The Emerging Security Challenges Division

The NATO Science for Peace and Security (SPS) Programme




Annual Report 2017

60th Anniversary Special Edition

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Preface by Dr. Antonio Missiroli

2017 has been another busy and successful year for the NATO Science for Peace and Security (SPS) Programme. Over the past year, the Programme has continued to align its activities with NATO's strategic objectives and partnership priorities. It has also shown that it is responsive to the changing security environment and able to respond effectively to the political guidance provided by the Allies.

When I took over responsibility for the SPS Programme, in December 2017, I inherited a Programme with a track record of practical cooperation leaving a tangible impact in partner countries in line with priority areas of cooperation. In 2017, SPS efforts in the context of projecting stability adopted a balanced and flexible 360 degree approach to help address challenges in both the East and the South of the Alliance. SPS activities in this area have notably focused on supporting the fight against terrorism, practical cooperation with the Mediterranean Dialogue (MD) and Istanbul Cooperation Initiative (ICI) partners, and capacity-building in the Western Balkans – while continuing to implement activities as part of Defence and Related Security Capacity Building (DCB) packages for Iraq, Jordan, and the Republic of Moldova (a concrete example is the launch of a project to develop Jordanian capabilities to counter Improvised Explosive Devices, providing assistance for the development of a national C-IED policy, inter-agency doctrine, and a training curriculum).

The NATO SPS Programme is also contributing to NATO's efforts in support of the international community's fight against terrorism through the development of tailored SPS activities, including a flagship programme on the Standoff Detection of Explosives. Furthermore, a special call for SPS proposals on counter-terrorism was launched in 2017.

Throughout 2017, the SPS Programme has put particular emphasis on enhancing practical cooperation with the MD and ICI partners. In October, the SPS Programme launched its first project with Algeria, which will provide important terahertz equipment helping to build scientific and research capacity in the country in a counter-terrorism related technological area. Moreover, two advanced cyber training courses were developed to enhance Morocco's cyber defence capabilities. Following the SPS Information Day at the NATO-ICI Regional Centre in Kuwait, in September 2017, the Programme developed five tailor-made training courses for ICI partners in the fields of CBRN defence, energy security and cyber defence. The first of these, a CBRN Incident Commanders Course, took place at the Centre in December, while the remaining SPS training activities are being implemented in the course of 2018.

Cooperation with Ukraine, including as part of the Comprehensive Assistance Package, continued to produce tangible results. Two flagship projects - on telemedicine and humanitarian demining - were brought to a successful completion, while work on the development of a cutting-edge 3D mine detector continues. SPS also responded to an urgent request for equipment following the Balaklia Arms Depot explosion in March 2017.

In the Caucasus, a project involving i.a. Georgia and Azerbaijan addresses geohazards to the Enguri hydro dam, located in the immediate proximity of Abkhazia. Another SPS initiative to study the organizational culture in the Georgian Armed Forces in light of UNSCR 1325 on Women, Peace and Security was launched in November 2017.

Last but not least, the SPS Programme continued to implement important capacity-building projects with partners from the Western Balkans. In September, the SPS

regional project *Next Generation Incident Command System* (NICS), supported by the US Department of Homeland Security's Science and Technology Directorate, was live-tested as part of the NATO crisis management field exercise in Tuzla (Bosnia and Herzegovina). The capabilities of two other SPS projects in the field of telemedicine involving Ukraine and partners from the Balkan region were also demonstrated in the exercise.

Thanks to the leadership of my predecessor, Ambassador Sorin Ducaru, and the dedication of the SPS staff, we can now look back at all these achievements and build on them. In 2018, we look forward to implementing the SPS Programme in line with agreed policy guidelines and strengthening the link between SPS activities and NATO strategic objectives. Building defence capacity in partner countries, projecting stability and countering terrorism will remain our key themes.

As the SPS Programme approaches its 60th anniversary, it will continue to deliver tangible outputs and remain flexible in its approach to developing with all partners new flagship initiatives that provide practical, political and public diplomacy value.

At the same time, the 60th anniversary of the SPS Programme provides an opportunity to look back at the milestones and achievements of the Programme over the six decades of its existence. Therefore, this Special Edition of the SPS Annual Report does not only provide a comprehensive overview of SPS activities in 2017, but also includes an additional chapter that reflects on the origins and evolution of NATO's science programme.

Dr. Antonio Missiroli

Assistant Secretary General

NATO Emerging Security Challenges Division

Foreword by Dr. Deniz Yüksel-Beten

During its 60 years of existence, the NATO Science for Peace and Security (SPS) Programme has promoted practical cooperation by engaging scientists from NATO member and partners countries through its grant mechanisms. The SPS Programme represents a fundamental part of NATO's practical and result-oriented cooperation with Partners and international organisations. In 2017, the Programme has successfully implemented new strategic and political guidance from Allies, while delivering civil science through security-related research and development (R&D), as well as top-down capacity building projects requested by several partner nations.

