

**PAGE 1**

Message from Chairman

**PAGE 2**

1958-2008: Celebrating 50 Years of science co-operation at NATO

SPS exhibit displays past, present and future

**PAGE 3**

VTC with Kabul University opens SPS Committee meeting

Expanding Internet Connectivity in Afghanistan

**PAGE 4**

Using Science in Defence against Terrorism

- Explosives Detection
- CBRN Detection & Countermeasures
- Cyber Security
- Eco-Terrorism
- Transport/Border Security
- Psychological and Sociological Consequences of Terrorism

**PAGE 5**

Priority topics highlighted by Special Call

From social science to security policy

**PAGE 6**

Detecting a suicide bomber in a crowd

**PAGE 7**

Defence & Environment

Mélange rocket fuel clean-up to move to Uzbekistan

**PAGE 8**

Contact

## Message from the Chairman

It is indeed a great pleasure for me to join in this celebration of the 50th Anniversary of science activities at NATO. As the scientific magazine *Nature* recently put it, “Prudent scientific diplomacy is a peacekeeping measure in its own right.” This is one thing that is increasingly evident from the real-world impact made by the activities of the SPS Committee. Since 1958, the scientific community at NATO has endeavoured to address evolving security issues through collaboration and innovation, and in this way has also made a significant contribution to the stability and development of its members. Today, the activities of the SPS Committee clearly demonstrate its commitment to the strategic objectives of the Alliance: operations, defence against terrorism and non-traditional threats to security. The work of this committee and the wide range of topics addressed incorporate a horizon-scanning approach that intends to support the Alliance and its Partners in future challenges, and to broaden knowledge and increase support among public opinions. More than ever at NATO, science will serve the overall purposes of the Alliance’s public diplomacy, as well as its core priorities.

**Jean-François Bureau**

*Chairman, Science for Peace and Security Committee  
Assistant Secretary-General for Public Diplomacy*



First Science Committee (SCOM) meeting, 1958

## 1958-2008: Celebrating 50 years of science co-operation at NATO

This year marks the 50th anniversary of science co-operation at NATO. As we look forward to both future achievements of innovation and new challenges in security, a glance back at the history of science at NATO reminds us of the principles of stability and collaboration that still motivate the programme today.

The origins of the NATO Science for Peace and Security (SPS) Programme date to 1956, when a report by Foreign Ministers Halvard Lange of Norway, Gaetano Martino of Italy and Lester B. Pearson of Canada emphasized the importance of political, economic and scientific consultation for Allied security.

These “Three Wise Men” proved prescient indeed. The next year, the launch of Sputnik alarmed NATO countries by demonstrating the gap between Soviet and Allied missile technology. With the report’s recommendations in mind, the North Atlantic Council established the NATO Science Committee (SCOM), which had its first meeting in Paris in March 1958, to increase Allied scientific co-operation.

Later, during the period of détente, Allies grew increasingly conscious of common environmental problems that could threaten the welfare and progress of their societies. Consequently, the North Atlantic Council created the Committee on the Challenges of Modern Society (CCMS) in 1969.

The end of the Cold War opened avenues for scientific, political, and economic co-operation that had never existed before. Former Warsaw Pact adversaries gradually joined the Science Programme, some first as Partners and then as Allies. Mediterranean Dialogue countries also began to participate.

In 2006, a new era began when SCOM and CCMS combined to form the Science for Peace and Security Committee, in parallel with the formation of a new, comprehensive SPS Programme. The new committee combines the functions of the two former ones by focusing on initiatives in civil science and innovation related to defence against terrorism, as well as countering other threats to security. The aim is to contribute to security, stability and solidarity among nations through increased collaboration, networking and capacity-building in NATO, Partner and Mediterranean Dialogue countries.

Among its many ongoing projects and activities, the SPS Committee is currently facilitating research and development in explosives detection and protection against chemical, biological, radiological and nuclear (CBRN) agents; assisting in the destruction of hazardous chemicals in Partner countries, and helping to provide Internet access to the Afghan academic community in Kabul, as well as the eight countries of Central Asia and the Caucasus, through the “Virtual Silk Highway Project”. Future priority areas of research include cyber-security, maritime and energy security, detection of improvised explosive devices (IEDs) in a crowd, and the proliferation of weapons of mass destruction.

