NATO
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Science for Peace and Security (SPS) Programme

NATO Emerging Security Challenges (ESC) Division

Science for **Peace** and **Security (SPS)** Programme

NATO Emerging Security Challenges (ESC) Division

Foreword

by **Dr. Antonio Missiroli**
Assistant Secretary General
NATO Emerging Security
Challenges Division

In 2018, the Science for Peace and Security (SPS) Programme celebrated its 60th Anniversary. This occasion brought together current and former high-level NATO officials and renowned SPS affiliated scientists to commemorate and highlight the key achievements of the Programme over the 60 years of its existence. NATO Deputy Secretary General, Mrs. Rose Gottemoeller, and Ambassadors from Allied and Partner countries reaffirmed the SPS Programme's fundamental role as NATO's practical and results-oriented framework for cooperation with Partners. The anniversary was also an excellent opportunity to present prototypes resulting from SPS funded activities. These were displayed at an Exhibition, which was organized at the new NATO Headquarters in Brussels. Additionally, three outstanding SPS Multi-Year Projects were awarded the 2018 NATO SPS Partnership Prize for excellence in scientific cooperation.

Today the SPS Programme is undoubtedly a key feature of NATO Partnerships, fostering peace, resilience and preparedness – both in NATO Partner countries and inside the Alliance. In line with NATO's '360 degree approach', SPS continues to build bridges and nurture collaboration through non-military practical cooperation, with Partner countries in the East, in the South, as well as with global Partners.

Just like NATO itself - which celebrates its 70th Anniversary in 2019 - SPS has proven its adaptability to the ever-changing security environment, closely following Allied political agendas and aligning to NATO's Strategic Objectives over these many decades. The Programme underpins the Allies' commitment to expand practical cooperation with any Partner nation that shares the Alliance's values, and to focus on establishing international security, peace and stability.

60 is usually the age to start slowing down and looking at retirement, but not for SPS! I am confident that SPS will keep making important contributions to the security related civil science field, while further developing and deepening NATO's partnerships so that they continue to meet the interests of both Allies and Partners.

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Introduction

The Science for Peace and Security (SPS) Programme is an established brand for NATO based on four pillars: science, partnership, security, and unconventional issues (hybrid threats). It has been contributing to the core goals of the Alliance for more than six decades. Today, the SPS Programme continues to be one of the largest and most important partnership programmes addressing 21st century security challenges, particularly cyber defence, counter-terrorism, CBRN defence, energy security and advanced technologies.

Based on the North Atlantic Council's (NAC) Overarching Guidelines launched in 2013, along with the streamlined working methods developed following a comprehensive reform process, the SPS Programme continues to work with NATO Allies and all Partner countries on practical and mutually beneficial cooperative activities in the field of security-related civil science and technology.

This brochure offers a comprehensive overview of the NATO SPS Programme. It contains information about grants, the application cycle, and key priorities, as well as concrete examples of completed and ongoing SPS activities. It also provides the reader with a clear understanding of how to apply to the SPS Programme's different grant mechanisms, which include: Multi-Year Projects (MYP), Advanced Research Workshops (ARW), Advanced Training Courses (ATC) and Advanced Study Institutes (ASI). The goal of all SPS activities is to enhance knowledge, to share best practices, to build scientific networks, and to train young scientists, thus contributing to international peace and security.

Guidelines on how to fill out the application forms can be found on the website: https://www.nato.int/cps/en/natohq/87260.htm

- Management Handbook for MYP
- Event Handbook for ARW, ATC, and ASI.

What is the NATO Science for Peace and Security (SPS) Programme?

About the SPS Programme

The NATO Science for Peace & Security (SPS) Programme enhances security-related civil science and technology to address emerging security challenges and their impacts on international security. It connects scientists, experts and officials from Alliance and Partner countries to work together to address these challenges. The SPS Programme provides funding and expert advice for security-relevant activities in the form of Multi-Year Projects (MYP), Advanced Research Workshops (ARW), Advanced Training Courses (ATC), and Advanced Study Institutes (ASI).

The SPS Programme also has a high public diplomacy value for NATO, providing the Alliance with separate, non-military communication channels by bringing together experts from NATO and Partner countries, often in situations or regions where other forms of dialogue more directly focused on defence and security are difficult to establish. Accordingly, the Programme enables NATO to become actively involved in such regions, often serving as the first concrete link between NATO and a new Partner.

All SPS activities contribute to the Alliance's Strategic Objectives - as defined in the 2010 Strategic Concept, and set out in the NATO Partnership Policy adopted in Berlin in 2011 - and arising from high-level political meetings, including Ministerials and Summits. Today, through a balanced 360° approach, SPS promotes practical cooperation based on these core dimensions that define its identity:

Science: the SPS Programme helps to foster research, innovation, applied science and technology, as well as knowledge exchange in an effort to address common security challenges. As a brand, SPS has a very wide network extending to hundreds of universities and institutions across Allied nations and Partner countries.

Partnership: the collaborative framework of the Programme brings together scientists, experts and policy makers from Allied and Partner countries to address today's security challenges. SPS is well known as one of the most important partnership programmes that is available to all Partners, proving that practical cooperation is achievable across political barriers through scientific exchange.

Security: according to the scope of the SPS Programme and guidance from NATO nations, all projects developed under SPS must have a security dimension. This is also reflected in the SPS Key Priorities developed by Allies.

Unconventional issues: The SPS Programme's primary purpose is to strengthen NATO's partnership policy. Following a comprehensive Strategic Assessment of the SPS Programme in 2013, it has grown to include projects that encompass capacity-building, hybrid threats and Women Peace and Security UNSCR 1325, while preserving the important scientific dimension of the Programme.

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Why SPS matters

The SPS Programme links the scientific community to NATO through civil science cooperation activities that address global security challenges. Civil actors, including researchers, academics and government experts play an important role in helping the Alliance identify, understand, and respond to contemporary vulnerabilities and threats. SPS offers unique ways to engage NATO nations and partners in meaningful, practical cooperation with tangible results and deliverables contributing to technical and scientific advancement.

Dr. Thomas Killion, Former NATO's Chief Scientist: SPS is a key tool that NATO has always had to reach out to the scientific community, to leverage the knowledge, the ideas and the enthusiasm, the innovation that comes both from within NATO and NATO Nations, together with Partner Nations that bring their own perspective, their own challenges and their own opportunities to us in order to help them.

Ambassador Vadym Prystaiko, Ukraine: For Ukraine this Programme is not merely a useful means of bringing together experts to enhance security and progress. Ukraine recognizes SPS as a true and devoted friend, which has supported Ukrainian scientists for more than 20 years.