Allies contribute to the success of the SPS Programme in various ways. The NATO Partnerships and Cooperative Security Committee (PCSC) directly oversees the implementation of the SPS Programme, approves all SPS activities, decides on an annual work programme, and nominates the members of Independent Scientific Evaluation Group (ISEG). The high approval ratings of SPS award recommendations by the PCSC reflects the Programme's rigorous peer-review process and alignment with NATO's strategic objectives.

ISEG brings value to the SPS Programme by making sure that all SPS projects meet the criteria for success and are well managed and reach the end of their life cycle with concrete deliverables. The sustainability of multi-year projects' impact is further ensured by the involvement of end-users in the implementation phase. Moreover, in 2017, ISEG members have been critical in designing and supporting the SPS Special Call for Proposals on Cyber Defence. This special call solicited applications in the area of operational cyber security, cyber security technology, Quantum Safe Solutions, as well as cyber security strategies and policies. ISEG members helped to identify focus areas of future research in this field and took part in a thorough evaluation of the applications received in response to this Special Call. This direct involvement of the scientific community is invaluable in maintaining the integrity and high scientific standard of the SPS Programme.

Following the Special Call, SPS hosted a subject-specific Cyber Defence Cluster Workshop that directly corresponded to the third recommendation of the SPS Performance and Financial IBAN Audit to systematically analyse the results of SPS activities in this field. The cluster workshop brought together ISEG members and subject matter experts representing Allied scientific institutions. The workshop provided a platform to take stock of NATO SPS activities in the field of cyber defence and to identify the latest trends in cyber defence training, research and technological applications. As a result of the event, SPS received valuable guidance on the further implementation of the priorities set out by the Allies in the field of cyber defence.

In responding to the recommendations made by the Independent Board of Auditors of NATO (IBAN) in 2014/2015, SPS continued to further streamline the Programme through efforts to systematically analyse the results of activities. SPS staff monitors the implementation of SPS activities on a daily basis, both from a technical and financial point of view. Allies in the Partnerships and Cooperative Security Committee (PCSC) receive regular updates on the progress and results of these activities. In 2017, the SPS Programme issued stocktaking reports on SPS activities related to counter-terrorism and Women, Peace and Security (UNSCR 1325) and launched two special calls for proposals in the fields of counter-terrorism and cyber defence, with successful applications to be awarded in the course of 2018.

In 2017, the Programme organized five Information Days in NATO and partner countries

allowing face-to-face engagement with scientific communities and government officials. Allies have manifested their ownership of SPS by hosting Information Days in the Netherlands and Norway. Organized in cooperation with the Norwegian Delegation to NATO and the Norwegian Research Council, the SPS Information Day in Oslo provided a platform to exchange on possibilities for capacity-building and research cooperation with partners in fields such as cyber defence, unmanned aerial vehicles (UAV) technology and chemical, biological, radiological and nuclear (CBRN) defence. Similarly, the SPS Information Day in the Hague provided an excellent opportunity to reach out to and engage with the Dutch scientific community, and share lessons learned in the fields of counter-terrorism and explosives management. Government officials as well as experts from the Netherlands Institute of International Relations (Clingendael) and the Netherlands Organisation for Applied Scientific Research (TNO) contributed to these discussions.

With a view towards ensuring a balanced 360-degree approach to its cooperation with all partners, the SPS Programme further enhanced its outreach to partners across the globe. Accordingly, Japan became increasingly active within the SPS Programme. Several SPS Advanced Research Workshops with Japan, notably on Leadership Development with regard to UNSCR 1325, as well as on cyber defence were approved by Allies. Moreover, Japanese experts contributed to the successful implementation of many SPS projects in the fields of CBRN defence and advanced technologies with security applications.

Once again, the SPS Programme has demonstrated its ability to effectively respond to Allied and partner countries' demands by developing and implementing joint collaborative projects, particularly in the area of security related civil science and technology. The Programme's cooperation with other international organisations at the staff-to-staff level have been instrumental in building synergies and avoiding duplication.

NATO Partners' expectations to further enhance practical cooperation with the SPS Programme is clearly demonstrated in the partnership political framework documents. Taking into account the North Atlantic Council (NAC) overarching guidance for the SPS Programme, new top-down key flagship projects, in particular in the fields of counter-terrorism, cyber defence, and women, peace and security will be developed and implemented based on the strong political support of the Allies.

This Annual Report presents you with a detailed overview of the work and main achievements of the SPS Programme in 2017. I hope you will enjoy reading it.