The SPS Committee continues to scan the horizon for emerging threats while encouraging innovation in defence against terrorism and supporting the operations and other strategic objectives of the Alliance.

### SPS exhibit displays past, present and future

On the occasion of the 50th anniversary celebration, the SPS Programme has created an interactive exhibit which can be seen in the Press Area of NATO Headquarters on 20-21 November 2008.

The display presents a historical look at the origins of the SPS programme, beginning in 1958, as well as the future directions of the programme as it addresses new challenges in security. In addition, LCD and touch screens illustrate a selection of SPS activities in defence against terrorism and other threats to security, such as detection of explosives and CBRN (chemical, biological, radiological and nuclear) agents; the Virtual Silk Highway project in Central Asia and Caucasus, including Afghanistan; countering computer terrorism; and securing energy and the environment.

The display was also part of the R&T Exhibition co-organised by the NATO Research and Technology Organisation (RTO) on 21-23 October 2008. The R&T Day provided a forum for the NATO R&T community, including the NATO Undersea Research Centre (NURC), Allied Command Transformation (ACT), NATO’s three Main Armament Groups (MAGs), the NATO Industrial Advisory Group (NIAG), and the NATO Consultation, Command and Control Organization (NC30), and national experts from NATO and Partner countries.

On the occasion of this exhibition and accompanying symposium, the NATO Secretary-General Jaap de Hoop Scheffer acknowledged the vital contribution of science and technology to the ‘holistic approach’ needed to face modern security challenges, including weapons of mass destruction, the increasing demand for energy and climate change. He made specific reference to the problem of detecting a suicide bomber in a crowd which is currently being addressed by SPS programme activities.

## VTC with Kabul University opens SPS Committee meeting

On the occasion of the 50<sup>th</sup> anniversary of science co-operation at NATO, a three-way video teleconference (VTC), made possible by NATO's Virtual Silk Highway (SILK) project, will connect NATO Headquarters in Brussels, Kabul University in Afghanistan and the Ruhr University of Bochum in Germany at the opening of the November 2008 Science for Peace and Security (SPS) Committee meeting.

The VTC will include NATO's Senior Civilian Representative in Afghanistan, the Afghan First Deputy Minister of Higher Education, and the chancellors of several universities in Kabul, speaking from Kabul; the SPS Committee, NATO ambassadors, the Ambassador of Afghanistan in Brussels and the Science Adviser to the U.S. Secretary of State, speaking from Brussels; as well as the Afghan Minister for Higher Education and the Chancellor of Kabul University, speaking from Bochum, Germany. These officials will express their expectations and wishes for future co-operation between NATO and Afghanistan in the context of the SPS programme.

The Chairman of the SPS Committee (NATO's Assistant Secretary General for Public Diplomacy) will chair the conference, which will also give science faculty and students from Kabul University, Kabul Polytec, Kabul Medical University and Kabul Pedagogical University the opportunity to interact with officials in a question-and-answer session.

The VTC to take place at the SPS Committee meeting takes advantage of SILK internet connectivity as well as SPS-funded VTC equipment at Kabul University.

In addition to the provision of the VTC facility, the SPS programme has connected all 14 faculties of Kabul University and the Ministry of Higher Education in a campus network in 2008. The set-up of a Metropolitan Area Network using 'WiMax' technology to connect 12 educational and governmental institutions in the capital is expected by the end of 2008. In 2009 work will begin to expand the network to six universities in the provinces.

## Expanding Internet Connectivity in Afghanistan

### Kabul University

The SPS Virtual Silk Highway (SILK) project, which began providing satellite-based internet connectivity to Kabul University in 2006, has now commenced work to complete a fibre optic network on the campus. Continuous battery power supply at the Kabul University network operation centre (NOC) will also be provided through NATO funds. In addition, a USAID-funded project, which is connected to SILK, will provide technical assistance and support for the NOC operator and staff.