Since the Programme's inception, a wide international network of scientist and experts from NATO member and partner nations has been established. Every year, approximatively 2000 experts participate in SPS activities and help to build capacity in partner nations, support NATO efforts in the fight against terrorism, facilitate the development of security-related advanced technologies and foster expert networks to address questions related to cyber defence or the role of women in peace and security. More than 20 Nobel Laureates have been involved in the SPS Programme, a testament to the scientific excellence supported by the SPS Programme. Young scientists are also actively supported through SPS activities, which contribute to broaden their professional network and scientific expertise.

The SPS Programme provides funding, scientific and technical expert advice and support to tailor-made, security-related activities through established grant mechanisms. SPS activities are always demand-driven, modular, and designed to meet the requirements of the nation(s) and end user(s). The relevance of SPS activities in response to NATO Strategic Objectives and political priorities is reinforced also via special calls, which are issued on an ad hoc basis to draw the attention of the scientific community towards current topics of interest for Allies.


NATO Science for Peace and Security
SPS Partnership Prize
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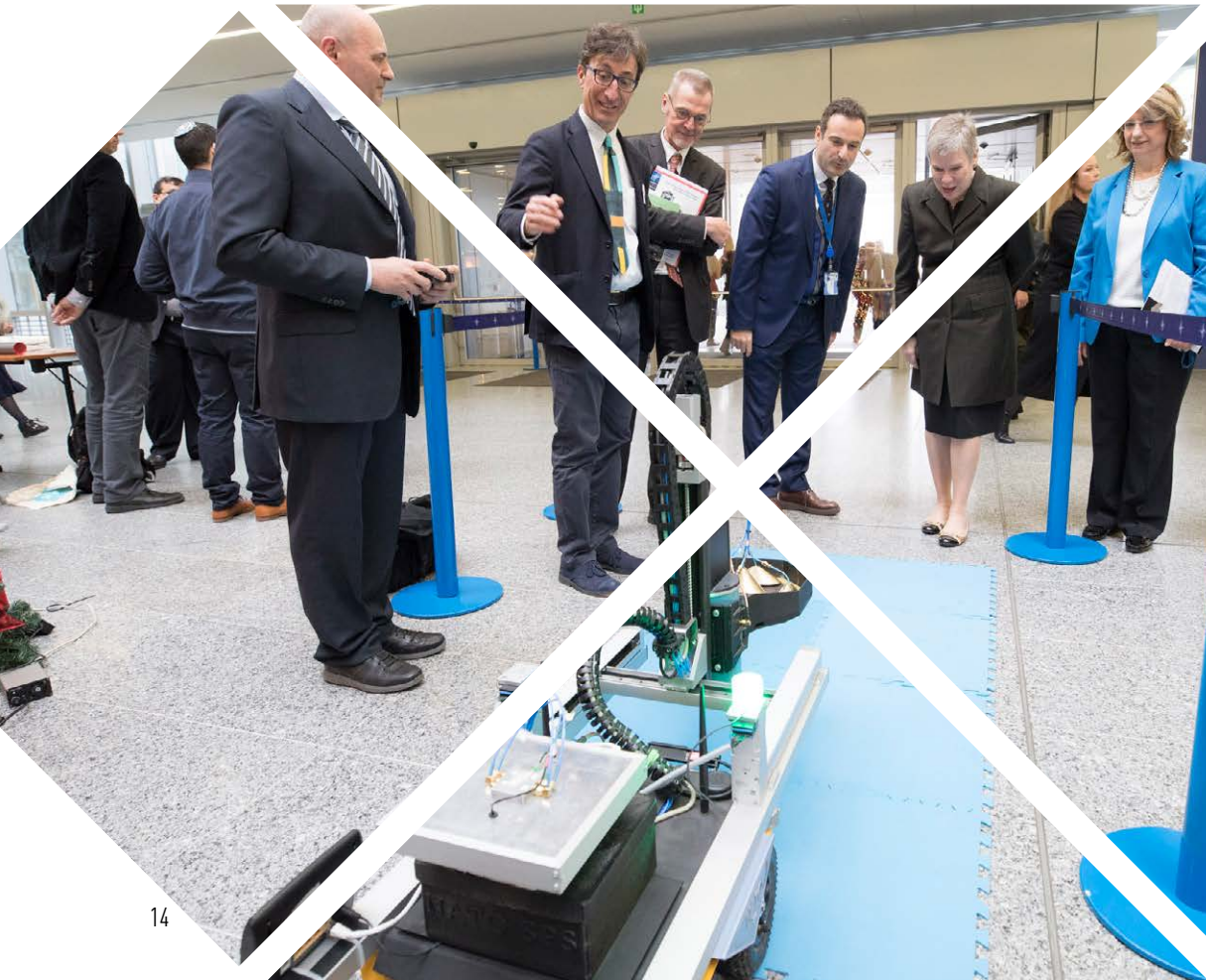

SPS in the last decade

Ambassador Claudio Bisogniero, Italy: SPS is a truly unique tool to foster scientific and technological cooperation between Allies and Partners while reinforcing the image of NATO as a soft power organization.

Since 2010, the SPS Programme has been an integral part of the Emerging Security Challenges (ESC) Division.

In line with the strategic objectives of NATO's partnership policy, as agreed upon during the Berlin Summit in 2011, and with the NATO Strategic Concept agreed upon in Lisbon in 2010, a new set of SPS Key Priorities was approved by Allies in 2012. These priorities reaffirm the focus of the SPS Programme on security-related civil and scientific cooperation.

In 2013, a new structure with the aim of further increasing the efficiency and cost-effectiveness of the Programme was approved. During this restructuring, the multi-disciplinary Independent Scientific Evaluation Group (ISEG) was established to peer-review (evaluate) all SPS applications.

Also in 2013, the SPS Overarching Guidelines were approved by the North Atlantic Council (NAC) to ensure that all prior political and strategic guidance for the SPS Programme was interpreted in line with the extant political and strategic aims of the Alliance. As a result, the SPS Programme broadened its scope to include activities that transcend purely scientific cooperation, while preserving the important scientific dimension of the Programme. It was also decided that the SPS Programme would increasingly promote top-down, larger scale and more strategic activities with a view to enhance both the political and public diplomacy impact of NATO's partnerships.

On the 29th of November 2018, Ambassadors, high-level governmental representatives and renowned scientists from NATO and Partner countries gathered at the new NATO Headquarters to celebrate the 60th Anniversary of the SPS Programme and all of its achievements over the years. An exhibition of technologies developed through SPS projects was presented on the same day.