Dr. Deniz Yüksel-Beten

Senior SPS & Partnership Cooperation Advisor

NATO Emerging Security Challenges Division

The SPS Team in 2017 (from left to right): Ms. Roxana Turtoi, Dr. Claudio Palestini, Ms. Elena Beganu, Ms. Eva Hoxha, Dr. Loredana Enachsecu, Dr. Deniz Beten, Dr. Antonio Missiroli, Ms. Randi L. Gebert, Dr. Susanne Michaelis, Ms. Juliana Mardon, Dr. Eyup Turmus, Mrs. Jane Bradbrooke, Ms. Klavdija Kaliope, Ms. Gulce Uzun

EXECUTIVE SUMMARY

The NATO Science for Peace and Security (SPS) Programme is a key vehicle to engage NATO partners in practical cooperation in the areas of civil science, technology, innovation and capacity building. Based on the Overarching Guidance provided by the North Atlantic Council (NAC), it develops and supports key flagship projects in line with NATO's strategic objectives and fosters regional cooperation among partners. As demonstrated over the last years, the programme is very flexible and versatile in its response to the changing security environment and to Allied guidance. SPS top-down flagship activities in particular are demand-driven and respond to NATO and partners' priorities for practical cooperation, while reflecting a 360 degree approach to security. While SPS staff is monitoring the implementation of SPS activities on a daily basis, Allies in the Partnerships and Cooperative Security Committee (PCSC), too receive regular updates on the progress and results of SPS activities. A 2014 Financial and Performance Audit confirmed the strong alignment of SPS with the political priorities of the Alliance and underlined that the SPS programme is well managed. It also provided a number of recommendations that have been addressed over the last four years to further streamline the programme, including efforts to systematically analyze the results of SPS activities. In 2017, these have included a SPS cluster workshop on cyber defence, as well as stocktaking reports on SPS activities related to counter-terrorism and Women, Peace and Security (UNSCR 1325).

SPS activities bring together experts and scientists from NATO and partner countries through several grant mechanisms, including multi-year projects, workshops and training courses that have a concrete impact, result in tangible outcomes and deliverables, and carry high public diplomacy value. This well-established partnership programme is an integral part of NATO's Emerging Security Challenges (ESC) Division, and, over the years, has helped to forge important international expert networks and build capacity while addressing a wide range of security concerns as identified in the SPS key priorities. These include counter terrorism, cyber defence, energy security, CBRN defence, the development of advanced technologies with security applications, mine and unexploded ordnance (UXO) detection as well as human and social aspects of security, such as the implementation of UNSCR1325 on Women, Peace and Security. In order to achieve its goals SPS is working in close coordination with other relevant NATO Divisions and Bodies.

In 2018 the SPS Programme is celebrating its 60th anniversary. It was on 29 March 1958, that the NATO Science Committee met for the first time. Since then, NATO's civilian science programme has come a long way and adapted to the changing security, technological and political circumstances. With the initial aim of fostering intra-Alliance scientific cooperation, solidarity and the transatlantic link, after the end of the Cold War, the Programme gradually opened up to partners becoming a key NATO partnership tool. This special edition dedicates a chapter to the history of science and NATO to trace back the origins and evolution of the SPS Programme. (See chapter 2)

Strong alignment with NATO strategic objectives and political guidance. All SPS activities have a clear link to security and help to address NATO's strategic objectives. The Programme is closely following guidance received from Allies and has repeatedly demonstrated its flexibility and versatility to adapt to the changing political and security context. The NATO Partnerships and Cooperative Security Committee (PCSC) is directly overseeing the implementation of the SPS Programme by e.g. giving approval to all SPS activities, agreeing on an annual SPS work programme and nominating the members of Independent Scientific Evaluation Group (ISEG). At the same time, SPS takes into account the strategic and political guidance resulting from NATO Ministerial Meetings, Summits as well as from the Meetings of Heads of State and Government that took place in May

2017 and July 2018. This has been reflected in the development of SPS activities in line with NATO-wide priorities such as the Defence and Related Security Capacity Building (DCB) Initiative, NATO efforts to project stability, supporting the fight against terrorism, and strong cooperation with partners in the South, the Western Balkans and Eastern partners. SPS has also continued its strong engagement with Ukraine, including trough the Comprehensive Assistance Package (CAP) for Ukraine and the organization of the annual meeting of the NATO-Ukraine Joint Working Group on Scientific and Environmental Cooperation. As the SPS Programme is celebrating its 60th anniversary in 2018, it will continue to develop and implement practical cooperation with all partner countries, remaining in particular focused on cutting-edge flagship projects with a strong political, strategic and public diplomacy impact.

Practical contributions to the Defence and Related Security Capacity Building (DCB) Initiative. Throughout 2017, the SPS Programme continued to support the DCB Packages for a number of partner countries through tailor-made activities. In Iraq, a SPS project provided specialized equipment and training to build countering improvised explosive devices (IED) capacity for the country. While the first two training cycles took place in Jordan, in line with a request made by Iraq, training was moved in-country in early 2017. In the *Republic of Moldova,* SPS cooperation in the framework of the DCB Initiative has focused on cyber defence and the implementation of UNSCR 1325 on Women, Peace and Security. SPS cooperation with *Jordan* provided concrete support to the Jordanian Armed Forces in key DCB areas such as cyber defence, C-IED training, and border security. Looking ahead, the programme is also considering potential, tailored SPS activities in support of a DCB Package for Tunisia that is being finalized.