### Metropolitan Area Network

Since July 2008, the Government Media and Information Centre (GMIC) has temporarily received internet connectivity through a NATO-funded contract with a commercial provider, with the expectation that SILK connectivity can be offered to support a wider Metropolitan Area Network by the end of 2008. To achieve this, a WiMax antenna will be installed on 'TV Hill', directly connected to the NOC at Kabul University by a microwave link, which will allow for a WiMax 'blanket' over the city.

The Metropolitan Area Network is expected to provide internet connectivity to the following 12 academic and governmental institutions in Kabul by the end of 2008: the Government Media and Information Centre, Kabul University, National Military Academy, Kabul Polytechnic, Ministry of Foreign Affairs, Ministry of Higher Education, American University, Kabul Medical University, Afghan Research and Evaluation Unit, Pedagogical University, Strategic Research Centre of the Ministry of Defence, and National Emergency Operation Centre. This setup would be flexible enough to enable the connection of additional institutes in the future.

### Expansion to the Provinces

Following the March 2008 SPS Committee meeting, the NATO Consultation, Command and Control Agency (NC3A) was tasked to conduct a feasibility study on the potential provision of internet connectivity for universities outside of Kabul. In the meantime, the Afghan Ministry of Higher Education has identified the following six universities as the first beneficiaries of this new Afghanistan expansion project: Herat University; Jawzjan University in Sherberghan; Kandahar University; Sheikh Zaid University, Khost Province; Balkh University in Mazar-e-Sharif; and Nangarhar University in Jalalabad.

The study produced by NC3A suggests a satellite-based project that could be launched with the installation of the first satellite ground stations during the second half of 2009. One possible way forward would be to reuse several satellite ground stations that are no longer in use in other SILK countries where connectivity has since moved on to a fibre-based system. A market survey to identify potential commercial providers is currently underway.



## Using Science in Defence against Terrorism

### Explosives Detection

Several SPS projects are underway to develop new devices to detect explosives in a faster, more reliable way. A new generation of scintillators are being used to build x-ray scanners with improved sensitivity for the detection of solid and liquid explosives at airports. Other projects include the detection of peroxide-based explosives and unexploded ordnance in humanitarian de-mining operations. A combination of advanced technologies could lead to a breakthrough in the detection of improvised explosive devices (IEDs) in a crowd.

### CBRN Protection

SPS supports the development of new



rapid and specific methods to diagnose hazardous agents including dirty bombs, and chemical and biological substances. A portable dirty bomb detection unit for scanning luggage was developed to detect explosives containing radioactive materials using nanosecond neutron-analyzing techniques. In addition, new optical and electronic organic sensors are being developed to detect low concentrations of hazardous chemical agents in solutions and in gas phase. Two new techniques based on photocatalysts were demonstrated to safely decontaminate sulphur mustard.

### Cyber-Security

SPS activities in the area of cyber defence comprise several projects, technical workshops and training courses to transfer state-of-the-art knowledge on software and hardware protection to end-users. Quantum mechanics are being used to improve cryptography and the security of data transmission and storage to avoid penetration by terrorists, industrial spies and other criminals. In addition, the SPS programme has established and trained Computer Emergency Response Teams (CERTs) in 15 Partner countries to respond to cyber attacks.

### Transport and Border Security

SPS activities help to enable border security to keep pace with an expanding trade market while protecting against threats of terrorist attack and illicit trafficking of explosives, chemical and nuclear agents, and humans. The development of an inspection system using tagged fast neutron beams to determine the position and composition of suspicious material inside shipping containers in a non-intrusive way will contribute to security at seaports. A

newly launched project will focus on detection of explosives in cargo using neutron resonance radiography.

### Environmental Security and Eco-Terrorism

Potential security threats to the environment and natural resources are being addressed through SPS activities that bring together experts and local authorities and ministries. An on-going pilot study is examining measures to reduce the risk and mitigate consequences of a variety of threats, including terrorist action, against the food supply. Preparing a prototype for an International Situational Centre to monitor agro-environmental and municipal water resources, with an international alert



system and capabilities for counteraction in case of environmental accidents of eco-terrorist attacks.

