathematical Modelling, Informatics.


Research activities for “Secure Societies”:

- Characterization of probability distributions in vector spaces.
- Maximal inequalities - applications in functional analysis, telecommunication networks and scheduling problems.
- Effectively realizable computational algorithms, relevant software for the problems of physics and engineering.
- Investigation of areas of impenetrability for nonlinear waves, which may appear after powerful explosions and hurricanes.
- Parallel iteration algorithms for complex applied problems.
- Quantitative description of information processes.
- Methods of computation and optimization for socio-economic problems.
- Mathematical models for environmental and medical problems.

Elaborated programming packages:

Approximate solution of problems on the plain of elasticity theory and of certain boundary problems; Automat control system of special appointment for marine forces; Optimal development and control of energy system; Optimal development of agriculture complex.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Crisis Management; Disaster Resilience and Climate Change; Communication Technologies and Interoperability);

Digital Security (Privacy; Risk Management and Assurance Models; Secure Information Sharing; Trust eServices).

Research and Technology Development Experience

National:
- 2006-2008, Grant # GNSF/ST06/3-009 “Sign-permutation duality in linear analysis. Applications to scheduling theory”.
- 2009-2011, Grant # GNSF/ST08/3-384 “Maximum Inequalities for Rearrangements with Applications to Functional Analysis and Scheduling Theory”;

International:
- In 2010-2012 the Institute was a coordinator of EC funded FP7 - INCO. 2010-6.1 Project N° 266155, (GEO-RECAP);
- In 2013-2016 participates in the projects:
  - FP7-INCO-2013-9. Project N° 609531 (NoGAP);
  - FP7- Marie Curie People-IRES;
  - PEER grant (The Partnership for Economics Education and Research) – for the lectures in ISET, 2011, 2012
- ISF Grant, travel grant to take part in the International Symposium, Ukraine, 1999.
- ISF-g rant MXC000, Gaussian measures in infinite-dimensional spaces, 1994-1996.
- ISF Grant, travel grant to take part in the collaboration activities with ISO (International Organization for Standardization), 1996.
- NATO Grant #NIG-941484, Launching of the Internet network system and appropriate equipment, 1994.
- ISF-gr ant No 1453/3, to take part in II World Congress of Bernoulli Society, 1994.

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Organisations in Ukraine
The main objectives of the association are fundamental and applied research in the field of ecology, environmental management and environmental protection. Association develops environmental projects, forecasts and plans, projects assessing the impact on the environment, independent inventory and a comprehensive analysis of existing and newly created objects, projects and programs, engineering and technology, finding and supporting innovative ideas and developments in the field of ecology.

**Research activities for “Secure Societies”:**

The organization is responsible for monitoring the environment for the presence of harmful substances in it.

**Areas of interest (collaboration with European organizations on research and technology transfer):**

**Disaster-Resilience** (Disaster Resilience and Climate Change, Critical Infrastructure Protection).

**Technologies and services for “Secure Societies”:**

Services: Association develops environmental projects, forecasts and plans, projects assessing the impact on the environment, independent inventory and a comprehensive analysis of existing and newly created objects, projects and programs, engineering and technology, finding and supporting innovative ideas and developments in the field of ecology. Some activities of the Association are: environmental monitoring of individual territories and regions, control of dynamics and state environmental objects, assessing the environmental condition of natural and nature-human systems with the influence of environmentally hazardous facilities on the environment, forecasting anthropogenic changes under the influence of local sources and long-term conservation programs for individual territories, development of mathematical models of geosystems.

Technology:

Environmental development of the project dry storage of spent nuclear fuel, developed a universal express analyzer liquid samples developed ultrasound technology to improve the efficiency of operation of wells in various stages of development.

**Research and Technology Development Experience**

**National:**

A) Projects that were submitted for the contest "Harkovsie Initiative" in 2013, which was held with the support of the Kharkiv Regional Center for Investment and Development:

B) Ultrasonic device for increasing production rate of wells in oil-gas and water extraction.

Method for producing high-octane fuels hydrocarbon.

**International**

A) CRDF:

B) Ultrasonic device for increasing production rate of wells in oil-gas and water extraction.

Method for producing high-octane fuels hydrocarbon.

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Cryos-Beta LTD is a non-state commercial enterprise. Main activities are directed towards development of fabrication technology of scintillation elements and detectors of ionizing radiation, as well as their production.

The main type of activity is export of products of own fabrication. Export is carried out to the USA, EU countries (The Netherlands, France, Italy, Poland, Czech Republic, etc.), Japan, Republic of Korea, China, India, and Russia.

The products made by the company are of general use and special use. The company has all the required licenses and permissions for production and export. Equipment used in production is owned by the company. Production premises are held on lease.

**Research activities for “Secure Societies”:**

The company carries out research using its own funds. The main direction of work is the development of production technology of scintillation detectors. Research works include:

- Development of methods of synthesis of organic molecular substances (stilbene, $p$-terphenyl), growth technology of crystals on their base, and production technology of scintillation detectors of different sizes and shapes. Also, developments are carried out of preparation technology of film detectors and polycrystal-based detectors;

- Development of methods of synthesis of raw material for growth of lithium iodide crystals, growth technology of $^{4}$LiI(Eu) single crystals and production technology of scintillation detectors.

**Areas of interest (collaboration with European organizations on research and technology transfer):**

- Disaster-Resilience (Critical Infrastructure Protection);
- Border Security and External Security (Border Crossing Points; External Security).

**Technologies and services for “Secure Societies”:**

- Detectors based on organic molecular crystals used in radiation monitoring instruments of environmental objects, in scientific experiments, including experiments in outer space for studies of cosmic radiation.

- Detectors based on $^{4}$LiI(Eu) single crystals used for detection of thermal neutrons in security systems for detection of fissionable radioactive materials, in geology for detection of hydrocarbons and studies of soil humidity for construction works (prediction of landslides).

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The Institute is a specialized state agency, which carries a forensic expert and scientific activity in the field of criminology and forensics in accordance with the law.

**Research activities for “Secure Societies”:**

Scientific work in the field of forensics and criminology and implementation of its results in expert practice

**Areas of interest (collaboration with European organizations on research and technology transfer):**

**Fight against Crime and Terrorism** (Forensics)

**Technologies and services for “Secure Societies”:**

Forensic examinations on criminal proceedings, civil, economic, administrative cases, cases of administrative delicts and enforcement proceedings.

**Research and Technology Development Experience**

**National:**

a) technology expert of the Ministry of justice of Ukraine,

b) the development of techniques for the forensic

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Institute of Agroecology and Environmental Management of the National Academy of Agricultural Sciences of Ukraine is a prominent research institution in the area of defining principles of public policy, as well as science and technology in agroecology, environmental management economics, rational use of natural resources and environmental protection. The staff of the Institute works on solving problems of sustainable development of agricultural ecosystems of Ukraine, agroecological monitoring, comprehensive assessment of natural resources condition, rational natural resources use and environmental protection; developing the environmental and economic foundations of the implementation of sustainable agricultural production, land management and sustainable rural areas.

Research activities for “Secure Societies”:

Comprehensive approach to ecologization of livestock and poultry enterprises resides in reagent wastewater treatment with secretion of residues and its subsequent utilization, together with solid wastes with a reduced period of fermentation. It helps to reduce the load on the sewage treatment and receive on output water that does not degrade the performance of natural water bodies, reduce emissions into the environment by reducing the concentration of impurities in the water. Utilization of litter and pus in the form of organic or organo-mineral fertilizer outputs from the technological cycle wastes that negatively influence on environment and create the preconditions for the creation of poultry production or meat in closed-loop for feed.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Disaster Resilience and Climate Change, Critical Infrastructure Protection, Ethical / Societal Dimension)

Technologies and services for “Secure Societies”:

1. Technology for fertilizers production from wastes of poultry, livestock that is combined with wastewater treatment and disposal of sewage sludge.
2. Technologies and biological products of plant protection and increasing efficiency of crop cultivation.
3. Technology to improve the crop yields and soil cleanup (phytoremediation).
4. Remote sensing of rural areas.
5. Organic production.
6. Scientific support of the balanced development of residential areas.
7. Ecological and economic assessment of biodiversity of balanced ecosystem development.

