



Developing Practical Cooperation through Science

Switzerland has been actively engaged within the framework of the NATO Science for Peace and Security (SPS) Programme since 1990.

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 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.

SWITZERLAND

Switzerland has been an active partner in the SPS Programme since 1990, and is currently involved in a number of ongoing activities. At present, the leading areas for cooperation with Switzerland are **CBRN Defence** and **Security-related Advanced Technology**. Below are some examples of ongoing and completed activities led by Swiss scientists and experts under the framework of the NATO SPS Programme.

Cooperative Activities

NEW AND VALIDATED TOOLS FOR THE DIAGNOSIS AND FOLLOW-UP OF SARS-COV-2 INFECTED INDIVIDUALS

Launched in response to the COVID-19 pandemic, this project aims to rapidly obtain diagnostic options for COVID-19 through a coordinated and multidisciplinary approach combining expertise in immunology, virology and molecular biology. The project is led by scientists on the frontline of COVID-19 research from Italy's Istituto Superiore di Sanità (National Health Institute) and Tor Vergata University Hospital together with the University Hospital of Basel University in Switzerland. The results foreseen from this project are extremely relevant to the current pandemic, and they are expected to have a long-term impact on the international response to the spread of viruses on a large scale. The contributions to the improvement of risk management and public health measures will be significant. This project will also represent a model for quick measures to counteract epidemics. *This project, launched in May 2020, is led by Switzerland and Italy.* [ref. G5817].

MOBILE ADAPTIVE/REACTIVE COUNTER UNMANNED AERIAL SYSTEM (MARCUS)

This ongoing Multi-Year Project (MYP) was launched in November 2018, and aims to develop technology to address current and future low-slow-small (LSS) threats to national security posed by unmanned aerial systems (UAS). The project will make use of both airborne and stationary/mobile ground-based sensors to increase situational awareness, and to efficiently neutralize LSS threats. *This project is led by Switzerland and the United States.* [ref. G5568].

LARGE SCALE COLLABORATIVE DETECTION AND LOCATION OF THREATS IN THE ELECTROMAGNETIC SPACE

This MYP, launched in 2018 and completed in October 2021, created the foundations for an accurate, autonomous, fast and secure system that identifies intruders and attackers in the electromagnetic space, before the threat becomes serious. The system also learns about the characteristics of the threat (physical layer features) and its geographic location, and provides this information to the appropriate authorities, law enforcement agencies and decision makers. The system builds upon the current Electrosense system (electrosense.org), an initiative led by the members of this project, which uses low-cost spectrum sensors. The first generation of these sensors is already operational, both for research and for providing a first set of applications to end users and stakeholders. *This project was led by Switzerland, Spain, and Belgium.* [ref. G5461].



MARITIME SECURITY – MULTISTATIC AND MULTIBAND COHERENT RADAR FLEET FOR BORDER SECURITY (SOLE)

This MYP developed an innovative distributed radar system for enhanced inverse synthetic aperture radar (ISAR) detection, tracking and classification in border security applications. The project overcame limitations of current ISAR systems that strongly impact their imaging performance. SOLE exploited photonics for the generation and detection of the specific radar signals on a centralized core to enhance the quality of detection, tracking and classification operations. The project developed a simpler and more

efficient multiband radar architecture that can be used both in military and civilian maritime applications. *This project was led by Switzerland and Italy.* [ref. G5267].

CONFRONTING HYBRID THREATS – FRAGMENTATION AND RESHAPING OF REAL AND VIRTUAL NON-STATE THREATS

This Advanced Research Workshop (ARW) intended to shape strategic debate on the crucial junction between three main topics: strategies against evolving armed radicalism; terrorist funding as a lynchpin between extremism and armed operations; and integrating operationally Countering Violent Extremism (CVE). The workshop resulted in guidelines, a political summary to give direct support to delegations, and advice for a more integrated and efficient way to staunch the threat of terrorism. The workshop took place in December 2019 in Rome. *This activity was led by Switzerland, Italy, and Morocco.* [ref. G5598].

THE VULNERABILITIES OF THE DRONE AGE: STRATEGIC FORESIGHT PLANNING FOR 2035

Focusing on the challenges posed by hostile and rogue Unmanned Aircraft Systems (UAS), this workshop contributed to international strategic foresight planning by focusing on the past, present, and future of countering hostile drone technologies. This ARW brought together experts from across the academic, technological, and military communities to provide NATO and its partners with strategic-level, tailor-made insight into this issue, to map the emerging vulnerabilities that drone technologies will pose to NATO and its partners over the next 15 years, and to address technological-strategic gaps. The workshop was interactive and based on a number of sessions on applied history, strategic foresight and risk analysis, and open source analysis to examine past, present, and future trends in unmanned technologies and innovation. *This event was led by scientists and experts from Switzerland and Denmark and Switzerland.* [ref. G5754].



The NATO Science for Peace
and Security Programme

www.nato.int/science