Engagement with Istanbul Cooperation Initiative (ICI) partners. Following the opening of the NATO-ICI Regional Centre in Kuwait by the NAC in January 2017, the SPS Programme organized an Information Day as part of the NATO Week at the Centre in September 2017. This resulted in the development of five, tailor-made training courses for ICI partners in the areas of CBRN defence, energy security, and cyber defence. The first of these training courses on CBRN Response was delivered in December 2017, the remaining four courses are to be implemented throughout 2018.

Strong cooperation with partners in the South. The SPS Programme maintained a high level of engagement with Southern partners and launched a number of new activities with countries in the MENA region that help to project stability and build capacity in the region. This included the first SPS project with Algeria in the field of terahertz technology as well as two comprehensive cyber defence training courses for Morocco. As part of a SPS flagship project with Egypt, 40 Egyptian experts received C-IED training and associated specialized equipment. Having successfully inaugurated a national crisis management centre in Mauritania, civil emergency experts received their final SPS-supported training sessions in France. Israel also remained an active partner under the SPS Programme, with cyber defence and advanced technologies with security applications as key areas of cooperation.

Highlighting the impact of SPS cooperation with Ukraine. 2017 witnessed the significant impact and tangible results of strong SPS engagement with Ukraine, notably of the three flagship projects under the Comprehensive Assistance Package for Ukraine. The SPS initiative to develop a multinational telemedicine system came to an end last year and the technology was successfully demonstrated live at NATO HQ. Through the project supporting humanitarian demining in Eastern Ukraine with training and equipment, the SPS Programme was able to immediately respond to an urgent request for equipment following the Balaklia Arms Depot explosion in Ukraine in March 2017. Work continued also on the development of a cutting-edge 3D mine detector. During the meeting of the NATO-Ukraine Joint Working Group on Scientific and Environmental Cooperation in July 2017, the Deputy Minister for Science and Education of Ukraine, Dr. Maxim Strikha, and representatives from the National Academy of Sciences of Ukraine

reiterated their strong support and appreciation of SPS cooperation with Ukraine.

Regional collaboration in the Western Balkans the Caucasus. SPS activities have helped to bring together partner countries on a regional level, notably in the Western Balkans and the Caucasus, adding to NATO efforts to project stability in these areas. Partners in the Western Balkans continued to work together with the MIT Lincoln Laboratory to customize and implement the Next Generation Incident Command System (NICS). Their work is receiving financial and political support from the US Department of Homeland Security, Science & Technology (DHS S&T) and was successfully demonstrated at the NATO EADRCC disaster response live exercise in Tuzla, Bosnia and Herzegovina in autumn 2017. The SPS Programme also implemented several activities in cooperation with Serbia, including a project on using microalgae for biofuel generation. In the Caucasus, an ongoing SPS project involving amongst others Georgia and Azerbaijan is seeking to help protect the Enguri hydro dam against geohazards. A new project to study the working environment in the Georgian Armed Forces with a view towards the role of Women in Peace and Security (UNSCR 1325) was also launched in November 2017.

SPS activities in support of the fight against terrorism. The SPS Programme has been a key vehicle to engage partners in counter-terrorism related, practical cooperation, supporting NATO's wider efforts in this area. In 2017, it launched a new flagship initiative to develop a comprehensive system for the standoff detection of explosives, including a microwave imaging curtain that will involve scientists from France, Ukraine, and the Republic of Korea. The project further enjoys strong political and financial support from the Prime Minister's Office in France. Other SPS activities provide recommendations and best practices in the field of counter terrorism policies, developing sensors and detectors for explosives, and looking at the role of women in countering violent extremism. Moreover, the SPS Programme issued a stocktaking report and launched a special call for proposals in the field of counter-terrorism, with successful applications to be awarded in the course of 2018.

Working with partners across the globe. Adopting a 360 degree approach, the SPS Programme is open to cooperation with all partners, and a number of SPS activities in 2017 involved NATO's partners across the globe. For instance, Japan hosted a CBRN tabletop exercises and new SPS workshops with Japan on cyber defence and the role of Women in Peace and Security were approved. Furthermore, work with Mongolia on a cyber defence project made good progress. NATO HQ also hosted experts from Australia and New Zealand to present the result of a study on NATO perceptions of the Asia-Pacific Region and a new project co-led by Iceland and New Zealand on the role of small states in international security was launched.