Research and Technology Development Experience

National:

State Agency on Science, Innovations and Information of Ukraine

Project “The development of microbiological preparation for accelerating the destruction of plant residues.”

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Directions of activities of the Institute:
1. Intelligent Robotic Systems: wheeled mobile robots; compact walking robot;
2. Speech recognition systems and musical images recognition systems;
3. System recognition of visual images and vision systems;
4. Multi-agent systems: system for control of group of intelligent agents of security systems;
5. Intelligent telecommunication systems;
6. Develop a theoretical framework to create computer systems of new generation.
7. Publication of scientific, popular scientific and methodological literature.

Research activities for “Secure Societies”:
1. Speaker recognition: robust acoustic features and speaker models, real-time speaker identification, methods of distortion compensation.
2. Autonomous systems for speech recognition (no data transmitted to the Internet): speaker-independent speech recognition and speaker adapted speech recognition, large vocabulary speech recognition, uttered phrases recognition, word by word dictation systems.
5. Development of a simple cheap highly reliable distributed system of control of group of intelligent agents, ensuring human security.

Areas of interest (collaboration with European organizations on research and technology transfer):

Fight Against Crime and Terrorism (Forensics; Urban Security); Digital Security (Access Control).

Technologies and services for “Secure Societies”:
1. A software library for speaker identification was created. It enables to add data of new speakers into an acoustic database, to produce identification or verification of person by a fragment of the audio signal with the possibility of automatic detection and suppression of noise.
2. A technology of large vocabulary speech recognition based on diphone recognition was proposed.
3. Technologies for identification of person by image of face, for recognition of license plates of cars on images, for search of target objects on images based on using of structural descriptions of pictures were developed.
4. A system for control by group of intellectual agents of system of safety was created.

Research and Technology Development Experience
National: National Academy of Science of Ukraine, Ministry of Education and Science of Ukraine:
• Development of scientific and theoretical foundations for new information and communicative technologies for accepting and processing voice and visual information in robotic computing mechanical hardware.
• Development of method for organization of storage for intellectual platforms in tasks of semantic-syntactic analysis for natural language text and image recognition.
• Development of methods for spoken sentence recognition within phoneme-based speech recognition with generalized transcription.
• Working out of scientific and technical bases of creation of an innovative highly reliable control system by group of intellectual agents of system of safety.
• Development of scientific and technical bases for mobile reception and technical analysis software sequence data quoted.
• Development of program libraries of automatic speaker recognition on the basis of robust identification features.
• Development of mobile information–measuring system of Internet control and management of remote sites to a mobile network.
• Development of methods for car license plate recognition based on intelligence analysis of visual information.

International: FP7-ICT support action: SCUBE-ICT Project «Strategic Cooperation in Ukraine, Belarus and EU in Information and Communication Technologies»

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LMNO is a research laboratory having 1 senior researcher and 5 postdoctoral young scientists and PhD students. The area of research is numerical modeling of the wavelength-scale effects and devices from the optical range of wavelengths to terahertz wave. This means that we use classical Maxwell theory however combined where necessary with quantum model of active regions and graphene layers. The basis of work is a set of in-house algorithms and computer codes developed using the integral equations with favorable features. LMNO is a part of larger government R&D facility, called the Institute of Radio-Physics and Electronics of the National Academy of Sciences of Ukraine (IRE NASU).

Research activities for “Secure Societies”:

LMNO laboratory is engaged into numerical modeling of fundamental effects in micro and nanoresonators and optically coupled arrays of such resonators. This involved both analysis of performance and their numerical optimization. We study both passive devices and components such as frequency-selective wave scatterers, filters, antennas, and transmission lines and active devices such as lasers based on micro and nanocavities equipped with active regions. Such lasers are considered as promising sources of the visible, infrared and terahertz waves for the dense optical circuits of the future generation of communication networks. Their introduction and use will greatly enhance the security of communications.

Areas of interest (collaboration with European organizations on research and technology transfer):
Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Communication Technologies and Interoperability); Digital Security: Cybersecurity, Privacy and Trust (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Research and Technology Development Experience

International: 2014-2015, European Science Foundation "Plasmon-Bionanosense" Network, 5 exchange grants to work at Institute of Photonics and Electronics ASCR, Prague and Ecole Nationale Superieur de Cachan
2010-2013, European Science Foundation: 12 exchange grants for work at Universite de Rennes 1, University of Nottingham, Ecole Politecnique Federale de Lausanne, etc.
2011-2012, FP-7: Project "Spin-thermo-electronics" (sub-contract work for the University of Gothenburg)
2008-2011, NATO-RIG: Project "Advanced numerical modelling of quasioptical focusing systems"
2008-2009, Ministry of European and Foreign Affairs, France: Project "Electromagnetic modeling and design of dielectric lenses and resonators for the emerging photonic and THz applications"
2007-2010, Turkish Council for Science and Technology: Project "Innovative electromagnetic modeling of multielement quasioptical focusing systems"
2007-2009, Ministry of Education and Research, France: Project "Advanced numerical modeling and design of dielectric lens antennas"

Technologies and services for “Secure Societies”:
Preceding numerical modeling of various expensive optical and terahertz components and devices id widely considered as efficient way to reduce the cost and time needed for developing new electromagnetic systems and improving the existing ones.

As we are interested in reliable numerical modeling of the wavelength-scale devices and effects, we need the adequate modeling instruments. These are the integral equations derived from the Maxwell equations and boundary conditions at the surfaces of components and materials. Such integral equations must be further solved numerically on computer. This implies discretization of integral equations that is non-trivial task because, if a discretization scheme is not appropriate, the solutions do not converge. This means that they cannot be trusted. We develop the convergent algorithms and further turn them to computer codes. These codes can be used as purely research tools aimed at the obtaining new knowledge. Besides, they can be used in the industry for the computer-aided design and control of real-life optical communication sources and other devices.

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The Ivano-Frankivsk National Technical University of Oil and Gas (www.nung.edu.ua) was founded in 1967. Today, 14 Faculties and 58 departments train over 10 thousand students in 19 BSc and 29 MSc programs. The University has around 700 persons in academic and research staff and around 160 PhD students. The Institute research results dealing with a technology transfer activities in energy industry are well-known among experts both from regional and international oil and gas companies. A number of research conferences are organized by the Institute every year. All the research and development work conducted at the University is done under the supervision of the Research and Development Institute of Oil and Gas Power Engineering and Ecology. The National Contact Point for EU Horizon 2020 on “Clean and Efficient Energy” is being active at the University since 2013.

Research activities for “Secure Societies”:

In recent times, the University focused its research priorities on sustainable development of power engineering covering the following fields of study – energy-efficiency, risk analysis, unconditional resources development, renewables etc. The research infrastructure used for this includes also the Oil and Gas Technological Park, 5 research laboratories, and the technical committee for standardization UA/TC146.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection); Border Security and External Security (Border Crossing Points; Supply Chain Security).

Research and Technology Development Experience

National: In the last 5 years, the University had more than 15 projects funded by the Ministry of Education and Science, the Ministry of Fuel and Energy, the Ivano-Frankivsk City Council, SC “Ukrtransgaz”, SC “Ukrtransnafta”, JSC “Chornomornaftogaz”, with a total budget of 6 MIO UAH.