Over six decades, the Programme has demonstrated its ability to adapt to NATO's changing strategic and security agenda, and it continues to support key Allied partnership priorities and policies today. With close to 150 ongoing activities, the SPS Programme maintains its key role in engaging NATO member and Partner countries in meaningful practical cooperation on security-related civil science and innovation.


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What SPS offers

Ambassador Miomir Udovicki, Serbia: The SPS Programme has proved to be one of the most useful and most accepted forms of cooperation between NATO and Partner countries. Participation in the Programme provide many benefits to Serbia and NATO. It is as often said a "two-way street" and it is not just an empty phrase.

Frameworks to Engage Partners

The SPS Programme is one of NATO's largest civil partnership programmes, and as such, has a considerable political dimension. The Programme allows NATO countries to engage with Partners through different frameworks, including the Euro-Atlantic Partnership Council (EAPC), the Mediterranean Dialogue (MD), Partners around the Globe (PaG), and the Istanbul Cooperation Initiative (ICI). The SPS Key Priorities reflect current developments in the international security environment and in NATO's political priorities.

Contribution to NATO's Partnership Priorities

The SPS Programme links civil society to NATO through activities that address global security challenges. Civil actors, like researchers, academics, and government experts, play important roles in helping the Alliance to identify, understand, and respond to contemporary vulnerabilities and threats. Civil society is integral to effectively addressing these threats, and NATO aims to ensure that funding and support is available for collaborative activities that address NATO's security objectives while promoting cooperation and partnership.

Following the guidance from the 2018 Brussels Summit, the SPS Programme actively contributes to a number of NATO partnership priorities and initiatives, such as the Defence and Related Security Capacity Building (DCB) Initiative. It projects stability through practical cooperation and by tailoring SPS activities to Partners' priority areas as outlined in their partnership agreements with NATO.

Creating Networks and Building Synergies

Joint SPS projects have created strong and lasting networks spanning the world. NATO SPS staff are well placed to provide advice and expertise regarding emerging security challenges such as cyber defence, energy security, defence against CBRN agents and counter-terrorism. The SPS Programme closely coordinates its activities with other NATO Divisions and Bodies, and with international stakeholders, thus increasing efficiency and creating further synergies on a case-by-case basis.

Public Diplomacy Value

> **Ambassador Gaya Mammadov, Azerbaijan:** The SPS Programme, without hesitation, could be named as the main soft power tool of the Alliance, as during the years it has well implemented a role of peacebuilder with smilingly distant partners.

The SPS Programme helps to balance the public perception of the Alliance as being primarily military, and demonstrates the tangible impact and benefit of NATO's partnerships.

SPS Information Days are excellent opportunities to raise public awareness of the SPS Programme and to explore potential new activities by engaging with government representatives, scientists, and experts in both NATO and Partner countries.

The SPS website remains the main point of reference for up-to-date information and news related to the SPS Programme, as well for all the necessary information and applications forms. More information is available on the website: https://www.nato.int/cps/en/natolive/78209.htm .

The SPS Twitter account provides updates on SPS activities, as well as on public diplomacy events linked to the Programme. Over the past several years, the SPS Twitter account has seen a marked increase in followers that includes scientists, subject matter experts, think tankers, interested individuals and delegations of NATO and Partner countries, with up to 50,000 visualizations. Follow us on @NATO_SPS.

Through scientific publications and media coverage that are part of tailored communication plans, each SPS project promotes its activities to the scientific community and to a broader public.

- An example of NATO Series includes a book which presents results, recommendations and best practices from the NATO Advanced Research Workshop (ARW) "Critical Infrastructure Protection Against Hybrid Warfare Security Related Challenges", held in Stockholm, Sweden, in May 2016: (https://www.nato.int/cps/en/natohq/topics_142011.htm?).
- An example of media coverage is the "Advanced Research Workshop on Explosives Detection" which took place in Florence in October 2018 and was highlighted in national media in Italy: (https://www.lanazione.it/firenze/cronaca/presentato-robot-mine-antiuomo-1.4245283).

The SPS Annual Report provides a yearly overview of the work and the main achievements of the SPS Programme.

Several SPS flagship activities reflecting NATO's Strategic Objectives, political priorities and key partnership initiatives, have been regularly highlighted in the Secretary General's Annual Report.

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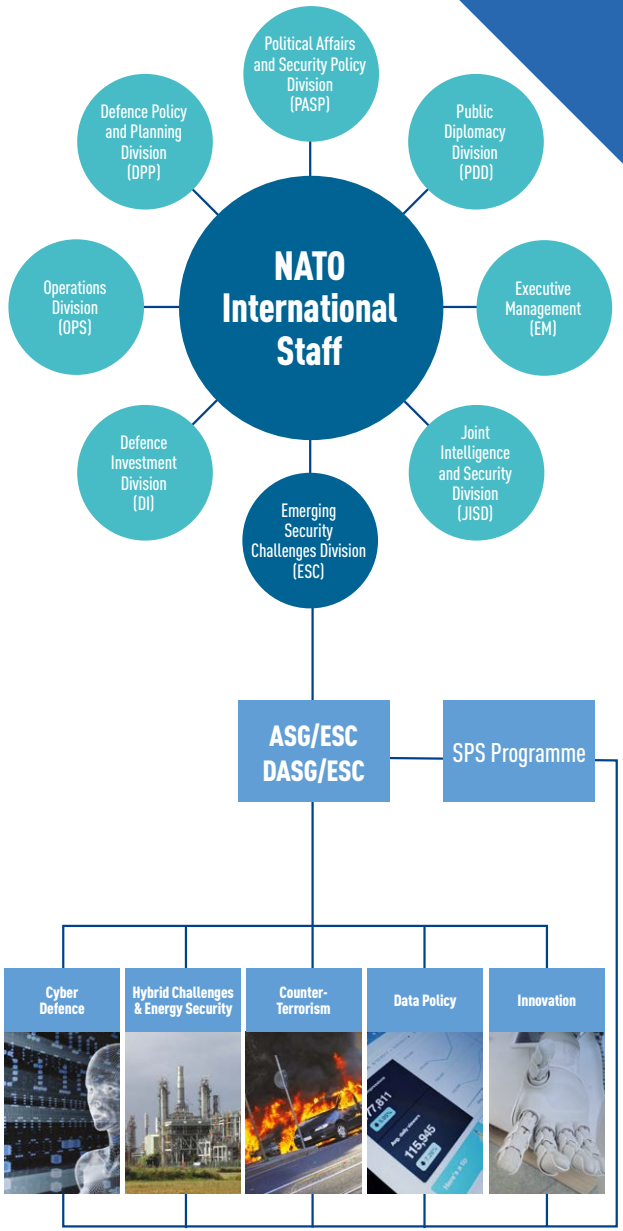


The Emerging Security Challenges Division

The Emerging Security Challenges (ESC) Division was established in 2010 in the run-up to the Lisbon Summit, when Allies adopted the new Strategic Concept. The document highlighted the growing importance of transnational threats to Allied security and raised NATO's level of ambition as a forum for consultation and joint action to respond to these threats.