Tangible political, practical and scientific benefits of completed SPS projects. A total of 28 SPS projects were completed in 2017, resulting in lasting practical and scientific impacts. They helped to build capacity through the provision of modern equipment and specialized training; they supported young scientists to build their careers, and they resulted in new insights, technologies, prototypes and policy recommendations that are often further developed and applied by end-users. This report highlights in particular the achievements of three SPS activities completed in 2017. Firstly, the key flagship project led by Romania, the Republic of Moldova, Ukraine, Finland and the United States developing a multinational telemedicine system that will help to save many lives in a military and civilian context. Secondly, a series of SPS-supported workshops organized by Denmark and Bosnia and Herzegovina on cultural property protection in military operations that brought together key stakeholders of the NATO community and resulted in a publication with comprehensive and useful recommendations on the subject that were i.a. presented to the Danish Ministry of Culture. And thirdly, a multi-year project between the United States and Georgia that developed an innovative method to contain underground fuel cloud explosions, involving and training five young Georgian scientists along the way. A full list of SPS

projects completed in 2017 can be found in Annex 3.

SPS Programme implementation in 2017. Over the last year, the SPS Programme received a total of 175 applications in response to three deadlines throughout the year (February, June, and October). Of these 126 passed the eligibility screening and were peer-reviewed by the Independent Scientific Evaluation Group (ISEG) during three meetings. Just above half of these (66 activities or 52%) were recommended by the ISEG. The NATO Partnerships and Cooperative Security Committee (PCSC) met on 10 occasions throughout 2017 to discuss the SPS Programme and during these sessions approved a total of 65 new activities for funding. About one third (31%) of these were top-down activities that had been developed in close cooperation with the NATO and partner countries involved to respond to their needs and priorities. While SPS activities cover a wide range of security-relevant topics, the development of advanced technologies with security applications, cyber defence and counter-terrorism were the top three SPS key priority areas addressed in 2017. 21 partner countries from all NATO partnership frameworks participated in last year's newly approved SPS activities. SPS Multi-year Projects and Advanced Research Workshops were the most popular grant mechanisms in 2017.

Working together with key stakeholder across the NATO and international community. The SPS Programme relies heavily on its close and well-established cooperation and coordination with various NATO stakeholders, including Allied and partner Delegations, NATO Agencies, Divisions, and Offices (such as the office of the Secretary General's Special Representative on Women, Peace and Security). The Programme has a well-established coordination and cooperation with the Science and Technology Organisation (STO) and the Office of the Chief Scientist. The Senior SPS and Partnership Cooperation Advisor is ex-officio member for the ESC Division in the Science and Technology Board (STB). Where appropriate, SPS draws on the expertise of the network of NATO Centers of Excellence to deliver specialized, tailor-made, modular training activities, responding to the needs of the partner nations. The SPS Programme is also engaging with other International Organizations to exploit synergies, forge networks and avoid duplication, including with the United Nations (UN), the Organization for Security and Cooperation in Europe (OSCE) and the European Union (EU).

Raising the visibility of the SPS Programme through public diplomacy activities. Given the high public diplomacy value of the SPS Programme, a number of outreach activities took place throughout 2017 to raise the visibility of the Programme, raise awareness among key stakeholders, and highlight the achievements of SPS projects. In doing so, the Programme made use of all available tools, including social media, and worked in close coordination with the NATO Public Diplomacy Division (PDD). The work and achievements of the SPS Programme also received ample recognition in the **2017 Annual Report of the NATO Secretary General, Jens Stoltenberg**. The successful participation of several SPS flagship projects at the Euro Atlantic Disaster Response Coordination Centre (EADRCC) disaster management exercise in Tuzla, Bosnia and Herzegovina in September, including the Next Generation Incident Command System (NICS) project for the Western Balkans as well as two SPS projects developing and applying telemedicine technology, was one of the key public diplomacy highlights in 2017 and generated a high degree of visibility. A visit of ASG/ESC to Ukraine in July 2017 as well as a book talk and live demonstration of the SPS-supported multinational telemedicine system in the beginning of the year further attracted a great amount of publicity across various channels. 2017 also saw the launch of a new interactive map showcasing selected SPS activities with various partner countries. The SPS Twitter presence (@NATO_SPS) was manifested with a steadily growing number of followers while the SPS website was restructured to make more information available and easily accessible. A total of 16 SPS-related news stories and 5 videos about SPS activities were published online last year, some of which were featured on the main NATO homepage. Moreover, various projects supported by the SPS Programme

attracted substantial coverage in mainstream media, including at a local, national and international level, and the results of 19 SPS-supported events were published in the NATO Science Series. The SPS Programme also organized five Information Days in NATO and partner countries (the Netherlands, Bosnia and Herzegovina, Norway, Iceland and Kuwait) and supported and featured in various public events.