International:
In the last 5 years, the University participated in CRDF, TEMPUS, HUSKROUA ENPI CBC, and FP7 projects.
HUSKROUA/0901/062 “Quality Assurance for Society Oriented Education, Research and Development”.
HUSKROUA/1101/194 “Cross-border network for technology transfer” FP7-INCO-2013-9 GA 609570 “Building a more effective pathway leading from research to innovation through cooperation between European Union and Eastern Partnership countries in the field of energy efficiency”.

TEMPUS 543966 project “Higher engineering training for environmentally sustainable industrial development”.

“How Training of Energy and Environment Experts - a program for industry and public sector in Ukraine” funded by the Norwegian Ministry of Foreign Affairs.


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Research activities for “Secure Societies”:

Research Laboratory Metaintelligence carries out research and development in the field of Web-based tools, resources, services, and environments supporting new forms of data accumulation, representation, procession and sharing based on semantic technologies and artificial intelligence methods and models.

One of the current trends in our work is semantic technology, linked data and big data application for protection of societies wellbeing, particularly human development via quality assurance in various problem domains, e.g., higher education, business, etc. The technology helps maintaining trust and collaboration between key domain players with help of new communication platforms - Web-portals. Portals represent a set of solutions that enable, support, and automate activities, information flows, and transactions within ecosystems of individuals, Web-agents, Web-systems and services, who are exchanging heterogeneous information.

National Semantic Portal for Quality Assurance of Higher Education (http://portal.dovira.eu) was designed and developed as a means for control, open communication, and social contribution to Ukrainian higher education.

Areas of interest (collaboration with European organizations on research and technology transfer):


Technologies and services for “Secure Societies”:

We focus on developing and utilization of technologies created under the vision of Semantic Web. In our work we integrate principles and approaches of Linked Data (semantic technologies for extraction, creation, distribution, sharing and utilization of interlinked data) with technologies supporting intelligent data manipulations and knowledge management like machine learning, collective intelligence, data mining, etc. Ontologies are used for knowledge representation.

Our main concern is both security (confidentiality, integrity and availability) and trustworthiness of the semantically-enabled content. We ensure it by means of user authorized access, flexible user-dependent customization (handling private and public user spaces on portals), social verification and user reputation management mechanisms.

The overall security of the developed systems and services we build over the state-of-the-art security solutions, e.g., clouds for distribute data storing, regular system backuping and administration.

Research and Technology Development Experience

National

“Development of the Web-oriented system supporting accreditation and licensing of HEIs in Ukraine” (РДР0108U010139) funded by Ministry of Education and Science of Ukraine;

“Development of the system supporting semantic queries to the ontological base of accreditation and licensing” (РДР0109U001647) funded by Ministry of Education and Science of Ukraine;

“Development and introduction of the distributed architecture for the Ontological Portal of MESU for safe, secure and effective system backuping and administration.”

International:

TEMPUS project “Towards Transparent Ontology-Based Accreditation” SCMI020806 funded by European Commission;

TEMPUS project “Towards trust in quality assurance systems” 516935-TEMPUS-1-2011-1-FITEMPUS-SMGR funded by European Commission (http://dovira.eu);
The Institute is a leading center in chemical science, where world-famous scientific schools have originated. Many developments of the Institute are widely used in various spheres: in chemical and petrochemical industry, aircraft and space industry, shipbuilding and mechanical engineering, medicine etc. In particular, a new generation of photosensitive materials and information-registration methods, efficient sorbents, novel chemical power sources, methods and means for non-destructive control of large-sized industrial products, technologies of radiation and chemical modification of polymers, etc.

Research activities for “Secure Societies”:

Research of ability of dynamic holography in self-assembled hybrid nanostructured silica films for all-optical switching and multiplexing

Areas of interest (collaboration with European organizations on research and technology transfer):

Digital Security: Cybersecurity, Privacy and Trust (Secure Information Sharing)

Technologies and services for "Secure Societies”:

Technology of composite films containing dye was examined for their potential use as the photonic layer in an all-optical switching device. The derived sol-gel composite films consisted of a silica framework and self-assembled organic mesostructures. Obtained films showed remarkable physical and optical properties. Recording of a dynamical grating in a single-pulse regime has been obtained. Since the dynamical grating exhibits the fast relaxation time (up to 10 ns), the nonlinear mechanism represents an electronic excitation of the photosensitive molecules.

Research and Technology Development Experience

International:
CRDF - 1998-2001
STCU - 2005

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The Institute of Applied Physics NAS of Ukraine is included into the Department of Nuclear Physics and Power Engineering of National Academy of Sciences of Ukraine. The Institute is engaged in fundamental and applied nuclear research like experimental and theoretical research of low-energy ion and electron interactions with matter or the development of electrostatic accelerator-based instrumentation for analysis of material structure and composition, including biophysical objects and biomaterials, with submicron lateral resolution; development of equipment for education and research. The staff amounts to 240 persons. Investigations are performed by 218 researchers including 42 PhDs, 9 ScDrs, 1 corresponding member of NAS of Ukraine, and 1 Academician of NAS of Ukraine.

Structure of the Institute:
Department of Charged Particle Beam Physics
Department of Radiation Biophysics
Department of Nuclear and Physical Research;
Department of Quantum Electrodynamics of Strong Fields;
Interagency Department of Physical Methods of Ore Analysis
Department of Modelling of Radiation Effects and Microstructural Transformations in Constructional Materials;
Research Centre of Equipment for Education and Research
Scientific and Organizational Department

Academic staff is trained in a Postgraduate Study and in the Doctorate
There is a specialized Board of Studies on theses defence at the IAP. The unique experimental base of the IAP allows launching cross-subject research and development in education, environmental science, and medicine.

Research activities for “Secure Societies”:

Studying the attributes of uranium ores and uranium-bearing materials to prevent their illicit trafficking.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Disaster Resilience and Climate Change); Fight Against Crime and Terrorism (Forensics).

Technologies and services for “Secure Societies”:

Analytical facility based on 2 MeV electrostatic accelerator with:
1) a microprobe end-station;
2) Rutherford back scattering end-station with high resolution;
3) Recoil nuclei end-stations with high resolution;
4) PIXE-end-station;
5) Nuclear end-station;
6) Ion luminescence end-station.
Additional techniques: electron microscopy; X-structure analysis; optic microscopy.

Research and Technology Development Experience

International:
STCU P 465
“Study of attribution signatures of various uranium bearing materials”

STCU P 464
“Investigation of representative samples of uranium ores from Ukraine deposits”
The department of integrated automated systems for special purposes was founded in 2004. It is a leading research team of the Institute in the field of automated and contingency management, modeling of decision-making in the development of systems for the protection of confidential information in the computer and telephone networks for application in civil and special purpose; hardware and software for integrating local and network provide a variety of PC platforms, and network fax systems, and telecommunications modules of mobile systems, systems software production and environmental and cultural security, as well as other innovative information technology.

Research activities for “Secure Societies”:

The Department of integrated automated systems for special purposes IPMMS concentrates the researches in priority areas to create “Safe Company” such as automated systems production and environmental safety as well as safety culture, a system of continuous and periodic monitoring, system modeling decision-making systems to protect confidential information in computer and networks for application in civil and special purpose.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Crisis Management; Disaster Resilience and Climatic Change; Critical Infrastructure Protection; Communication Technologies and Interoperability); Digital Security (Privacy; Access Control; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust Services)

Technologies and services for “Secure Societies”: 

- Development of architectures of software and hardware computer networks and telephone systems for cryptographic protection of information. There were created means of cryptographic protection of telephone conversations for network standards of GSM, CDMA and phone switched public networks, system notifications, corporative systems, hardware and software information security in LANs, including encryption package devices for Ethernet-channels of computer network, hardware and software keys active users computer network. Developed software and hardware cryptographic protection produced and delivered to customers under separate contracts;  
- Development of the structure and the formation of an integrated database of geological and geographical information and methods of three-dimensional modeling of rock masses and developments to predict migration of methane in coal deposits and mines, mathematical modeling and monitoring of changes in the stress state of rock masses abandoned mines;  
- Development of hardware and software for integrating local and network providing various personal computer platforms, network and fax systems, and telecommunications modules mobile systems. The division has a Quality Assurance Group and formalized procedures of software development based on the requirements of ISO-2000. Technology tools design, documentation preparing and project management are Rosa 2000, ER-Win, BP-Win, Test Center 1.2, Lybid II software systems.