Currently, the Division covers a broad spectrum of important functions supporting the strategic orientation of NATO. ESCD aims to address evolving security challenges in a comprehensive and cross-cutting way, serving as NATO'S hub of expertise on a growing range of unconventional risks and challenges.

Cyber-attacks, terrorism, threats of CBRN agents, energy security and hostile hybrid activities are major contemporary challenges to international peace and security. In the cyber defence field, ESCD leads NATO's policy development and coordination efforts to protect the Allied networks against cyber-attacks, to assist Allies in improving their resilience, and to develop cyber defence cooperation and partnership programmes. In the fight against terrorism, the Division coordinates counter-terrorism related efforts across an Alliance that is fully conscious of and determined to combat the enduring, but mutating terrorist threat. The counter-terrorism team also works on capabilities to protect forces and to respond widely to asymmetric threats. The hybrid challenges and energy security team works to raise Allies' awareness in this field. The focus of the SPS Programme spans across these contemporary security challenges to bring together scientists, experts and policy makers from NATO and Partner countries to address them.

To fulfil its role, ESCD interacts and collaborates closely with all other NATO Divisions and the International Military Staff, as well as NATO's agencies, NATO's Centres of Excellence, Partner nations, and other international organisations.

What SPS Supports

Grant Mechanisms

The SPS Programme supports collaboration through four established grant mechanisms: Multi-Year Projects (MYP), Advanced Research Workshops (ARW), Advanced Training Courses (ATC) and Advanced Study Institutes (ASI). Interested applicants must develop a collaborative activity that fits within one of these formats. Information regarding the application procedure can be found on the SPS website.

All SPS applications are evaluated by an Independent Scientific Expert Group (ISEG) nominated by NATO nations.

Research and Development (R&D) Projects

Multi-Year Project (MYP)

WHAT: Research and development projects related to NATO's strategic goals and relevant to the SPS Key Priorities.

DURATION: R&D Projects have an average duration of 24 to 36 months.

TARGET AUDIENCE: Applications are submitted jointly by an expert who resides and works in a NATO country, and an expert who resides and works in a Partner country. Projects involving more than one Partner country and the participation of young scientists are encouraged.

BUDGET: NATO funds are provided to cover project-related costs such as scientific equipment, computers, software and training of project personnel and young scientists. Typically, roughly half of the budget is allocated to equipment; about 20% to training and travel; and 15% to stipends. These percentages may vary according to the needs of each project. Project budgets usually range between €150,000 – 350,000 over 2-3 years.

Events

Advanced Study Institute (ASI)

WHAT: A high-level tutorial course communicating the latest developments in subjects relevant to NATO to an advanced-level audience.

DURATION: 7-10 working days. Lecturers of international standing report new advances on topics of security-related civil science.

TARGET AUDIENCE: ASIs target pre- and post-doctoral level scientists with relevant backgrounds in the subject matter of the course. Young scientists from NATO Partner countries are especially encouraged to attend.

BUDGET: The SPS grant for an ASI (average 60,000 EUR) pays for direct organizational costs, travel and living expenses for up to 15 lecturers and 60 to 80 students from countries eligible to receive NATO funding.

Advanced Training Course (ATC)

WHAT: A course designed to enable specialists in NATO countries to share their security-related expertise in one of the SPS Key Priority areas. An ATC is not intended to be lecture-driven, but to be intensive and interactive in nature. The course contributes to the training of experts in Partner countries and enables the formation and strengthening of international expert networks.

DURATION: 5-7 working days

TARGET AUDIENCE: Trainees (20 to 50) are primarily from Partner countries. These trainees are chosen on the basis of their qualifications and experience, and the benefit they may draw from the ATC for their future endeavours.

BUDGET: The SPS grant (average 60,000 EUR) pays for direct organizational costs, travel, and living expenses of all specialists, and attendance costs of trainees from countries eligible to receive NATO funding.

Advanced Research Workshop (ARW)

WHAT: An advanced-level workshop that provides a platform for experts and scientists to share their experience and knowledge on security related topics in order to promote follow-on activities such as Multi-Year Projects.

DURATION: 2-5 working days

TARGET AUDIENCE: ARWs usually gather 20-50 participants. It is preferable for the workshop to be held in the applicable Partner country.

BUDGET: The SPS grant for this event (average 30,000 to 40,000 EUR) is intended to cover direct organizational expenses of the ARW, travel and living expenses of key speakers, as well as non-speakers from NATO countries and Partner countries unable to obtain support from other sources.

How to Apply

Who Can Apply

Applications for funding must be submitted jointly by a NATO country co-director and a Partner country co-director.

Please find an overview of NATO and Partner countries below:

NATO Countries

Albania, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Netherlands, the Republic of North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, United Kingdom, United States.

NATO Partners

Afghanistan, Algeria, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Bosnia and Herzegovina, Colombia, Egypt, Finland, Georgia, Iraq, Ireland, Israel, Japan, Jordan, Kazakhstan, the Republic of Korea, Kuwait, Kyrgyz Republic, Malta, Mauritania, the Republic of Moldova, Mongolia, Morocco, New Zealand, Pakistan, Qatar, Serbia, Sweden, Switzerland, Tajikistan, Tunisia, Turkmenistan, Ukraine, United Arab Emirates, Uzbekistan.

When and how to apply

There are normally two to three peer review evaluation panels held per year with deadlines for application submissions corresponding to their scheduling. The deadlines are generally set as follows:

- February
- June
- October

A decision on funding can take up to nine months following an application deadline. It is important to take this into consideration when proposing dates for an activity. Please consult the NATO SPS website for the latest application deadline schedule.

All applications must address the SPS Key Priorities and must have a clear link to security and to NATO's Strategic Objectives.

Applications for funding should be sent to: sps.applications@hq.nato.int

Application and Approval Procedure

At least one NATO Country Expert and

At least one Partner Country Expert must collaborate

Select a topic (in line with the SPS Key Priorities)

Select a grant mechanism (MYP, ARW, ATC, ASI)

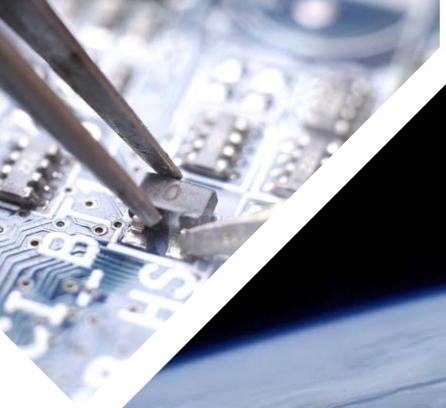
Submit your application to the SPS Programme

www.nato.int/science

Peer review by the Independent Scientific Evaluation Group (ISEG)

Approval by PCSC (Allied countries)

Approval: After receiving the Award Letter from NATO SPS staff, start your collaboration!



