

Developing Practical Cooperation through Science

Malta has been engaged in several activities within the framework of the NATO Science for Peace and Security (SPS) Programme.

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 warnings 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 high *public diplomacy* value.

MALTA

Malta first joined NATO's Partnership for Peace (PfP) for one year in 1995. The country reactivated its membership in April 2008, and since participated in practical bilateral cooperation with NATO through the PfP framework. Malta recognizes that this can help to address new security threats and challenges, and contribute to international peace, security and stability. To date, Malta has played a leading role in several SPS Programme activities. Leading areas of cooperation include **Security-Related Advanced Technology** and **Cyber Defence**. Below are some examples of ongoing and completed activities with Malta under the framework of the NATO SPS Programme.

Cooperative Activities

SECURE QUANTUM COMMUNICATIONS THROUGH SUBMARINE OPTICAL FIBRE LINK BETWEEN ITALY AND MALTA (SEQIM)

The goal of this Multi-Year Project (MYP) was to develop new forms of long-distance undersea secure communication, allowing defence and public institutions to connect and communicate safely in a protected cyber space. The proposed solution was a Quantum Key Distribution (QKD) system, a recent cutting-edge technology also developed into a user-friendly and commercially viable solution. Existing implementations are limited in scale and in scope, and often make use of infrastructure adapted for the purpose of quantum technology communication.



This project, completed in 2022, aimed to realise a QKD link between Italy and Malta using existing telecommunication infrastructures between the two countries. It aimed to develop and test emerging safe quantum communication technologies in a real-world environment. *This project was led by scientists and experts from Malta and Italy.* [ref. G5485].

QUANTUM-SAFE AUTHENTICATED GROUP KEY ESTABLISHMENT

The goal of this MYP was to provide quantum-safe solutions for fundamental cryptographic algorithms, which are currently the basis for securing computerised communications. The research team developed complete solutions for Authenticated Group Key Agreement (AGKE), which will enable groups of users to exchange information and collaborate securely over open networks. The solutions developed in this project aimed to offer strong security guarantees of the confidentiality of the classical network, taking into account the risks posed by quantum technology's potential to break computer encryptions. In order to achieve the abovementioned deliverables, the research team developed general techniques and concrete protocols, providing secure implementation and efficient hybrid solutions for quantum-safe AGKE. *This project was completed in 2022 and led by scientists and experts from Malta and Slovakia.* [ref. G5448].

BORDER SECURITY THREATS FROM THE MEDITERRANEAN REGION

This Advanced Research Workshop (ARW) focused on the most vital border security dangers in the Mediterranean region. The event brought together leading senior policymakers and experts from NATO and partner nations in Europe, the MENA region and the United States, as well as a selection of institutions. The event provided a forum for experts and leaders who engaged in group debates and applied their collective knowledge to identify joint solutions and policies regarding border security threats and

challenges. Developing the best possible practices to meet these challenges leads to a more secure environment. It also strengthens local partnerships, crucial to fighting border security threats, bringing people with different perspectives and backgrounds together in order to work jointly on solutions to improve border security. This workshop was organized as the starting point of a long-term project of participating professionals and experts. *The event was led by scientists and experts from Malta and Poland. It took place from 2 to 4 June 2014 in San Giljan, Malta.* [ref. 984863].

TOWARD A QUANTUM-SAFE COMMUNICATION INFRASTRUCTURE

This ARW brought together two communities in the field of quantum technology: the community of scientists working on quantum physics (quantum mechanics, photonics entanglement, QKD, etc.) and mathematicians looking at quantum computing and related Post-Quantum Cryptography. By bringing these experts together, the workshop identified a strategy leading to an effective development of technologies and techniques for a comprehensive quantum-safe cyber infrastructure. The intent was to define a roadmap for future developments in order to ensure that all elements are taken into account, from architectural considerations and protocol design to implementation and experimental validation. *This ARW was led by Malta and the United States and took place from 14 - 18 November 2021.* [ref. G5756].



The NATO Science for Peace
and Security Programme