

### Developing Practical Cooperation through Science

Serbia has been actively engaged within the framework of the NATO Science for Peace and Security (SPS) Programme since 2007.

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.

## SERBIA

Serbia is currently leading six ongoing activities with the SPS Programme. The primary areas for cooperation include **Defence against CBRN Agents, Counter-Terrorism, Cyber Defence, Security-related Advanced Technology, Women, Peace and Security, Border and Port Security, and Energy and Environmental Security**. Below are some examples of ongoing and completed projects led by Serbia under the framework of the NATO SPS Programme.

### Cooperative Activities

#### SPECIALIZED CYBER DEFENCE TRAININGS FOR CIVIL SERVANTS OF SERBIA

Information Systems Security (INFOSEC) is an important tool for the management of cyber threats. This Advanced Training Course (ATC) provided civil servants from the Office of the National Security Council and Classified Information Protection of the government of Serbia with specialized advanced training to deal with INFOSEC in real-life situations. The ATC addressed essential theoretical and practical aspects of INFOSEC implementation, best practices and risk assessment methodologies. The participants learned how to develop and implement specific toolkits and roadmaps to address INFOSEC policies within their institutional framework. *This event, led by scientists and experts from Serbia and Estonia, took place from 7 to 18 November 2016.* [ref. G5331].



## BIOLOGICAL AND BIOINSPIRED STRUCTURES FOR MULTISPECTRAL SURVEILLANCE

This ongoing Multi-Year Project (MYP) aims to develop a proof-of-concept of a multispectral surveillance system, inspired by evolutionary optimized nano- and micro-structures of insect wings. Compared to existing systems, which are restricted to narrow spectral bands, the proposed system will cover ultraviolet (UV), visible and infrared (IR) radiation. The system uses micron-sized particles with internal nanostructures, similar to butterfly wing scales, as sensing elements. The radiation-induced perturbations are amplified by the interaction with the surrounding gas and detected by sensitive holographic techniques. The project's multispectral approach will enable efficient and enhanced detection, recognition and identification, with increased robustness to various noise sources in complex tasks (such as unexploded mine detection or trafficking control). *This project is led by scientists and experts from Serbia and Croatia.* [ref. G5618].

## EXPLOSIVE TRACE DETECTION FOR STANDEX (EXTRAS)

Avoiding or reducing casualties during terror attacks in mass transportation systems or in large public events, as recently experienced in various NATO and partner nations, currently requires human screening at a slow rate and very high cost. Launched in 2018, this ongoing MYP is included in the overall context of the DEXTER (Detection of EXPlosives and firearms to counter TERrorism) programme, which aims to detect explosives and firearms in a mass-transit environment without disrupting the flow of pedestrians. Through EXTRAS, the project team will develop a screening device, which will operate in real time at a high throughput rate. The project ultimately endeavours to advance a proximal trace explosive detection device capable of investigating in real-time a wide range of surfaces that might be contaminated with energetic materials. *This project is led by scientists and experts from Serbia, Italy, Germany, The Netherlands and Ukraine.* [ref. G5526].

## IMPROVED SECURITY THROUGH SAFER CEMENTATION OF HAZARDOUS WASTES

This ongoing MYP aims to improve public security by removing the chemical and radiological hazards associated with waste materials. Specifically, the project uses alkali-activated materials (AAMs) for improved solidification/stabilization (S/S) of hazardous wastes (toxic and/or radioactive). The S/S process decreases the potential environmental impact of hazardous wastes by reducing their leachability. The main expected outcome of the project is the safe and secure storage and eventual disposal of wastes, removing them from the biosphere. When proven feasible, the developed technology for S/S of hazardous wastes with AAMs will be applied in the Waste Processing Facility (WPF) within the public company "Nuclear Facilities of Serbia". *This project is led by scientists and experts from Serbia and the United Kingdom.* [ref. G5402].

## RADIATION HORMESIS FOR HIGHER MICROALGAE BIOFUELS YIELD

Biofuels derived from micro-algae biomass represent a key future renewable energy solution with military and civil applications. Exploitation of such biofuels is essential for energy security and to overcome environmental and resource constraints. The aim of this ongoing MYP is to employ and elaborate hermetic and priming/cross-adaptation effects of low dose X-radiation that can improve commercially-relevant parameters of microalgae production: biomass yield, productivity and carbon/nitrogen ratio, lipid content and extractability, and tolerance of microalgae to environmental stressors. The proposed technologies represent easy-to-use upgrades of available bioreactors. *This project is led by scientists and experts from Serbia, the United Kingdom, and the United States.* [ref. G5320].



The NATO Science for Peace  
and Security Programme