Key Priority Areas

All activities funded under the SPS Programme must address one or more of the SPS Key Priorities and have a clear link to security.

The priority areas for the SPS Programme focus on contemporary security challenges such as: counter-terrorism, energy and environmental security, cyber defence, defence against CBRN agents, border and port security, mine and unexploded ordnance detection and clearance, hybrid warfare, and human and social aspects of security, including implementation of the United Nations Security Council Resolution (UNSCR) 1325 on Women, Peace and Security.

The SPS Key Priorities are based on NATO's Strategic Concept agreed by Allies at the Lisbon Summit in November 2010, and the Strategic Objectives of NATO's Partner Relations agreed in Berlin in April 2011. Before applying, please make sure that your proposal aligns with at least one of the Key Priorities listed below:

1. Facilitate mutually beneficial cooperation on issues of common interest, including international efforts to meet emerging security challenges

a. Counter-Terrorism

- Methods for the protection of critical infrastructure, supplies and personnel;
- Human factors in the defence against terrorism;
- Detection technologies against the terrorist threat of explosive devices and other illicit activities;
- Risk management, best practices and technologies in response to terrorism.

b. Energy Security

- Innovative energy solutions for the military; battlefield energy solutions; renewable energy solutions with military applications;
- Energy infrastructure security;
- Maritime aspects of energy security;
- Technological aspects of energy security.

c. Cyber Defence

- Critical infrastructure protection, including sharing of best practices, capacity building and policies;
- Support in developing cyber defence capabilities, including new technologies, and support to the construction of information technology infrastructure;
- Cyber defence situation awareness.

d. Defence against Chemical, Biological, Radiological, and Nuclear (CBRN) Agents

- Methods and technology to protect against, diagnose effects of, detect, decontaminate, destruct, dispose and contain CBRN agents;
- Risk management and recovery strategies and technologies;
- Medical countermeasures against CBRN agents.

e. Environmental Security

- Security issues arising from key environmental and resource constraints, including health risks, climate change, and water scarcity, and increasing energy needs, which have the potential to significantly affect NATO's planning and operations;
- Disaster forecast and prevention of natural catastrophes;
- Defence-related environmental issues.

2. Enhance support for NATO-led operations and missions

- Provision of civilian support through SPS Key Priorities;
- Provision of access to information through internet connectivity as in the SILK-Afghanistan Programme;
- Cultural and social aspects in military operations and missions;
- Enhancing cooperation with other international actors.

3. Enhance awareness of security developments including through early warning, with a view to preventing crises

a. Security-related Advanced Technology

- Emerging technologies including nanotechnology, optical technology, micro satellites, metallurgy and the development of Unmanned Aerial Vehicle (UAV) platforms.

b. Border and Port Security

- Border and port security technology;
- Cross border communication systems and data fusion;
- Expert advice and assessments of border security needs and best practices.

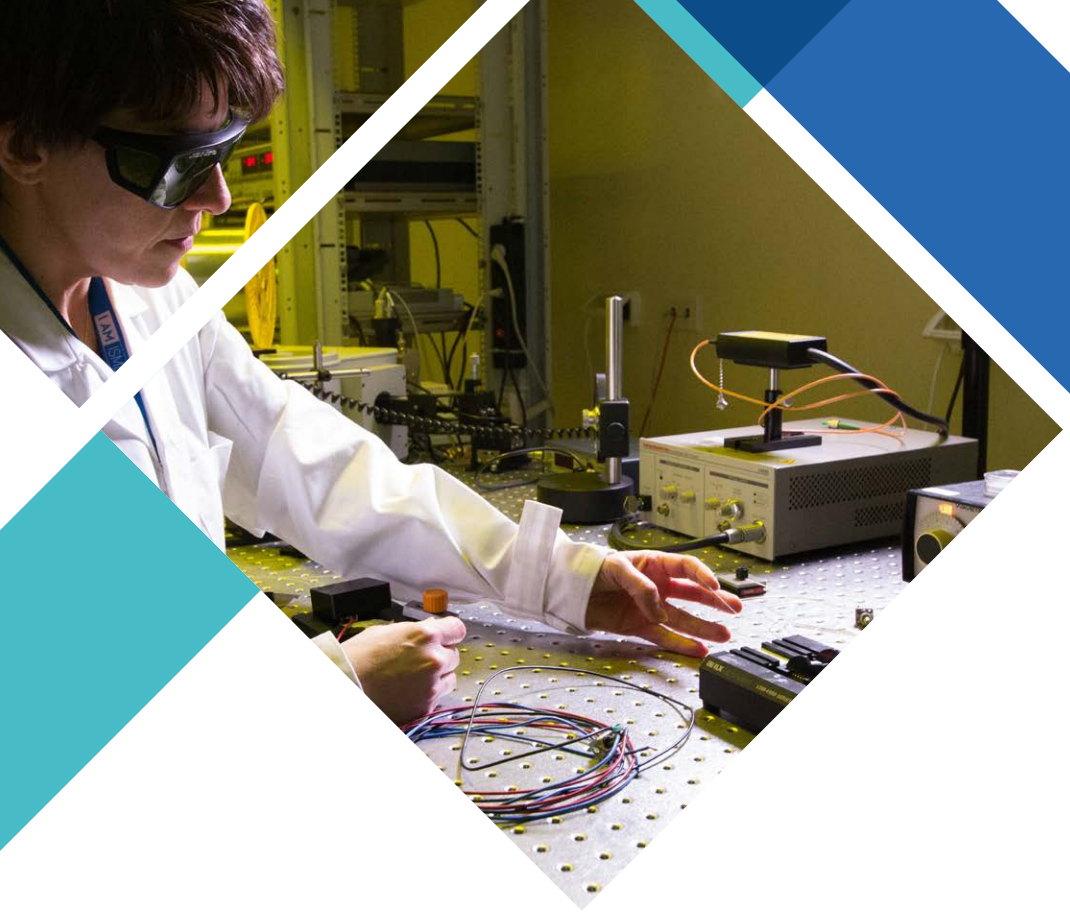
c. Mine and Unexploded Ordnance Detection and Clearance

- Development and provision of advanced technologies, methodologies and best practices;
- Solutions to counter improvised explosive devices (IED).

d. Human and Social Aspects of Security related to NATO's Strategic Objectives

4. Any project clearly linked to a threat to security not otherwise defined by these priorities may also be considered for funding under the SPS Programme

Such proposals will be examined for links to NATO's Strategic Objectives. (e.g. hybrid).

