NATO OTAN

The NATO Science for Peace and Security Programme

CountryFlyer 2022

August

Developing Practical Cooperation through Science

Armenia has been actively engaged within the framework of the NATO Science for Peace and Security (SPS) Programme since 1993.

The NATO SPS Programme enables close collaboration on issues of common interest to enhance the security of NATO and partner nations by facilitating international efforts to meet emerging security challenges, supporting NATO-led operations and missions, and advancing early warning and forecasting for the prevention of disasters and crises.

The current SPS Key Priorities include:

- *Counter-Terrorism;*
- *Energy Security;*
- *Cyber Defence;*
- *Defence against CBRN Agents;*
- *Environmental Security;*
- *Security-related Advanced Technology;*
- *Border and Port Security;*
- *Human and Social Aspects of Security*.

Additionally, the SPS Programme helps to promote *regional security* through scientific cooperation among partners. The Programme also helps to *prepare* interested eligible nations for NATO membership. SPS activities often have a high *public diplomacy* value.

ARMENIA

Armenia has been involved in several activities with the SPS Programme. Leading areas for cooperation include **Defence against CBRN Agents**, **Security-related Advanced Technologies, Counter-Terrorism** and **Environmental Security**. Below are some examples of practical cooperation in the framework of the NATO SPS Programme involving Armenia.

Cooperative Activities

BIOMARKERS OF RADIATION IN THE ENVIRONMENT (BRITE)

This Advanced Research Workshop (ARW) set out to develop approaches to quantify exposure risks of populations and ecosystems to low doses of radiation. Biomarkers are biological measures that are able to identify if exposure has occurred. This ARW advanced the development of robust field-friendly biomarkers of radiation exposure of humans and the environment. It also aimed to foster the development of new research collaborations to take forward the development of robust biomarkers. Additionally, through discussion with regulators, the ARW explored the practicalities of operationalising biomarker usage. *This activity was led by Armenia and the United Kingdom. It took place in Yerevan in November 2017.* [ref. G5255].

SOLID STATE GAS SENSORS FOR SECURITY AND MILITARY THREATS

Initiated in 2014, this MYP aimed to develop technology for low-cost, field-ready sensors for a variety of vapour threats such as explosives, chemical warfare agents, and toxic chemicals. By producing and adding new, chemically sensitive layers to existing technologies, these new sensors can increase the sensitivity and selectivity of the detection devices, allowing them to operate effectively at room temperature. *This activity was led by Armenia and the Czech Republic.* [ref. G4597].

DEVELOPMENT OF BIOSENSORS USING CARBON NANOTUBES

Biological weapons pose a major threat to security. Applications to detect biological threats at an early stage have become crucial. The ability to detect pathogenic organisms and substances at an early stage can reduce the number of victims, or entirely prevent a potential attack. The main goal of this Multi-Year Project (MYP) was to develop a reliable, fast, sensitive, and selective prototype of an electrochemical DNA biosensor to detect pathogenic substances and organisms. *This activity was led by Armenia and Italy.* [ref. G4537].

CBRN SECURITY CULTURE: CONCEPT, ASSESSMENT, AND ENHANCEMENT

Recent efforts in the field of CBRN security culture have focused on the deployment of risk-based assessments to evaluate the prioritisation of security measures and to strengthen the exchange of information between states on CBRN security issues. The objective of this Advanced Study Institute (ASI) was to reinforce sustainable security culture in each CBRN sector by building a common architecture which would promote a shared vision of the issue. Such an integrated approach enables many countries lacking experience in this sector to better address CBRN risks and to comply with international obligations, such as United Nations Security Council Resolution 1540 regarding the non-proliferation of weapons of mass destruction. *This activity was led by Armenia and the United States. It took place in Yerevan in June 2014.* [ref. G4733].

DEVELOPMENT OF AN OPTICAL MAGNETIC SENSING SYSTEM FOR SECURITY CHECKPOINTS

This project aims to develop an optical magnetometric system for security screening at checkpoints for a sensitive detection of potential harmful objects. The proposed system will offer an alternative or a complementary option to existing walk-through metal detectors and baggage scanners by providing higher sensitivity, reliability, and safer operation with no bursts of strong magnetic field spikes. The novel optical magnetometric system will include a compartment for feedback-based real-time cancellation of a background magnetic field, providing fast and reliable detection of potentially dangerous metal objects, and a wide-range magnetometer allowing the localization of a harmful object and the evaluation of its danger level. The compensation system will warn when persons or goods passing through the checking compartment produce a magnetic field or alter its background value over the set limit. Upon detection of these materials, the high-spatial-resolution magnetometer will be used to locate the source position and the field value in the checking compartment. Besides homeland security and safety applications, the proposed system can find industrial, technological and medical applications. *This activity, launched in October 2020, is led by Latvia, Armenia, and France. [ref.G5794].*

MEETING SECURITY CHALLENGES THROUGH DATA ANALYTICS AND DECISION SUPPORT

Information overload is a problem that both military and civilian organisations are facing today. It creates major challenges in gaining accurate situational awareness, and confuses decision making processes. Big Data-Analytics and Decision Support (BD-DS) uses technology and statistics to distil large amounts of data into useful bits of information that could strengthen decision making in many defence-related areas. This SPS Advanced Research Workshop (ARW) addressed BD-DS as it applies to Counter-Terrorism, Cyber Defence, and Border and Port Security, and provided possible ways of addressing these issues through technological solutions. The event offered a forum for over 50 highly-qualified scientists who currently work with BD-DS to exchange knowledge of its practical application in defence. The results of the workshop were shared in a NATO Science Series publication. *This activity was led by experts from Armenia and Canada. It took place in Aghveran, Armenia, in June 2015.* [ref. G4789].