Research and Technology Development Experience

National: Various projects funded by the Ministry of Defense of Ukraine, the Ministry of Education and Science of Ukraine, the Ministry of Emergencies of Ukraine, the State Committee of Communications and Infomatisation of Ukraine, the General Directorate of Industrial Policy of the Kyiv City State Administration, etc.;

Theoretical Foundations of automated intelligent decision support systems based on the situational modeling (Situational centers) modeling system to predict and eliminate the consequences of the accident at the nuclear power station Chornobyl, theoretical fundamentals, methods and techniques of model-based industrial control systems and their security; architecture of software and hardware computer networks and telephone systems for cryptographic protection of information, structure and formation of integrated databases of geographical and geological information are based on three-dimensional modeling methods and workings of rock masses to predict the migration of methane in coal deposits and mines, mathematical modeling and monitoring of changes in the stress state of rock masses abandoned mines, architecture of software and hardware automation systems for industrial enterprises industrial and environmental safety, as well as improving safety culture; hardware and software for integrating local and network provide various personal computer platforms, network and fax systems, and telecommunications modules mobile systems.

International: Prolific Inc. firm, Taiwan; SW Division, Germany; 3 COM firm, U.S.; ClearFax firm, U.S.; SkyCom ClearFax firm, Luxembourg: Development of software USB-bridges association platforms Mac - PC and Linux - PC; software development an external memory of various kinds (CD, CDRW, CF, MO, etc.) for Mac, PC, Linux - platforms; development of radio network software and wired networks based on USB technology; portable Linux on R-3000 microprocessor, software development of clustered operating systems elements based on Windows NT-platform, software development, IRDA-adapters, fax software development, development of telecommunication module of mobile systems.

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The Institute’s main activities include research of technical objects magnetism. The Institute consists of three academic departments, 4 doctors of science and 10 PhDs. The Institute has a unique magneto-dynamic complex for experimental studies of magnetism phenomena of technical objects, which has Ukraine national heritage status.

These studies are aimed at industrial and residential premises magnetic ecology, protection of environment and people from magnetic field influence, elimination of negative influence of magnetism phenomena on electric welding processes and metal treatment, orbital spacecraft magnetic operation, equipment magnetic compatibility, development of methods of precision control of electromagnetic and electromechanical systems.

Research activities for “Secure Societies”:
- Theory of technical objects magnetism: mathematical modelling of technical objects as magnetic field sources, solution of inverse magneto-static problems, methods and means of shielding, technical objects magnetization and demagnetization;
- Determination of technical objects magnetic characteristics: creation of new measurement systems with improved metrological characteristics, measurement of magnetic parameters of different objects, including satellites;
- Operation of technical objects magnetic field: development of methods and means of electromechanical devices high precision operation, elaboration of automatic control systems (compensation) of technical objects magnetic field;
- Magnetic ecology and compatibility, reduction of magnetic field influence on human health and environment.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Critical Infrastructure Protection).

Technologies and services for “Secure Societies”:
1. Technology of GMF monitoring in operators’ workplaces. The technology is based on maps of GMF distribution in workplaces drawing as the result of magnetic induction module measurements by vector flux-gate magnetometers and hygienic assessment of energy objects operators’ workplaces.
2. Technology of GMF weakening in premises simulation. Technology provides a methodology and software. Software is based on magnetic field calculation in the vicinity of ferromagnetic structures using finite integration technique and absorbing boundary layers. Calculation of magnetic field in presence of ferromagnetic elements allows finding quantitative indices of ferromagnetic elements mutual location influence on their magnetic field, which is the basis for choice of control stations' operators workplaces location where levels of GMF weakening do not exceed permissible values.
3. Technology of weakened GMF normalization to permissible levels. This technology involves elaboration of organizational and technical measures complex, normalizing GMF in control stations’ operators workplaces of energy facilities (both existing and designed) that are based on optimization of workplaces location, as well as compensation, demagnetization, shielding.

As a result of the proposed technology usage, reliability and safety of power facilities operation (including nuclear power plants) improves due to stress-factor in operational personnel associated with man-made distortions of GMF lessening (elimination).

Research and Technology Development Experience

National: Research project "Development of scientific and methodological foundations of normalization of technological distortions of geomagnetic field in the control stations’ operators of power systems workplaces" of the integrated program of research of NAS of Ukraine “Scientific and technical problems of integration of Ukraine Energy System to the European energy system ("Integration")", funded by National Academy of Sciences of Ukraine.

Experimental research base - Magneto-dynamic complex of the Institute

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The Institute for Scintillation Materials of the National Academy of Sciences of Ukraine (ISMA) is a unique institution combining fundamental scientific studies and R&D activity in the field of radiation detection materials. The high experience in scintillation materials research makes for competitiveness of ISMA developments on the world market of radiation detection technologies. The latter is confirmed by a long-term partnership between ISMA and leading world-known producers.

Research activities for “Secure Societies”:

Scintillation materials are the base for ionizing radiation detectors and systems widely used in the different security applications - non-intrusive inspection of freights/transport and body scanners at checkpoints, radiation monitoring of environment, etc.

ISMA research activities focus on functional properties improvement of traditional scintillation materials via novel engineering and technology solutions as well as on search of advanced, more effective transformers of ionizing radiation based on inorganic, organic and composite materials.

Areas of interest (collaboration with European organizations on research and technology transfer):

**Border Security and External Security** (Maritime Border Security; Border Crossing Points; External Security).

**Technologies and services for “Secure Societies”**:

ISMA possesses state-of-the-art production and processing technologies for different scintillation materials as well as advanced developments in radiation detectors of various types and constructions.

Research and Technology Development Experience

**National**:

The National Academy of Sciences of Ukraine’s Project «New crystals for experiments on search for muon-electron conversion» 2012-2013;

The State fund for fundamental researches’ Project «Search for new inorganic crystalline scintillation materials for operation in the detectors at LHC with increased luminosity» 2013-2014.

**International**:

FP7 ERA-WIDE project «Strengthening Ukraine and EU research cooperation in the field of Material Sciences» (project acronym SUCCESS) INCO-2010.6.1 Theme [Nanosciences, Nanotechnologies, Materials and new Production Technologies –NMP] 2010-2013

The State fund for fundamental researches, Ukraine-France bilateral project «Structure, electronic and scintillation properties of mixed crystals based on silicates of lutetium and gadolinium» 2010-2011

The State fund for fundamental researches, Ukraine-Japan bilateral project “Development of novel scintillators for advanced gamma-ray imaging” 2013-2014

a) The Ukrainian State Agency for Science, Innovation and Informatisation

b) Ukraine-France bilateral project “New low cost scintillating materials based on mixed oxides for medicine, security and high energy physics” (DNIPRO) 2013-2014.

NATO, Project “Development of the thin-film and film-crystal combined scintillators based on the rare earth-doped silicates”.