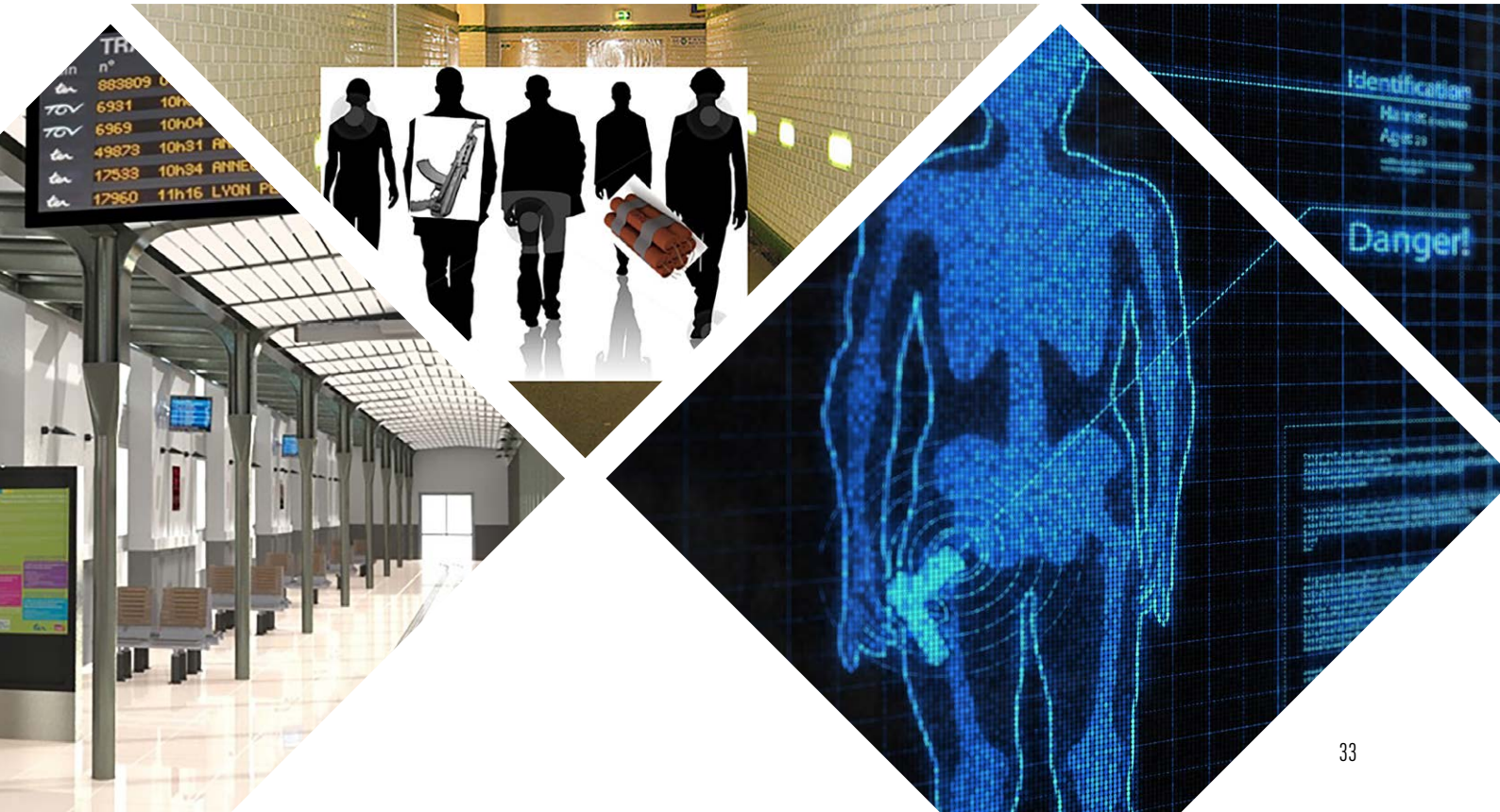


SPS Funded Activities

Priority Area 1:
Emerging Security Challenges

1.a COUNTER-TERRORISM

DEXTER (Detection of EXplosives and firearms to counter TERrorism): DEXTER is a multinational 'top-down' programme, run by a consortium of laboratories and research institutes. It aims to develop an integrated system that can detect explosives and firearms in public spaces, remotely and in real time, without disrupting the flow of pedestrians. It includes 11 institutions from NATO (France, Italy, Germany, the Netherlands) and Partner countries (Ukraine, Republic of Korea, Serbia, Finland). The project will be live-tested in a metro station in Rome in 2021.



1.b ENERGY SECURITY

Energy security related SPS activities facilitate cooperation among experts in accordance with NATO's Strategic Objectives, with the aim of strengthening the resilience of critical energy infrastructure and developing advanced technologies to reduce fossil-fuel wastage by militaries.

Harmonised Energy Monitoring & Camp Simulation Tools for Energy Efficiency: This SPS Multi-Year Project kicked-off in September 2018 as part of NATO's Smart Defence project, "Smart Energy Training and Assessment Camp (SETAC)". The project, led by CanmeENERGY Research Centre (Natural Resources Canada), brings together expert teams from Australia, Germany, the Netherlands, and the USA. They work closely together with experts from France and Italy to build a multinational interoperable Smart Energy unit at the exercise Capable Logistician 2019 (June 2019 in Poland). End-users include Allied Command Operations (ACO) and the Military Engineering Centre of Excellence (MILENG COE) in Germany.

1.c CYBER DEFENCE

Cyber defence activities offer opportunities to foster collaboration among NATO and Partner countries in the areas of research and technological developments.

Secure Communication in the Quantum Era: This Multi-Year Project aims to develop complete solutions for authenticated group key agreements, which will enable groups of users to exchange information and collaborate securely over open networks. The solutions to be developed in this project will guarantee the security of the confidentiality of the classical network, taking into account the risks posed by the quantum technology's potential to break computer encryptions. This project, led by experts from Slovakia, Spain, Malta and the United States, will contribute to the improvement of the long-term security of today's information technology infrastructure.

Cyber Advanced Training Courses for Partner Countries: Modular tailor-made training courses at basic and advanced levels on cyber defence have been developed for and delivered to professionals directly involved in handling critical information systems at a national level. Experts from Morocco, Serbia, Ukraine, the Republic of Moldova, Azerbaijan, Jordan, Bosnia and Herzegovina, Mongolia, and ICI countries received specialized cyber security training.