Looking ahead: The SPS Programme in 2018. The implementation of the SPS Programme in 2018 will be guided by the annual SPS Work Programme and will take into account any further political guidance provided by Allies, including from Ministerial Meetings and the NATO Summit on 11-12 July 2018. The Programme will remain open to cooperation with all partners, reflecting a balanced 360 degree approach, and will continue to be closely aligned with NATO's strategic objectives and partnership priorities. These include continued efforts to project stability, tailored support to the DCB Packages of the Republic of Moldova, Iraq, Jordan, and possibly Tunisia, contributions to NATO's efforts in the fight against terrorism, and enhancing regional cooperation across partner countries through practical cooperation with concrete deliverables, including in the South. The programme intends to support both technical, scientific activities as well as capacity-building efforts. Key initiatives in the areas of cyber defence (i.a. capacity-building project with the Republic of Moldova as well as hands-on tailor-made, modular training courses for Iraq, Morocco and at the ICI-Regional Centre in with Kuwait), counter-terrorism (standoff detection of explosives), women, peace and security (in Georgia, Ukraine, Japan and Republic of Moldova) and a conference on energy efficient applications for the military linked to smart energy efforts are already in preparation. 2018 also marks the 60th anniversary of the SPS Programme, recalling that the first meeting of the NATO Science Committee took place in 1958. Building on the outreach efforts undertaken previously for the 60th anniversary of the Report of the Three Wise Men in December 2016, a number of activities and events are foreseen to mark this milestone and raise the profile of SPS across the NATO and partner community. On the 29th November 2018, important contributors to the Programme will gather in the new NATO Headquarter to celebrate its 60th anniversary.

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List of Abbreviations

ACO	Allied Command Operations
ACT	Allied Command Transformation
ARW	Advanced Research Workshop
ASG	Assistant Secretary General
ASI	Advanced Studies Institute
ATC	Advanced Training Course
CAP	Comprehensive Assistance Package
CBRN	Chemical, Biological, Radiological, and Nuclear
CERT	Computer Emergency Response Team
C-IED	Counter-Improvised Explosive Devices
CIRT	Computer Incident Response Team
CPP	Cultural Property Protection
CoE	Centre of Excellence
CSIRTS	Computer Security Incident Response Teams
CT	Counter Terrorism
DASG	Deputy Assistant Secretary General
DCB	Defence and Related Security Capacity Building
DHS S&T	Department of Homeland Security, Science and Technology
DI	Defence Investment
DPP	Defence Policy Planning
DSG	Deputy Secretary General
EADRCC	Euro-Atlantic Disaster Response Coordination Centre
EAPC	Euro-Atlantic Partnership Council
EOD	Explosive Ordnance Disposal
ERW	Explosive Remnants of War
ESC	Emerging Security Challenges Division
EU	European Union
FRG	First Responders Group
GSMAF	General Staff of the Mongolian Armed Forces

HQ	Headquarters
IBAN	International Board of Auditors NATO
ICI	Istanbul Cooperation Initiative
IESMA	Innovative Energy Solutions for Military Applications
IMS	International Military Staff
INFOSEC	Information Systems Security
IO	International Organisation
IPAP	Individual Partnership Action Plan
IPCP	Individual Partnership Cooperation Programme
ISEG	Independent Scientific Evaluation Group
JAF	Jordanian Armed Forces
MAP	Membership Action Plan
MD	Mediterranean Dialogue
MENA	Middle East and North Africa
MoD	Ministry of Defence
MYP	Multi-Year Project
NAC	North Atlantic Council
NATO	North Atlantic Treaty Organisation
NCIA	NATO Communications and Information Agency
NICS	Next-Generation Incident Command System
NUC	NATO-Ukraine Commission
NSPA	NATO Support and Procurement Agency
OPS	Operations Division
OSCE	Organization for Security and Co-operation in Europe
PaG	Partners across the Globe
PASP	Political Affairs and Security Policy Division
PCSC	Partnerships and Cooperative Security Committee
PDD	Public Diplomacy Division
R&D	Research & Development
SCOM	NATO Science Committee

SESU	State Emergency Service of Ukraine
SPS	Science for Peace and Security Programme
STANDEX	Stand-off Detection of Explosives
STB	Science and Technology Board
STO	NATO Science and Technology Organisation
UAV	Unmanned Aerial Vehicles
UN	United Nations
UNSCR	United Nations Security Council Resolution
UXO	Unexploded Ordnance
WMD	Weapons of Mass Destruction
WPS	Women, Peace and Security

CHAPTER 1

Introduction

The NATO Science for Peace and Security (SPS) Programme contributes to the fulfilment of NATO's Strategic Objectives related to the cooperation with the Partner countries. It offers practical cooperation between experts and scientists from Allies and all partners. It provides funding, scientific and technical expert advice, and support to tailor-made, security-related activities in form of established grant mechanisms. With limited resources, the Programme brings significant opportunities to the research and scientific communities to advance the knowledge and technical frontiers of our nations.

The SPS Programme is a long established NATO brand that provides the Alliance with additional, non-military communication channels between NATO and partner countries, often in contexts or regions where other forms of dialogue more directly focused on defence and security are challenging. Accordingly, it enables NATO to become actively involved in such regions, often serving as the first concrete link between NATO and a new partner. Furthermore, the SPS Programme promotes dialogue and regional cooperation among partners, including those for whom direct engagement with NATO is difficult.