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The Institute for Single Crystals of NAS of Ukraine has more than a half century history and is one of the recognized leaders in the creation of new crystal materials for optics, laser technology, electronics, radiation detection and other applications; in basic research on the structure, physical and physicochemical properties of crystals, thin films, nanomaterials; in the development and improvement of high-tech equipment and methods of production of crystals for various applications.

Long experience of research, search for optimum procedures and development of high technologies allows us to obtain dielectric, semiconducting, ferroelectric and other types of crystals of the highest quality.

Research activities for “Secure Societies”:

Development of technology for receiving of KDP, ADP, KADP single crystals with incorporated nanoparticles of metal oxides, organic phosphors and rare-earth elements to create a highly efficient nonlinear optical and selective scintillation medium. Synthesis low-temperature methods, characterization, determination of stability conditions of the nanocrystals and nanocrystalline powders of noble metals Au, Ag, Pt, Pd, REO3, Y2O3, Y3Al5O12 high-temperature oxides and others, ZnO, CdS, PbS semiconductors and others, development of the methods for obtaining of ordered arrays, film structures and ceramics based on them for the problems of photonics, catalysis and medicine.

Development of products from shaped sapphire, sapphire products for medicine (implants, scalpels), ethermometry, transparent armor and other special applications.

Development of active laser media for solid-state lasers and scintillation materials based on oxide single crystals. Development of industrial methods for Al1BVI compounds and their solid solutions growing from the melt doped semiconductor crystals.

Development of technologies for producing large single crystals of refractory oxides (sapphire, Ti:sapphire, YAG:Ce, LuAG:Pr, etc.) and products from them for optics, optoelectronics, microelectronics, lasers, scintillation technique, special applications.

Areas of interest (collaboration with European organizations on research and technology transfer):

Border Security and External Security (Maritime Border Security; Border Crossing Points; Supply Chain Security; External Security; Ethical/Societal Dimension).

Technologies and services for “Secure Societies”:

Sapphire Armor. Transparent armor based on sapphire. The thickness of the armor: 35 mm against a bullet with armor-piercing heart; 45-55 mm against bullet 7.62x54AP with core of tungsten carbide. Developed a technology that allows creating a wide range of nanomaterials from the solutions using controlled processes of phase formation (colloidal synthesis, sol-gel method, synthesis in microemulsions at the temperatures of up to 90-95 °C). The technology is environmentally friendly, allows to obtain nanoparticles of different chemical compounds (metals, alloys, oxides, chalcogenides, etc.) and with high reliability to control their composition, structure and geometric characteristics. Traditional and perspective fields of nanoparticles and nanomaterials applications: raw materials for chemical industry, glass and glass-ceramics production, abrasive wear-resistant materials; structure-forming additives for metals and alloys hardening; components for obtaining of super hard, high temperature, wear-resistant, homogeneous and inert ceramics; raw materials for obtaining of optical ceramics (laser, scintillation, luminescence); photonics, plasmonics, sensors, catalysis, and medicine. Scintillation material. KDP:Ti, ADP:Ti, KDP:Ce are scintillation materials for the detection of fast neutrons in mixed n, γ fields.

Semiconductor detectors based on CZT crystals provide direct conversion of radiation energy into an electrical signal. The crystals of Cd1-xZnTe (x=0.1) is an effective material for registration of ionizing (mainly gamma-) radiation when solving the problems of radiation monitoring, medical testing, pollutions of the environment monitoring, as well as for use in space technology and astronomy.

Research and Technology Development Experience

National: National Academy of Sciences of Ukraine, The State Fund For Fundamental Researches, Ministry of Education and Science Of Ukraine, State Agency on Science, Innovations and Informatization of Ukraine. Investigation of phase formation, the formation of structure and properties of high laser nanoceramics(Y1-xREx)(Al1-yGav)yO12 (RE=Nd, Yb);

Single crystals of compounds of group A1B1II: Fe2+ and double borates lasers for infrared range of continuous broadband frequency tuning generation.

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The Institute was established in 1955 on the basis of the former Departments of Electromagnetic Oscillations and Radio Wave Propagation of the Kharkov Institute of Physics and Technology of NASU. The main objective of the newly founded Institute is research and development in the wide frequency range of electromagnetic wave spectrum, with a special emphasis on the millimetre (mm) and sub-millimetre (sub-mm) waves. Since its establishment, the Institute has gained a status of a widely-known scientific centre, whose achievements determine the level of the national science in radio physics, vacuum electronics, quasi-optics, microwave studies in solid-state physics and biophysics, radio wave propagation, remote sensing of Earth from airborne and space-borne platforms, etc.

The most significant achievements of the Institute are:

- Fundamental theoretical and experimental analysis of the phenomena of electromagnetic wave generation has been carried out; a series of new radiation sources of millimetre and sub-millimetre wavebands has been developed, with wide potentialities in radar, communication systems, and defence applications;
- A pulse-mode magnetron has been designed, which operation mode name is "Kharkov 11 one", as well as continuous-mode magnetrons, klynotrons1 and reflection klystrons covering the wavelength range from 0.5 mm to 2 cm;
- New sources of coherent radiation of the mm and sub-mm ranges have been designed: orotrons (diffraction radiation sources) of pulsed and continuous modes having champion parameters in terms of high stability, narrow spectrum, low noise and high power;
- High-efficient sources of far-infrared and optical band have been developed: dye lasers with a tuneable frequency of induced emission;
- Full sets of the waveguide measuring devices (within the range from 1 mm to 10 mm), a set of quasi-optical wide-range measuring devices and components for measurements within the wavelength range from 0.1 mm to 1 mm have been developed;
- Quasi-optical single- and multibeam interferometers-polarimeters of the sub-mm range have been developed for the hot plasma diagnostics in large Tokamak fusion machines;
- A one-of-a-kind experimental research setup has been designed for studying the non-linear processes in nuclear systems by using the methods of electron-spin and nuclear-paramagnetic resonance;
- Computationally efficient and mathematically correct methods of solving boundary-value problems of electromagnetic wave diffraction by periodical and open structures of various geometries have been developed;
- Advanced methods of mathematical modelling of the problems of analysis and synthesis of complicated electromagnetic systems have been suggested.

Research activities for “Secure Societies”:

1. Radar for detection of sea pirates.
2. Wireless radio-beam sensor for perimeter security.
3. Doppler radar guard.
4. Radiometer for detection of the foreign objects on the human body under clothing.
5. Portable radar detection of living people for opaque obstacles.
6. Scanning GPR.
7. Videopuls GPR.
8. Radar safety airfield.

Research and Technology Development Experience

National: National academy of science of Ukraine, RLS-AERO
International: Numerous STCU projects.

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The National University of Civil Protection of Ukraine is a leading educational institution of the State Emergencies Service of Ukraine which has the highest – IV-th accreditation level of Ukrainian Ministry of Education and Science. Nowadays our University is one of the most prestigious and oldest Fire and Rescue profile educational institutions not only in Ukraine but also in CIS countries. Today we provide all types of training on all educational levels for personnel of the State Emergencies Service of Ukraine, civil youth and foreign citizens. Research and teaching staff as well as students of the University are directly involved in extinguishing fires, emergencies, accidents and natural disasters, carry out preventive work among the population.

Research activities for “Secure Societies”:
1. Management problems of civil protection;
2. The problem of improving the efficiency of maintenance of fire safety of objects, processes and other;
3. The problems of prevention and localization of emergency situations and liquidation of their consequences.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience (Crisis Management; Disaster Resilience and Climate Change).