1.d DEFENCE AGAINST CBRN AGENTS

In line with NATO's political agenda, the central objective of SPS activities regarding the defence against chemical, biological, radioactive and nuclear (CBRN) agents is to improve the ability of NATO and Partner countries to protect their populations and forces from CBRN threats.

Rapid Skin Wound Healing by Integrated Tissue Engineering and Sensing (RAWINTS): Skin wound healing is a very complex biological process that can take quite a long time. This project contributed to the development of rapid medical countermeasures to reduce recovery time after suffering a skin wound. To this end, scientists from Japan and Belgium worked together to build human disposable skin, or mucosa patches, for immediate application in case of emergency. These patches will provide fast relief to civilians and military personnel injured by chemical or physical agents that destroy skin and surface tissues. The new patches will strengthen medical countermeasures for exposure to CBRN agents, and support the monitoring of the healing process associated with wounds, burns and vesicles.

The CBRN First Responders Course was organized by the Joint CBRN Defence Centre of Excellence at the NATO-ICI Regional Centre in Kuwait from 18 to 22 March 2018, and was supported by the SPS Programme. The purpose of the course was to provide training for interagency response representatives in the organization to effectively respond to potential chemical, biological and radiological incidents. The course was attended by participants from Kuwait, the United Arab Emirates, and Bahrain.

1.e ENVIRONMENTAL SECURITY

New Phytotechnology for Cleaning Contaminated Military Sites: This project will develop methods for producing biomass from a grass hybrid, grown on contaminated military sites, in order to decontaminate the soil. Research will also focus on how to produce second generation biofuels from the biomass. The new phytoremediation technology could be another alternative approach to the rehabilitation of military sites, while the biomass production would offer the possibility to the defence research and development community to advance the biofuel production. The new findings will be combined with the results of former research studies, leading to the publication of a guideline book that will enable relevant authorities to use the method for commercial production of this grass hybrid on contaminated soil, including obsolete military sites. The project is co-led by experts from Ukraine and the United States and it involves scientists from Belarus, Kazakhstan and Slovakia.

Priority Area 2:
Enhance Support for NATO-led Operations and Missions

NATO and Cultural Property: Embracing New Challenges on the Battlefield: Among military forces, it is a well-known fact that protecting cultural property – similar to protecting the environment - is a core obligation under the Laws of War (LOAC) and an important human security factor in enhancing mission effectiveness. Over the years, SPS has supported a series of Advanced Research Workshops titled, **"Best Practices for Cultural Property Protection in NATO-led Military Operations"** (NATO SPS CPP). This project assisted NATO HQs, COEs and member states in developing a collective approach to preserving cultural heritage in the context of armed conflicts.

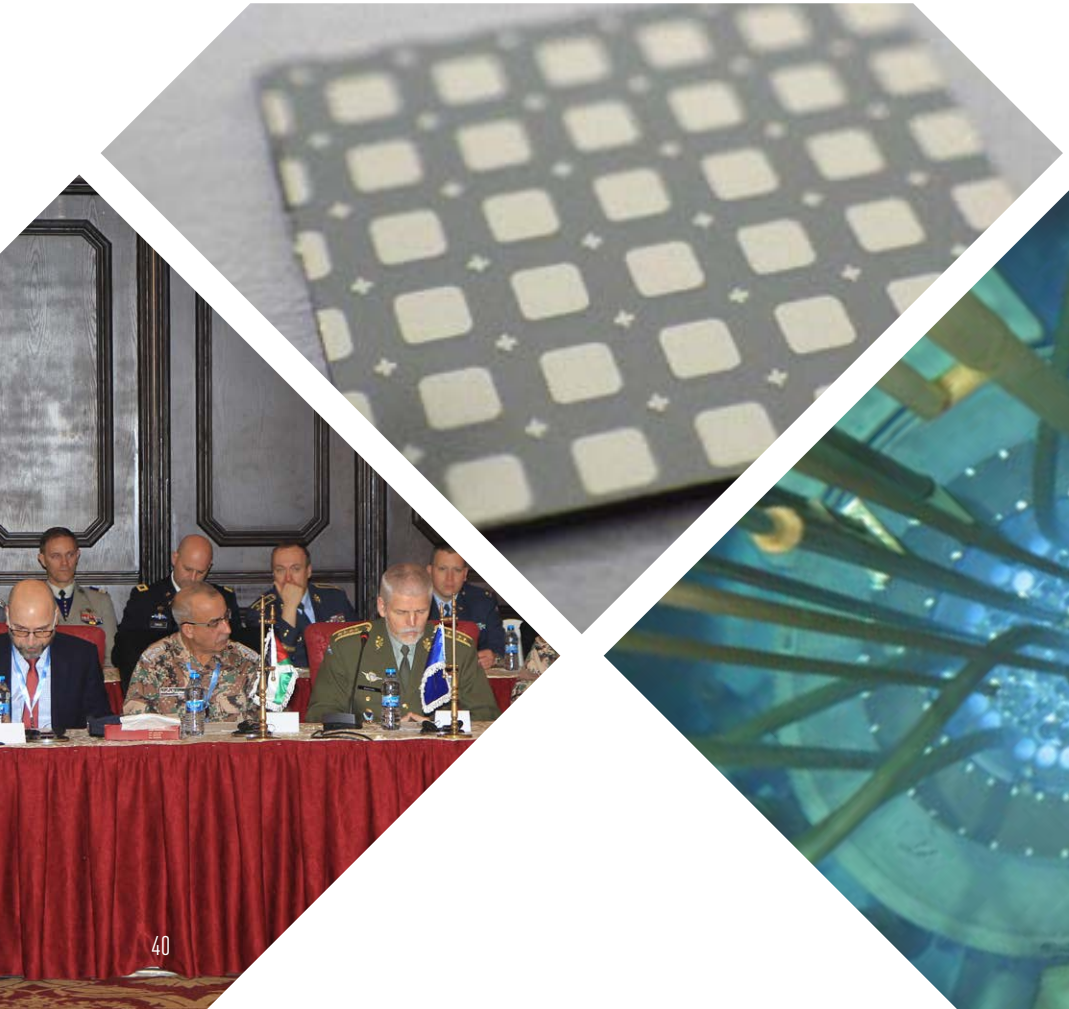
Priority Area 3:
Enhance Awareness of Security Developments & Crisis Prevention

3.a SECURITY-RELATED ADVANCED TECHNOLOGY

Next Generation Incident Command System (NICS): This flagship, top-down Multi-Year Project was launched in 2016 in the Western Balkans, and it is supported by the SPS Programme and the US Department of Homeland Security (DHS) Science & Technology Directorate (S&T). It is developing and implementing a system to facilitate coordination among responders, and to improve civil emergency management across the Western Balkans. Once in place, the new technology will allow responders to share all kinds of information about an incident, including GPS locations and images via mobile devices. This will maximise real-time situational awareness and help coordinate appropriate responses to natural or man-made disasters. This project is led by experts from Bosnia and Herzegovina, the United States, Croatia, the Republic of North Macedonia and Montenegro.