### Psychological and Sociological Consequences of Terrorism

The SPS programme also deal with topics such as the use of the Internet by terrorists, the sociological roots and motivations of terrorism and mitigation of the societal impact of terrorist actions. Experts have examined the social and psychological effects of radiological terrorism, such as with dirty bombs, and made proposals for developing societal resilience against this threat. In addition, methodologies are being developed for the rehabilitation of victims of terrorist attacks.



## Priority topics highlighted by Special Call

In Spring 2008, the SPS Programme made a special call for applications for Advanced Research Workshop (ARW) grants on topics relating to Maritime Security, Energy Security, Weapons of Mass Destruction and Cyber Security. Applications were reviewed after the 30 April deadline, and 10 workshops were awarded funding, incorporating a broad combination of NATO, Partner and Mediterranean Dialogue Countries. The highlighted topics are listed below:

- Nuclear power and energy security
- Environmental security of multimodal transport
- Enhancement of cryptographic techniques
- Protection of critical energy infrastructure in the Black Sea
- Regional exchange of information on WMD proliferation and trafficking
- Climate risk management for the energy sector
- Port and harbour security systems
- WMD threat assessment
- Operational network intelligence
- Control of dangerous materials and crisis management

## From social science to security policy

The fourth workshop of the “Security: Advancing a Framework for Enquiry” (SAFE) initiative convened in Istanbul, Turkey, on 21-23 May 2008.

The SAFE initiative has been jointly sponsored by NATO and the European Science Foundation over the past two years, with the goal of developing a research agenda for scholars in the social sciences and humanities on issues of security. Further objectives are to encourage excellence in international collaborative approaches towards complex interdisciplinary security research and to facilitate knowledge transfer from humanities and social science research into security policy-making.

SAFE responds to the fact that security policy-making is often overwhelmingly concerned with technological aspects. The presence of humanities and social science research in international collaborative endeavours is very limited, even though it is vital to understanding the causes of radicalism, developing effective legal security frameworks and responding effectively to security threats.