Technologies and services for “Secure Societies”:
1. Development of scientific bases of state regulation of construction and increase of efficiency of civil protection system functioning, its functional and territorial subsystems.
2. Scientific substantiation of legislative, normative-legal and normative-technical acts of civil protection.
3. Development of methods and systems of support of acceptance of administrative decisions in the sphere of civil protection.
4. Research of regularities of combustion conditions and fires factors.
5. Research on preventing the formation of a combustible environment, as well as prevention education in it sources of ignition.
6. Creating and searching of optimal methods and means of fire extinguishing, liquidation of emergency situations, fire protection systems and fire safety.
7. Automation of technological and tactical processes in systems of fire safety of objects.
8. Characterization of fire equipment, automation, alarm, and other products and fire protection systems.
9. Development of methods and means of testing flammable materials, fire extinguishing substances, means of protection from harmful factors of fires, as well as methods and means of control and diagnostics of samples fire engineering, automation, alarm, and other tools, devices and fire protection systems.
10. Development of methods of increasing the reliability and efficiency of means and equipment of fire safety of objects.
11. Development of scientific foundations of civil protection. Substantiation of the fundamentals of risk assessments in the daily activities of people in a separate facility or region.
12. Development and creation of state systems and regional monitoring of emergency technogenic situations and natural character.
13. The improvement of existing and creation of new methods of forecasting and prevention of emergency situations of technogenic and natural character.
14. Development of mathematical models of emergencies, creation of optimum algorithms of elimination of accident consequences and disasters, including search and rescue people in the water.
15. Development of scientific bases of efficient organization and carrying out of rescue and other emergency operations in emergencies.
16. Are technical means and devices for carrying out of rescue works.

Research and Technology Development Experience

National: South Ukraine Nuclear Power Plant: Development of complex emergency security system.
National Technical University of Ukraine ‘Kyiv Polytechnic Institute’ is one of the oldest and largest technical universities in Ukraine. It was founded in 1898. NTUU KPI is famous for its academic excellence and leading innovative research.

NTUU KPI ranks first nationally, and is world recognized in the number of graduate academic and research programs in the top ten in their field. 40500 students study at 29 University Colleges. NTUU KPI has drawn 1500 students from all over the world.

There was established post-graduate education center, which provides second-degree programs in all fields of study for undergraduate programs. NTUU KPI has a long track record in scientific cooperation with Europe in a number of FP7 and H2020 projects, Tempus and Erasmus Mundus Programs.

NTUU KPI is founder of Ukrainian Research Academic Network and Science Park "Kyivska Polytechnika" which is a form of scientific and research process organization which promotes effective commercialization of high-tech developments.

Research activities for “Secure Societies”:

2. Startup IOT-GUARD – IOT-based Warning and GUARDing System. Priorities: Consumer Internet of Things (IoT), Smart Home, Security (Personal and Corporate)
3. Startup Automated intrusion detection system. Priority: “Cybersecurity services to protect enterprises”

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Critical Infrastructure Protection); Digital Security: Cybersecurity, Privacy and Trust (Privacy; Risk Management and Assurance Models; ICT in Critical Infrastructure Protection; Secure Information Sharing; Trust eServices).

Technologies and services for “Secure Societies”: The Ukraine Grid Certification Authority is created to provide the needs of Ukrainian research and education community for Public Key Infrastructure service. UGRID CA is hosted and operated at the High-Performance Computing Center of the National Technical University of Ukraine Kyiv Polytechnic Institute. [https://ca.ugrid.org](https://ca.ugrid.org)

Research and Technology Development Experience

National:
1. Supporting of Ukraine National Grid Certification Authority [https://ca.ugrid.org](https://ca.ugrid.org)
2. MANAGER OF TRAINING. Cyber security for IT special agents in information technologies

International:
1. Member of the EUGridPMA (Building Trust for Distributed IT Infrastructures for Research) [https://www.eugridpma.org/](https://www.eugridpma.org/)
2. Tempus IV 530319-TEMPUS-1-2012-1-DE-TEMPUS-JPHES. Innovation hybrid strategy of IT-outsourcing partnership with enterprises
4. TEMPUS IV 543839-2013-SE-SMHES Innovation hybrid strategy of IT-outsourcing partnership with enterprises
5. FP 7 The PICTURE project, ICT R&I priorities in EaP, areas of cooperation WORKING GROUP FOR EU-EECA ICT POLICY DIALOGUE AND RESEARCH COOPERATION IN THE WG2: COMPONENTS, COMPUTING SYSTEMS, AND NETWORKS FIELD

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The Information Control Systems Department of National Aerospace University “KhAI” was founded in 1974 due to the industry needs in professionals on automated control systems in different sectors of national economy.

Research activities of the Department are aimed on development of science-based approaches, mathematical methods and models applicable for advanced production processes control.

The Department realizes research in the following areas:
- Development of information technologies for administrative management of complex socio-technical systems
- Development of methodological principles, methods and mathematical models for logistic analysis and control of distributed technological complexes
- Synthesis of system and informational technologies intended for projects and programmes management
- Development of methods and models intended for quality management of the production development programmes and new research-intensive product development projects
- Development and upgrading of communication and data networks.

The department has international links with Universities and Research Centres of Russia, USA, Germany, Austria, Sweden, Netherlands, Mexico, Canada, China and other countries.

Research activities for “Secure Societies”:
1. Research in the field of risk analysis during the whole product life cycle including complex equipment recycling stage.
2. Development of models and methods to be used for generation of work package for aircraft recycling project, e.g.:
   - system model of work package in the aircraft recycling project
   - method of analysis of risk of recycling process adverse impact on environment and personnel
   - optimization models for basic indexes of aircraft recycling project – profit, cost, time, quality and potential risk cost value approach for recycling project efficiency estimation taking into account the risk cost and avoided damage value

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate (Crisis Management, Disaster Resilience and Climate Change, Critical Infrastructure Protection, Communication Technologies and Interoperability); Border Security and External Security (Supply Chain Security); Digital Security; Cybersecurity, Privacy and Trust (Privacy, Access Control, Risk Management and Assurance Models, Secure Information Sharing).

Research and Technology Development Experience

National:

Workflow of aircraft equipment recycling project

Assessment of potential damage could be caused by the risk of recycling adverse impact on environment and personnel

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The National Aerospace University “KhAI” (KhAI) is a leading Ukrainian technical University that provides a completed cycle of higher education in the field of aerospace engineering. The University consists of 10 Faculties, each subdivided into several Department (41 Departments in total). The KhAI is a member of International Association of Universities (IAU/UNESCO), Partnership of a European Group of Aeronautics and Space Universities (PEGASUS), European Aeronautic Science Network (EASN), The Magna Charta of the European Universities (Magna Charta Universitatum), International Association of Technical Universities from CIS Countries, Academic Association of CIS Countries Higher Education Institutions. KhAI academic community participates in double-degree academic programmes, and EU-funded educational projects, such as TEMPUS and ERASMUS Plus.

In addition to its educational activities, KhAI is a globally-recognized research center, whose research teams carry out intensive research in the fields of aircraft engineering, space engineering, advanced manufacturing processes, control systems engineering, information technologies and systems, material sciences, physics, etc.

KhAI has been working together with the leading European and other international industrial and research organizations, such as AIRBUS, ONERA, Thales Alenia, Boeing, EOARD, IA, AVIC, etc. KhAI researchers successfully participate in a number of industry-driven bilateral agreements, nationally-funded and EU-funded projects (FP7, Horizon 2020).

Research activities for “Secure Societies”:

R&D Center of Dependable Embedded Systems, Services and Technologies of the Department of Computer Systems and Networks carries out research activities on dependable and secure systems and communications for safety critical (NPP I&Cs, Aerospace systems, IT medicine), business critical (e-science, e-commerce, banking) and energy (or recourse) critical applications. Main research lines are Instrumentation and Control systems safety and security and Smart-Grid& Infrastructures safety and security.

Researchers of the Department of Transmitters, Receivers and Signal Processing conduct research focused on digital signal and image processing for telecommunications and remote sensing from airborne and spaceborne platforms. Developed bispectrum-based signal processing techniques are suitable for various surveillance technologies and techniques capable to provide quality detection capabilities and imaging.