3.b BORDER AND PORT SECURITY

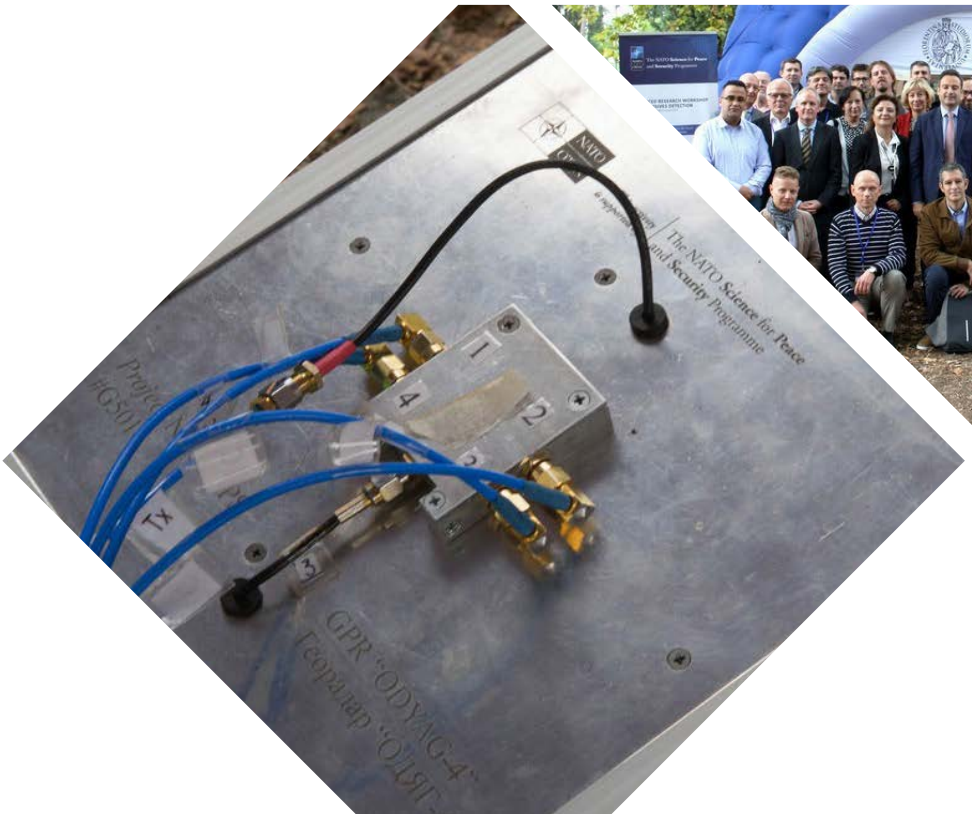
Jordan Border Defence Symposium (JBDS): This three-day Advanced Research Workshop was held in Amman in March 2017, and brought together 75 participants, representing a variety of technical experts, stakeholders, and practitioners from the Jordanian Armed Forces (JAF), NATO Allies and Partner countries, and international organizations such as the EU Mission to Jordan and the Organization for Security and Cooperation in Europe (OSCE). The objectives of the workshop were to develop a shared understanding of Jordan's border defence strategy, objectives, and challenges; develop a shared understanding of bilateral activities; identify priority requirements and gaps; and discuss how Allies and Partners can orchestrate and synergize activities to address capability gaps. The event was organized in cooperation with the US Department of Defence.



3.c MINE AND UNEXPLODED ORDNANCE DETECTION AND CLEARANCE

The SPS Programme supports the development of new capabilities and technologies to tackle the significant threat posed by mines, UXOs and IEDs, and to manage the consequences of their proliferation.

Advanced Research Workshop on Explosives Detection: The workshop took place in October 2018 in Florence, Italy. The event, which gathered over 50 scientists and experts from 16 NATO and Partner countries, was a great opportunity to assess how SPS projects in the field of explosives detection contribute to the development and refinement of scientific and technical knowledge. During the event, three technologies on the detection and clearance of improvised explosive devices (IEDs), namely a semi-autonomous robot for the detection of mines and IEDs; a lightweight and easy-to-use mine detector; and a handheld detector for dirty bombs, developed in the framework of SPS Multi-Year Projects, were successfully tested. The aforementioned robot for the detection of mines and IEDs was developed by a project co-led by Italy, the United States and Ukraine. It is named 'U-GO First', a nod to its purpose to prevent casualties in the search for explosives. It uses new impulse radar and 3D data for real-time detection. The prototype was also displayed during an Exhibition at NATO Headquarters on the occasion of the SPS 60th Anniversary.



3.d HUMAN AND SOCIAL ASPECTS OF SECURITY RELATED TO NATO'S STRATEGIC OBJECTIVES

The implementation of the United Nations Security Council Resolution (UNSCR) 1325 on Women, Peace and Security (WPS) and related Resolutions is an important policy priority for NATO and Partner countries.

In Georgia, a SPS Multi-Year Project conducting an organizational assessment of gender equality in the Georgian Armed Forces is progressing. The overall aim of the project is to improve gender balance and reduce barriers to the active and meaningful participation of women within the Georgian Armed Forces and military operations, including within NATO-led operations, missions and crisis management.

Responding to Emerging Security Challenges in NATO's Southern Neighbourhood: Europe's southern neighbourhood has witnessed dramatic developments over the past decade, which have generated uncertainties and challenges for NATO's "southern flank". This project thoroughly researches the profound transformations taking place in the South, while considering a number of less researched dynamics that may impact the future of NATO's southern neighbours.

Priority Area 4:
Any Other Project Clearly Related to a Threat to Security

HYBRID WARFARE

Pooling Expertise to Develop an Early Warning System to Counter Hybrid Threats: The SPS Programme supported this Advanced Research Workshop, which took place in Vilnius in April 2019. The event was organized by the Eastern European Studies Center in Lithuania and the National Institute for Strategic Studies in Ukraine in the framework of the NATO-Ukraine Platform Countering Hybrid Warfare. The project brought together experts from NATO and Partner countries, including Georgia, Republic of Moldova, Belarus and Sweden, who are working on hybrid threats countermeasures strategies towards developing an early warning signal concept.

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You can find further information and the latest news about the SPS Programme on our website (www.nato.int/science).

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