

## GERMANY

### Cooperative Activities under the SPS Programme

Since NATO began offering science cooperation to partners in 1992, German scientists and experts have had leading roles in more than 1,573 activities, and more have 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 with their counterparts from Partner and Mediterranean Dialogue countries through workshops, training courses, team collaborations and multi-year projects.



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

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### Examples of Activities

An Advanced Study Institute on “**Logics and Languages for Reliability and Security**” was organised on 4-16 August 2009 in Marktoberdorf by information technology experts from Germany and Israel. This training course was designed to teach state-of-the-art methods and tools for logics- and language-based security to enhance computer systems reliability and information safety. Researchers from industry and universities discussed how the theoretical research could be re-directed towards practical and industrial relevance. [ref 983551]

Today, decoding classical cryptographic systems can be easily accomplished by terrorists, industrial spies and other criminals. In the ongoing project “**Data Encryption**” a German team from the Technical University of Berlin is cooperating closely with the Nobel Laureate Prof. Alferov who received the precious prize in 2000 for semiconductor heterostructures used in high-speed- and optoelectronics. Guided by his profound knowledge, the teams from Germany, Russia, the United Kingdom and the United States have developed

electrically driven quantum dot single photon sources to safeguard data transfer. A prototype has been constructed and a special optical system will be built with high time resolution for the characterization of Superconducting Single Photon Detectors. The end-result is expected by September 2010. [ref 982735]

Scientists from Germany and Egypt are collaborating on “**Chemical and Biological Sensor Systems**” that can detect hazardous chemicals released by accident or by terrorist attack. The focus is on supramolecular sensors that can be applied in a wipe test to detect peroxide- and nitrogen-based explosives. In 2009, the photometric evaluation of sensor complexes formed with explosives will be concluded and the two most promising substances that respond to most classes of explosives will be selected. The ability of these substances to recognize explosives will be quantified and suitable combinations of chemosensors and wipe material will be evaluated. The end-product is expected for August 2010. [ref 982697]

Since June 2007, researchers from Germany, Greece and Romania have been collaborating on the development of a new **“Immunoassay for the Early Detection of Pathogenic Bacterial Infections”**. Their main goal is the development of a new test, in the form of an easy-to-perform, enzyme-linked immunosorbent assay (ELISA) that can detect the very early changes that are induced in host immune cells by life threatening pathogens. Consultations on commercializing the results of this project have already been underway with German company PANATecs located in Tuebingen. [ref 982838]

For the **“Detection of Dirty Bombs”**— i.e., devices containing both conventional explosives and nuclear material—scientists from Germany, the Netherlands and Russia



Photo: Andrey Kuznetsov (Co-Director)

The prototype of the portable “dirty bomb” detection system. This device was developed within the framework of this project.

have worked together to develop a portable prototype device based on x-ray, neutron and alpha-particle detectors. The prototype was tested using a wide range of explosives, radioactive and fissile materials as a demonstration to potential end-users, including

the Ministry of Foreign Affairs of Germany. This mobile detection system could help with baggage inspection at airports, landmine detection and cargo screening. [ref 981003]

In the field of energy security, scientists from Germany, France, Mauritania, Morocco and Turkey are cooperating on a project using the prevailing trade winds over the Sahara Desert to produce hydrogen for sustainable energy systems. Within this project, entitled **“Sahara Trade Wind/Hydrogen Power System”**, two research platforms are built at the main research centres in Morocco and Mauritania. The aim is to integrate the produced energy into the grid infrastructure of the Saharan/Sahel region and use it for power storage as well as for fuel or chemical feedstock in specific industries. The Ministry of Economic Affairs and Energy of NRW in Germany provides its expertise in energy storage systems for building local capabilities in Mauritania and Morocco. [ref 982620]

In addition to NATO-funded activities, the SPS Programme facilitates the development of nationally funded activities, such as the pilot study on **“Food Chain Security”**. Experts from Germany joined their counterparts from other NATO and Partner countries to examine the safety and security of the food system. The study includes the development of protective and response measures to reduce risk and mitigate the consequences of these incidents, which could destroy or degrade the food system at the source, or during distribution, processing or consumption. The main outputs were the identification of common weaknesses and comparison of food systems among countries. The final meeting of this pilot study took place on 19-20 September 2008, in Antalya, Turkey. [ref 982184]

The SPS programme has also engaged a number of German consultants to lend their expertise in various fields—such as communications security, bio-sensors to detect toxic material, hologram-imaging for security applications, solar power for energy security—to technical advice and monitoring of projects.