SPS Programme activities support NATO's efforts to strengthen international and regional security by projecting stability and helping partner countries build capacity. While doing so, they contribute to the Alliance's Strategic Objectives as defined in the 2010 Strategic Concept and as set out in new NATO Partnership Policy adopted in Berlin in 2011. Today, the Programme promotes practical collaboration and cooperative security based on three core dimensions that define its identity:

Science. The SPS Programme helps to foster research, innovation, applied science and technology, as well as knowledge exchange to address mutual security challenges. As a brand, SPS has a very wide network reaching out to hundreds of academic and research institutions across the world.

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 together. Furthermore, SPS provides the framework for management of projects in its key priority areas available to all partners – proving that practical cooperation is achievable across political barriers through scientific exchange.

Security. In accordance with the scope of the SPS Programme and political guidance from NATO member states, all projects developed under SPS must have a security dimension. This fundamental aspect is also reflected in the SPS Key Priorities developed by Allies.

SPS Programme Grant Mechanisms

The SPS Programme supports collaboration through four established grant mechanisms: Multi-year Research 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. Moreover, all activities funded within the framework of the SPS Programme must follow the rules and regulations outlined in the SPS Programme Management Handbooks.

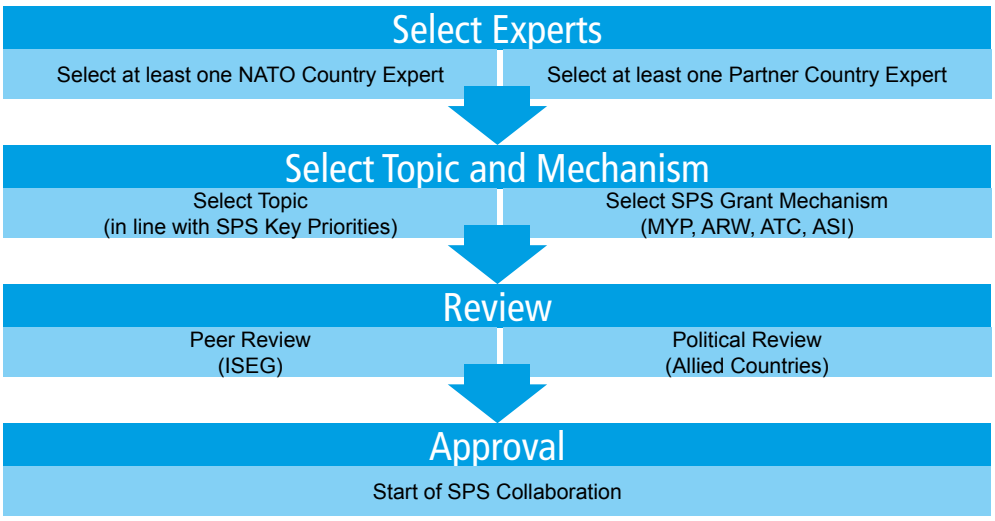
Partnership Frameworks

The SPS Programme supports collaboration between NATO and partner scientists and experts from countries that are associated with the Alliance through the Euro-Atlantic Partnership Council (EAPC), the Mediterranean Dialogue (MD), the NATO-Ukraine Commission (NUC), the Istanbul Cooperation Initiative (ICI) and Partners across the Globe (PaG). SPS activities take into account the priorities and preferences of partners, in particular those outlined in approved partnership documents such as Individual Partnership Action Plans (IPAPs), Individual Partnership Cooperation Programmes (IPCPs) and Membership Action Plans (MAPs).

SPS Programme Focus and Key Priorities

The SPS Programme focuses on a growing range of non-traditional security risks and challenges faced by both the Alliance and the broader international community. These include terrorism, cyber security threats, energy security concerns, and defence against chemical, biological, radiological and nuclear threats. The Programme also supports NATO-led missions and operations, develops advanced technologies that have tangible security applications, and contributes to human and social aspects of security, in particular to the implementation of UNSCR 1325 on Women, Peace and Security. Reflecting the cross-cutting nature of global security threats, a multidisciplinary panel of independent scientists evaluates all SPS applications. Civil actors such as researchers, academics, and government officials all have an important role to play in helping the Alliance identify, understand and respond to these threats and contemporary security issues. NATO, therefore, aims to ensure that funding and support are available for collaborative activities that address its strategic security objectives while promoting cooperation and partnership.

Applications received by the SPS Programme are pre-screened by NATO experts, peer reviewed by independent scientists, and then presented to Allies for approval in the Partnerships and Cooperative Security Committee (PCSC). There are 2-3 peer review evaluation panels held each year with corresponding application deadlines. Last year, applicants sent their proposals to the SPS Programme (sps.applications@hq.nato.int) in response to three deadlines on 1 February, 1 July, and 1 October 2017. Visit our website www.nato.int/science and follow us on Twitter @NATO_SPS for more information and updates about our Programme.