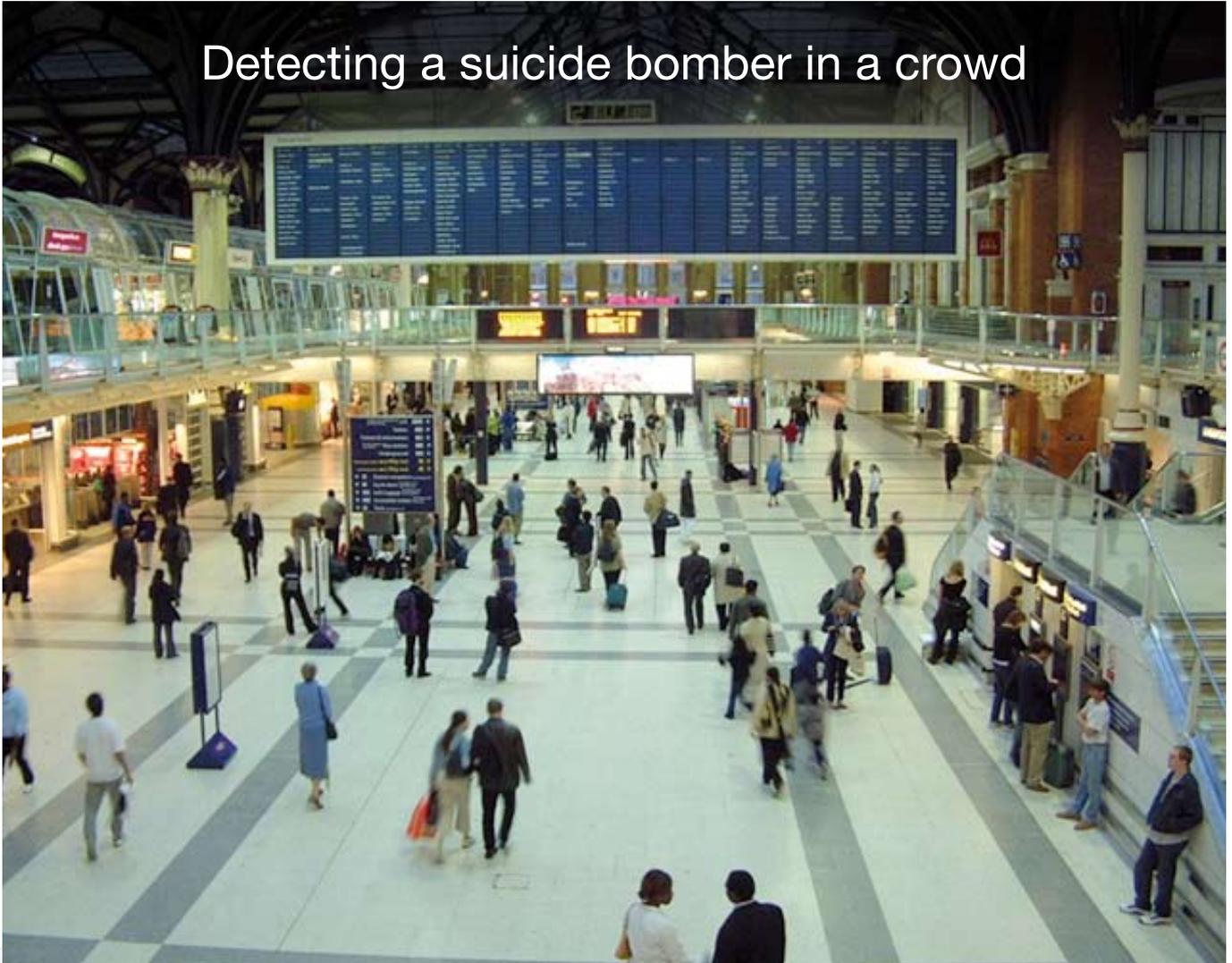
The NATO Secretary-General Jaap de Hoop Scheffer recently highlighted this issue while referring specifically to the contribution of the SPS Programme in the social sciences: “If we want to protect ourselves against fanatics,” he said, “we also need to know what motivates them. So R&T that seeks to support NATO’s agenda must also include soft sciences, such as psychology, cultural studies or sociology.”

Earlier SAFE workshops have examined “Models of Security” (Sarajevo, Bosnia & Herzegovina, June 2007); “Identity, Loyalty and Security” (Meknes, Morocco, October 2007); and “Security and norms: Law, ethics and justice” (Oslo, Norway, March 2008). The most recent workshop in Istanbul focused on “Management of Security: Successes and Failures”.

A final conference on “The intangibles of security”, scheduled to take place in Brussels in 2009, will present avenues for future research and strategies for better knowledge transfer. A major consolidated report of the recommendations and conclusions on future threats and challenges will be forthcoming.



## Detecting a suicide bomber in a crowd



After a number of meetings with key international experts, the SPS Committee decided to focus future efforts in the field of Explosives Detection on the threat posed by suicide bombers and the techniques for stand-off detection applicable to surveillance of large groups of people.

The objective of the Programme for Stand-off Detection of Explosives is to design and engineer a system composed of multiple technologies, each developed in a separate project, for the detection of suicide bombers and to demonstrate the efficiency of this system on-site, for example, in a subway station. The combination of cutting-edge technologies for this purpose could lead to a breakthrough in the detection of improvised explosive devices (IEDs) in a crowd.

The Explosives Detection Expert Group (EDEG), established by the Committee in 2006, selected the four techniques of laser interrogation, microwave active imaging, millimetre (terahertz) passive imaging and video imaging as capable of performing

stand-off detection in different circumstances and at different ranges, as well as suitable for data collection into the system.

The EDEG recommended the following project proposals to be implemented through the SPS programme:

- “Stand-off Detection of Surface Contaminations with Explosives Residues Using Laser Spectroscopic Methods” (proposed by scientists from Germany and Russia);
- “Systems for Stand-off Detection of Suicide Bombers with Active Millimetre Waves” (proposed by scientists in the Netherlands, Germany and Russia);
- “Data Merging and Alert System”, including off-the-shelf video and passive millimetre imaging components; and
- “On-Site Trials”.

