



## UKRAINE

### Cooperative Activities under the SPS Programme

Ukraine has been involved in NATO science activities since 1991. In total, scientists and experts from Ukraine have had leading roles in 721 activities, and more joined various cooperative activities as participants and key speakers.

Today, NATO science activities enable close collaboration on the two key priorities of **defence against terrorism** and **countering other threats to security** and are managed under the Science for Peace and Security (SPS) Programme. SPS activities contribute to NATO's strategic objective of partnership, helping to connect scientists and experts from NATO countries



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with their counterparts from Partner and Mediterranean Dialogue countries through workshops, training courses, team collaborations and multi-year projects.

All activities supported by the SPS Programme are approved by NATO nations on the basis of consensus.

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### Examples of Activities

On 19 to 23 May 2010 an Advanced Research Workshop led by a Ukrainian scientist will focus on “**Advanced Water Supply and Wastewater Treatment: a Road to Safer Society and Environment**”. This SPS event, to be held in Lviv, Ukraine, will bring together 45 scientists from various NATO and Partner countries in order to discuss recent advances in the field of municipal and industrial water supply and wastewater treatment. Featuring a key speaker from the Chernivtsi National University in Ukraine this event will be focused on the issues related to lowering the risk of failure and malfunctioning of the water supply/wastewater treatment systems by application of advanced methods of water treatment, rational water management aimed at enhancing environmental sustainability and also by considering other important issues in this field. [ref 983957]

Since October 2007, scientists from Ukraine, France and the United States have cooperated to develop a “**New Generation of Multi-energy X-ray Scanners for Anti-Terrorism Inspection**” for the quantitative detection of explosives with a probability up to 90-95%. The target is detection of solid and liquid explosives, even when embedded in a background of inert organic materials with similar densities, which involves a new approach to visualization and recognition using X-rays in the dual- and multi-energy regimes. It is expected that the combination of two different technologies in one instrument, alongside a new method for determination of the atomic and chemical composition of materials, will lead to substantial improvements in sensitivity to illegal and dangerous materials. The most important end-users are expected to be the

Ministry of Industrial Policy of Ukraine, and Ukrainian State Customs. [ref 982823]

Scientists from Ukraine, Denmark, the Netherlands and Russia have cooperated in the design of super-conducting **“Integrated Spectrometers for Rapid Chemical Agents Detection”**. During the project, several technologies and methods have been developed and tested, and plans for the remainder of the project include a comprehensive test of the ability of the spectrometer to detect explosive substances, as well. The project was recently completed. One important use of the spectrometer will be onboard a heterodyne balloon mission launched to study the Earth’s atmosphere. From such a platform, the integrated spectrometer can also be used to detect chemical warfare agents in the atmosphere. [ref. 981415]

A project **“NESTOR”** has combined the expertise from Ukraine, Russian, Germany and the Netherlands in order to build a unique machine to produce high-energy x-rays needed for high resolution image detection in the field of medicine, illicit trafficking, explosion detection, forensic detection and environmental security. Currently available high energy X-Ray generators worldwide have at least 700 meters of circumference and cost over 200 million EUR. The new machine that is based on advanced laser and storage ring technologies will have the same range and energy, but will be compact (15 metres circumference) and cost less than 2 million EUR. The new X-ray-generator will be located at the National Science Centre in Kharkov. It is expected to be completed by the end of 2010. [ref 974898]

Scientists from the Institute for Single Crystals in Kharkov, Ukraine, have developed a sapphire-based material used in the production of improved **“Lightweight and Transparent Armours”**. Together with



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Experts from the Institute for Single Crystals in Kharkov are playing a leading role in developing a new composition for lightweight and transparent armoured windows, to be used on military and security personnel vehicles.

researchers from the Czech Republic, Slovak Republic and Russia, they have designed a new armour composition, consisting of “sandwich layers” of the sapphire-based material and a transparent, high-aluminum glass, which enables the assembly of armoured windows that are 40% thinner, lighter and at a reasonable price compared with the protective windows currently used on military and security personnel vehicles. Besides the obvious advantage in mobility of lighter windows, the reduced thickness also allows for a less distorted view. In March 2009, the transparent armour material was successfully tested at a shooting demonstration in the Czech Republic and earned a STANAG certificate for protection against sniper rifles, including armour-piercing ammunition. [ref 981770]