



Developing Practical Cooperation through Science

Morocco has been actively engaged within the framework of the NATO Science for Peace and Security (SPS) Programme since 1999.

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.

MOROCCO

Morocco is an active partner in the framework of the SPS Programme. At present, leading areas for cooperation with Morocco include **Defence against CBRN Agents, Environmental Security, and Human and Social Aspects of Security**. Below are some examples of ongoing and completed activities led by scientists and experts from Morocco and NATO countries under the framework of the NATO SPS Programme.

Cooperative Activities

RESPONDING TO EMERGING SECURITY CHALLENGES IN NATO'S SOUTHERN NEIGHBOURHOOD

Given the characteristically complex and multifaceted nature of the security environment in NATO's southern neighbourhood, it is necessary for the success of the Alliance's "southern agenda" to better understand and conceptualise the various interconnected emerging risks and threats. Moreover, a better understanding of the southern neighbourhood may help NATO adapt institutionally—on a political and operational level—to meet diverse challenges in the South and the East. This MYP aimed to analyse those dynamics in order to better comprehend their political and security implications, and to provide foresight, early warning mechanisms and scenarios to inform policy planning and policy making within NATO and its member states. *This project was completed in 2021 and led by Morocco and Belgium, in cooperation with experts from Spain, the United Kingdom and Jordan.* [ref. G5570].

DIMLAB – DEPLOYABLE CHEMICAL AND BIOLOGICAL ANALYTICAL LABORATORY

This ongoing Multi-Year Project (MYP), launched in November 2019, aims to develop two dual-use (civil and military) deployable laboratories, one chemical and one biological, for Tunisia and Morocco respectively. NATO has been working with Morocco to strengthen the country's capacity to defend against CBRN agents. Scientific research with direct applications in defence and security, such as the DIMLAB project, responds directly to the Individual Partnership and Cooperation

Programme between NATO and Morocco, which highlighted the “exchange of information and expertise, and capacity building in defence against CBRN agents” as a main practical area of cooperation through the SPS Programme. The DIMLAB project will build a laboratory for the detection, identification and monitoring of both chemical and biological threats. It will focus on the application of nanobiotechnology to develop a fully operational, chemical-biological analytical turnkey solution for the use of academia and national institutions. *This project is led by Morocco, Spain and Tunisia.* [ref. G5571].



CYBER THREAT FORECAST USING BIG DATA

Predicting cyber-attacks can help prevent and reduce their impacts. This SPS Multi-Year Project (MYP) aimed to predict various types of cyber-attacks well in advance. The project research team developed machine-learning algorithms that captured spatial-temporal dynamics of cyber-attacks and global social, geo-political and technical events. In addition to developing an early-warning capacity, the project aimed to improve the research community’s understanding of cyber security as a socio-technical problem by analysing and describing large datasets from multiple sources. The project resulted in a scientific report on prediction models and the implementation of a cyber threat forecasting tool. *This project was completed in 2020 and led by scientists and experts from Morocco, France and the United States.* [ref. G5319].

IRIS - INSPECTION AND SECURITY BY ROBOTS INTERACTING WITH INFRASTRUCTURE DIGITAL TWINS

IRIS aims at designing and developing an innovative integrated system for “digital twins”, a computer-based model of a mechanical system, which can provide an exhaustive and realistic replica of the system during its service life and even in post-disaster occurrences. The prototype will comprise autonomous / robotic systems and sensor networks for data acquisition, survey, inspection and monitoring of critical infrastructures. *This project was launched in November 2021 and is led by experts from Morocco, Italy, Slovakia and Poland.* [ref. G5924].

TECHNOLOGY AGAINST CLIMATE CHANGE TO MITIGATE CO2 ENVIRONMENTAL SECURITY THREATS (TANGO)

The main goal of the TANGO project is the reduction of CO2 emissions in the atmosphere and, consequently, the mitigation of the impact of greenhouse gases on climate change. This will be achieved through the development of a novel and sustainable technology for the utilization of CO2, which can be employed as a building block to produce a wide variety of chemicals and fuels, turning a pollutant into a feedstock. *This project was launched in July 2021, and is led by experts from Morocco, Italy and Belgium.* [ref. G5885].



The NATO Science for Peace
and Security Programme