Researchers of the Department of Aircraft Radioelectronic Systems Design focus on the development of radio-engineering systems. One of research topics is aimed on the development of ultrawideband radiometric systems with multiantenna arrays, which provides significant advantages over existing radar technologies, e.g. decreased observation time, high resolution, decreased fluctuation sensitivity, high accuracy of parameters estimation, decreased number of antenna, environmentally-friendliness.

KhAI’s Research Institute “NII PFM” develops and manufactures UAVs for civil and security applications, including real time aerial and border surveillance, radio-electronic combat, aerial mapping, etc.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Critical Infrastructure Protection; Communication Technologies and Interoperability); Border Security and External Security (Maritime Border Security; Border Crossing Points); Digital Security: Cybersecurity, Privacy and Trust (Privacy; Access Control; ICT in Critical Infrastructure Protection).

Research and Technology Development Experience

National: Nationally-funded project “Methodological and implementation basis of analysis of adaptive processing and noiseless coding of multichannel multimedia and telemedical data” (2012-2014)

Nationally-funded project “Development of sustainable methods, algorithms and digital devices for joint processing of physiological signals for telemonitoring and telemedicine systems” (2013-2014)

Nationally-funded project “Development of the theory, methods and means of high-precision remote monitoring of environmental UWB multichannel radiometric systems” (2016–2018)

International: 7th Framework programme, KhAI-ERA project (Integrating the National Aerospace University “KhAI” to the European Research Area) (2012-2015) – cooperation with Tallinn University of Technology (Estonia) on Dependable Embedded Systems

Ukraine and France research cooperation programme “Dnipro”, project “Automation of hyperspectral remote sensing data” (2013-2014), cooperation with University of Rennes 1 (France)

STCU funded project “Safety-Critical Software Independent Verification and Validation and Latent Faults Assessment Based on Diverse Measurement of Invariants” – cooperation with ISTEC (Institute Garshing, Germany)

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University "Ukraine" is a classic institution. In it there are a lot of different directions and specialties (45) and including engineering, philosophy, psychology, physical rehabilitation, biotechnology, publishing, economics and management, information technology, legal, etc. The main goal is to provide quality high education services to all people especially with special needs. University "Ukraine" has 22 branches in Ukraine.

Research activities for “Secure Societies”:
Creating a safe society for people with special needs

Areas of interest (collaboration with European organizations on research and technology transfer):


Technologies and services for “Secure Societies”:
Human health.
Accessibility for people with special needs.
ICT.

Research and Technology Development Experience

National:

a) G.M. Dobrov Center for Scientific and Technological Potential and Science History Studies (research center) b) training “Support to knowledge based and innovative enterprises and technology transfer to business in Ukraine” EuropeAid/127644/C/SER/UA a) Vadym Hetman Kyiv National Economics University and Education, Audiovisual and Culture Executive Agency b) training “European Union Innovation and Investment Development” №529031-LLP-2012-UA-AIM-MO a) Vadym Hetman Kyiv National Economics University, Jean Monnet Fund and Education, Audiovisual and Culture Executive Agency b) training “European regional development model” №528395-LLP-1-2012-UA-AIM-CH

International:

a) CRDF Global & IC2 Institute, University of Texas, Austin. With the support of the Center "Kharkov Technologies" and the State Agency for Science, Innovation and Informatization of Ukraine b) training "Commercialization Pathfinder" №3726759 a) the European Union b) research project research project "Development of Stem Cell-Based Therapy for Thymic Regeneration" (THYMISTEM) of FP-7 Health-2013 Innovation-1 program 1.4-1"Controlling differentiation and proliferation in human stem cells intended for therapeutic use”
The Public organization “Transcarpathian Association of Innovative Development and Cooperation” (hereinafter TAIDC) is a non-profit public organisation registered on 27.02.2014 by the Mukachevo Department of Justice under #14/1 in the Register of Public Organisation. The President of TAIDC is Mr Victor Yarovoy.

TAIDC is founded by a group of individuals with extensive experience of domestic and international cooperation in development and implementation of innovative technologies in multiple projects on management, technology, environment and education amongst others. TAIDC unites under one umbrella a pool of experts, both individuals and companies, who assume different roles within the community acting as co-founders, permanent, interim or associated members and participants, joint partners, customers etc.

General areas of activity of TAIDC:
1. Monitoring and market research of the innovation sector of Ukraine
2. Monitoring of international innovations and market research of European innovation sector
3. Technical and market expertise of innovations
4. Selection and promotion of innovative ideas suitable for market implementation in Ukraine, Europe and/or internationally. This includes but is not limited to search and securing of funding, development of a sample, prototype production and preparation for large scale production.
5. Management of domestic and international innovation cooperation
6. Realisation of specific projects from Ukrainian and international customers on search and/or development and implementation of required innovations
7. Informative and educational activities relating to rules of conduct in disaster and humanitarian crisis situations and managing innovation enterprises in Ukraine and abroad with focus on the EU.
8. Conduct of proper innovation research and development.

Representative and intermediary functions in innovation segment.

Research activities for “Secure Societies”:
- Geological exploration of water and mineral deposits
- Water purification and treatment
- Ground-based transportation of 2nd level
- Alternative energy sources
- Effective use of energy in everyday life
- Human bioenergy
- Crisis situations, including technogenic and natural disasters
- Other

Areas of interest (collaboration with European organizations on research and technology transfer):
Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Crisis Management, Disaster Resilience and Climate Change, Critical Infrastructure Protection, Communication Technologies and Interoperability, Ethical/Societal Dimension); Fight against Crime and Terrorism (Ethical/Social Dimension); Border Security and External Security (Border Crossing Points, Supply Chain Security, Ethical/Societal Dimension); Digital Security; Cybersecurity, Privacy and Trust (Risk Management and Assurance Models, Trust eServices).

Technologies and services for “Secure Societies”:
1. Geological exploration of water and minerals based on the technology of Nuclear Magnetic Resonance (NMR geoeexploration).
2. Scientific research and management of ad hoc research activities for “Secure Societies”
3. Training of practical survival skills and rules of conduct in humanitarian, technogenic and natural disaster situations. Carried out in conjunction with the “Peace Academy” of the “Soldiers of Peace”, the International UN Peacekeepers Association

Research and Technology Development Experience

National:
Participation in the EU “EEN-Ukraine” project, funded by a private investor
“Managing the pharmaceutical market in technogenic and natural disaster crises”, an TAIDC funded project

International:
Participation in the EU “Support to scientific and innovative enterprises and transfer of technologies to businesses in Ukraine” project
Participation in the “Training of experts” project funded by the CRFD Global
Participation in the “Development of entrepreneurship” project funded by CRDF Global

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Scientific and research institute of providing legal framework for the innovative development is the leading state scientific institution that carries out the complex of fundamental and applied researches on development and improvement of the legal regulation of innovation implementation in different spheres of economic and social life.

The Institute is a state scientific and research organization with the status of a legal person. It is directly subordinated to the Presidium of the National Academy of Law Sciences of Ukraine. The Institute is a non-profit organization and acts in accordance with the Articles of Association.

There are 3 departments and 2 laboratories in the structure of the Institute.

According to the Articles of Association the basic directions of the Institute activity are carrying out the fundamental and applied scientific researches in the area of innovative activity; participation in development of concepts, drafts of national and regional legal acts concerning innovative policy; carrying out scientific and juridical expert examinations of innovation projects and other legal documents; analysis and generalization the world experience on the legal governing of the innovative activity; consulting on the problems in the field of law and innovations; training of the scientific staff and other specialists.