The programme was approved by the NATO Research and Technology Organisation (RTO) and a steering committee was appointed. The projects will be monitored and audited by the EDEG and the RTO steering committee.

## Defence & Environment

A Defence and Environment Expert Group (DEEG) was established by the Science for Peace and Security (SPS) Committee in March to respond to new demands regarding the environmental dimensions of defence-related activities, particularly military operations. The expert group has proposed an agenda for a future focus on activities in the areas of deployment, domestic and regional operations, infrastructure, logistics, and environmental impact on soldiers.

The establishment of the DEEG follows on the work of the former Committee on the Challenges of Modern Society (CCMS), which, between 1984 and 2006, conducted a number of nationally funded pilot studies, short-term projects and workshops on issues of defence and environment. A significant past example is the "Pilot Study on Environmental Aspects of Reusing Former Military Lands" (1994-1998, led by United States and Germany). This study led to the creation of a Handbook on the Reuse of Former Military Lands, as well as two major follow-up workshops in Bishkek, Kyrgyz Republic in 2002 and in Ulaanbaatar, Mongolia in 2004.

Other recent activities on these issues include "Environmental Management Systems in the Military Sector (launched 1996 by the Netherlands and United States); "Sustainable Building for Military Infrastructure (launched in 1999 by the Netherlands and Canada); and "Environmental Aspects of Military Compounds" (launched in 2006 by Germany, the Netherlands and United States).

As a result of CCMS activities on defence and environment, the NATO Environmental Policy Statement for the Armed Forces and Guidelines on Environmental Training were reviewed by the Military Committee and adopted in 2001.

## Mélange rocket fuel clean-up to move to Uzbekistan



Following the successful completion of a project to clean up stocks of the hazardous rocket fuel oxidizer mélange in Azerbaijan, the NATO Science for Peace and Security (SPS) programme will begin a similar process in Uzbekistan in spring 2009.

In June 2008, an SPS-sponsored project in Azerbaijan completed the destruction of about 1,300 tonnes of the highly toxic, corrosive substance, a process that had begun two years earlier. All stocks of mélange that had been stored in the cities of Alat and Mengichevir since the Soviet period were converted into a non-hazardous material, using an environmentally safe chemical process in a mobile conversion plant operated by the NATO Maintenance and Supply Agency (NAMSA).

The project was managed by the U.S. contractor UXB, in collaboration with the Azerbaijan Ministry of Defence and the Azerbaijan National Academy of Sciences. The government of Azerbaijan supported the project by supplying the necessary infrastructure, consumables and logistic support, while the SPS Programme funded the construction, transport, assembly and operation of the plant, as well as technical personnel.

As a follow-up of the project in Azerbaijan, the SPS conversion plant will be moved to Uzbekistan next year, where another 1,100 tonnes of hazardous mélange is stored and awaiting destruction. In co-operation with the Ministry of Defence of Uzbekistan, the SPS programme plans to start this new mélange destruction project in Spring 2009. The mélange is currently stored at a military base in the city of Aqtash in the Samarkand Region.

**Contact:**

**Science for Peace and Security  
Programme**

Public Diplomacy Division  
NATO Headquarters  
Boulevard Léopold III  
B-1110 Brussels, Belgium  
Fax: +32 (0)2 707 4232  
Web: [www.nato.int/science](http://www.nato.int/science)

**M. Jean-François Bureau**

Assistant Secretary General for Public Diplomacy  
Chairman of SPS Committee

**Mr. Michael Stopford**

Deputy Assistant Secretary General for Strategic Communication Services

**Dr. Deniz Yüksel Beten**

Head of Section

General questions about the SPS Programme may be sent to  
[science@hq.nato.int](mailto:science@hq.nato.int)

Questions or suggestions regarding the web site may be sent to  
[natodoc@hq.nato.int](mailto:natodoc@hq.nato.int)