Research activities for “Secure Societies”:

Chapter “State providing framework for innovative, technological, scientific and technical security” was included into the project of Innovative Code Ukraine, in which definition of innovative security was given, two its basic directions were given: scientific and technical security and technological security; objects and subjects are separated; state support facilities are formalized.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Crisis Management); Border Security and External Security (Supply Chain Security); Digital Security; Cybersecurity, Privacy and Trust (Privacy, Secure Information Sharing, Trust eServices).

Technologies and services for “Secure Societies”:

- Analysis of legislation in effect, including in the field of technology transfer;
- development of concepts, drafts of national and regional legal acts;
- legal support of technology transfer agreements;
- due diligence;
- carrying out scientific and juridical expert examinations.
Main direction of research activity of Institute of Semiconductor Physics are in physics of electromagnetic radiation interaction processes with matter; physics of low-dimensional structures, micro- and nanoelectronics, sensors, optics and optoelectronics, semiconductor materials science. Theoretical and experimental research include photoelectrical phenomena in semiconductors, fluctuation analysis of semiconductor materials and structures, cryomagnetic electronics, optics and spectroscopy of semiconductors, electrical and galvanomagnetic phenomena in semiconductors, structural and element analysis of semiconductor materials and systems, and physics of surface, photochemical phenomena in semiconductors, polariton optoelectronics, solar elements, semiconductor detector of ionizing radiation, optoelectronics, chemistry of semiconductors, semiconductor heterostructures, physico-technological bases of sensor materials science, semiconductor IR technique and photoelectronics, physics and technology of low-dimensional systems, photonic semiconductor structures.

Research activities for “Secure Societies”:

Development of the high resolution registering media on the base of thin films of chalcogenide glasses, polymers and different composites on their base, including media modified by different types of dopants or nanoparticles (by introduction of modifying elements, using different fabrication methods it is possible to change optical, luminescent, thermal, mechanical and magnetic properties of media). Development of the technologies for fabrication of optical security elements with the use of such media. Combination of modified properties characteristic new media (for example, composites with nanoparticles) with diffraction properties of periodical structures opens perspective of the development of new generation devices such as processed by light optical filters and switches, sensors, lasers, diffraction optical elements with high optical quality and efficiency, etc.

Areas of interest (collaboration with European organizations on research and technology transfer):

Digital Security; Cybersecurity, Privacy and Trust (Access Control).

Technologies and services for “Secure Societies”:

Technologies for fabrication registering media on the base of composite materials.

Technologies for the fabrication of diffraction optical elements (holographic diffraction gratings, Fresnel lenses, holograms, etc.) on the base of developed registering media (thin films of chalcogenide glasses and thin films chalcogenide glasses/metals systems, composites). Developed technologies enable to obtain high quality holographic gratings with parameters close to theoretical ones and are well inserted in modern technological process. These technologies can be used for the production of holographic security elements.

Research and Technology Development Experience

National:
Budget funding: physical and physical-technological aspects of the development of modern semiconductor materials and functional structures for nano- and optoelectronics (section development of functional materials for optoelectronics)

Budget funding: Investigations of optical and electronic phenomena in semiconductor photonic systems, organic and composite materials, thin film and layered systems as physical base of modern optoelectronics

International:
EC - International Research Project No 609534-SECURE-R2I
Bilateral - The Ukrainian-Slovak R&D joint project for the 2014 – 2015 “Relaxation and photoinduced effects in chalcogenide glasses of Ge-As-5 (Se) system”
Bilateral - Agreement on cooperation (Institute of Semiconductor Physics NAS Ukraine, Kiev, Ukraine and Institute of Physical-chemical problems of Belorussian University, Minsk Belorussia)
Bilateral - Agreement on cooperation (Institute of Semiconductor Physics NAS Ukraine, Kiev, Ukraine and Laboratory of optical materials and elements of optoelectronics and Institute of Applied Physics AS Moldova, Cisinau, Moldova, Laboratory of Registration media and Photonics
Bilateral - Agreement on cooperation (Institute of Semiconductor Physics NAS Ukraine, Kiev, Ukraine and Pardubice University, Pardubice, Pardubice, Czech Republic

Participants of the project took part in different international projects

Holographic diffraction gratings obtained on the base of As-S-Se layers with the use of wet etching after exposure – a; Fresnel lens obtained in the glass with the use of As-Se thin films as registering media and etching mask - b; photograph of reconstructed hologram obtained on the base of As-Se thin films as registering media – c, grating with 3600 mm-1 spatial frequency on the base of As-Se thin films - d.

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V.N. Karazin Kharkiv National University is one of the oldest universities in Eastern Europe. It was founded in November 1804. The University is one of the largest research centers in Ukraine. It covers virtually all spheres of modern fundamental research and incorporates.

School of Ecology was founded in 2007. Currently, the School of Ecology provides training in Ecology, Conservation, and Balanced Environmental Management and offers bachelor’s and master’s degree opportunities.

The School comprises of the following Departments:
- Department of ecology and neo-ecology;
- Department of ecological safety and ecological education; and
- Department of monitoring and nature management.

Research activities for “Secure Societies”:

The key scientific and research directions:
- soil ecology and effect of environmental pollution on foodstaff quality;
- development of theoretical fundamentals of environmental monitoring, auditing and expertise of various parts of environment;
- contact and remote researches of natural environment;
- human ecology (medical ecology);
- fundamental researches in the domain of higher and secondary ecological education;
- environmental management and auditing;
- prevention and elimination of emergences;
- management of environmental activity;
- ecological expert analysis;
- ecological bio-testing;
- landscape ecology.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Disaster Resilience and Climate Change).

Research and Technology Development Experience

National:
We have local projects with city and oblast administrations, local environmental authorities, etc.

International:
- Tempus project “Improvement of education on environmental management” – 2009-2012.
- NEAR4 project “Network for Environmental Assessment and Remediation in aquatic system” – 2009-2012;
- SI project “Stormwater quality: Implications for reduced impact on receiving waters and climate change adaptation” – 2012-2013.
- Tempus project “Qualifications Framework in Environmental Science at Ukrainian Universities”, 2013-2016.

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Veritas Research Center has been functioning since 1996. It specializes in developing and manufacturing innovative medical technologies for diagnostics, monitoring and personalized treatment of vascular and psychoneurological diseases from the disease early stages to less-curable states. The Center has developed fundamentally new technologies for restoration of functioning of vascular system in different regional reservoirs based on principles of multivector examination of vascular system, unique screening technology of examination of inherent formation of microvessels, unique technologies for objectivation of hemo- and neurodynamic changes in patients of psychoneurological type, exclusive technologies for neurorehabilitation of acute patients.

Technologies and services for “Secure Societies”:

1) Vascular screening technology;
2) Brain main vessels monitoring system “angio-markers”;
3) Neural monitoring technology;
4) Technology for cerebral vascular therapy.

All our technologies include: technical devices, intellectual technology, patents for intellectual property protected in Ukraine, methodology for clinical interpretation, manual, warranty support.

Research and Technology Development Experience

National:

1. A program for calculation of capillaroscopic images;

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Project Young Investment Group is a startup company specializing in the commercialization of youth business projects. Main areas of activity: industry, construction, agriculture, retail, transportation.

Research activities for “Secure Societies”:
Sociological studies in youth, energy, greening production.

Areas of interest (collaboration with European organizations on research and technology transfer):

Disaster-Resilience: Safeguarding and Securing Society, including Adapting to Climate Change (Crisis Management); Fight Against Crime and Terrorism (Forensics, Urban Security); Border Security and External Security (External Security, Ethical/Societal Dimension)

Technologies and services for “Secure Societies”:
Commercialization of innovation in small and medium business.

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For further information on the FP7 SECURE-R2I project please visit

secure-r2i.ru

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