All activities funded by the SPS Programme must address at least one of the SPS Key Priorities and have a clear link to security. The SPS Key Priorities listed below 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.

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 for 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 CBRN AGENTS

- Methods and technology regarding the protection against, diagnosing effects, detection, decontamination, destruction, disposal and containment of 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, 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 ON 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 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 practice.

c. MINE & UNEXPLODED ORDNANCE DETECTION AND CLEARANCE

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

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

4. ANY PROJECT CLEARLY LINKED TO A THREAT TO SECURITY NOT OTHERWISE DEFINED IN THESE PRIORITIES MAY ALSO BE CONSIDERED FOR FUNDING UNDER THE SPS PROGRAMME. SUCH PROPOSALS WILL BE EXAMINED FOR LINKS TO NATO'S STRATEGIC OBJECTIVES.

CHAPTER 2

1958-2018 - 60 Years of Science at NATO

2018 marks the 60th anniversary of the NATO Science for Peace and Security (SPS) Programme: On 29 March 1958, the NATO Science Committee (SCOM) was established and met for the first time. It aimed to promote scientific cooperation for Allied security, strengthen the transatlantic link, and enhance solidarity.

The origins of the Programme can be traced back to December 1956, when the North Atlantic Council endorsed a report to enhance non-military cooperation and coordination within NATO. Known as the Report of the Three Wise Men, it proposed concrete activities to enhance cooperation in the areas of politics, economics and science. The final Report of three NATO Ministers, i.e. Lester B. Pearson (Foreign Minister of Canada), Gaetano Martino (Foreign Minister of Italy), and Halvard Lange (Foreign Minister of Norway), included a dedicated subchapter on scientific and technological cooperation.

Throughout its 60-year history, NATO's civil science programme has been flexible and adapted to reflect and respond to the changing political and security context. In the early years, the Science Programme contributed to building a positive image of NATO as a security provider through engagement with Allied scientific and civilian communities based on solidarity and the transatlantic link. Over the years, and particularly with the end of the Cold War, the programme reached out to and offered cooperation across NATO's partnership frameworks. Today, the NATO SPS Programme offers opportunities for practical, scientific cooperation between experts from Allied and partner countries.

By bringing together researchers, practitioners, and scientists, the Programme has helped to forge important international, security-related expert networks over the last decades. The more than 20 Nobel Laureates that are associated with the SPS Programme are a testimony to the scientific excellence and innovation that have been nurtured through NATO's Science Programme.

Against this background, this chapter tracks the remarkable history, evolution and achievements of the SPS Programme over the six decades of its existence and collects a number of articles published on this subject.

Following an introduction by NATO Assistant Secretary General for Emerging Security Challenges, Dr. Antonio Missiroli, it provides background information on the birth of the Programme in the 1950s, as well as a piece written by historian Simone Turchetti on the development of the Programme in the years after its creation. A contribution by Dr Brian Heap as well as a re-published article on Nobel Prize Laureates associated with the SPS Programme reflect on the track record of scientific excellence and the impact the Programme has achieved over the last sixty years.

Introduction by Assistant Secretary General, Dr. Antonio Missiroli: SPS - Still Pretty Smart @ 60

60 years ago, on 29 March 1958, the North Atlantic Council met in Paris where the then 15 NATO Ambassadors formally announced the establishment of a NATO Science Committee and the position of a Science Advisor to the Secretary General. Professor Norman F. Ramsey, a renowned US physicist from Harvard University who had once worked on the Manhattan Project, was appointed Science Advisor and chaired the first meeting of the NATO Science Committee, marking the foundation of the NATO Science Programme. Against the background of the launch of Sputnik1 by the Soviet Union, one of the Programme's major goals was to promote the training of scientists within NATO countries to facilitate exchanges, build networks, and increase returns on research investments.

The North Atlantic Council approved the creation of the NATO Science Committee in the late 1950s

The NATO Science Committee met for the first time in March 1958

Since then, the Programme has come a long way while constantly adapting to changing demands. Known since 2006 as the Science for Peace and Security (SPS) Programme, it offers unique ways to engage NATO nations and partners in meaningful, practical cooperation with tangible results and deliverables. Today, approximately 150 ongoing SPS projects, workshops and training courses help to build capacity in partner countries, 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.

As the SPS Programme celebrates its 60th anniversary, I am proudly looking back at its past achievements and impact. For instance, a constant throughout the last six decades has been the Programme's contribution to and emphasis on innovation and scientific excellence. More than 20 scientists who had been involved in the Science Programme received a Nobel Prize. This included two gentlemen who were strongly involved in the creation of the Programme in the late 1950s: Norman Ramsey, the First NATO Science Committee Chairman, was awarded with the Nobel Prize for Physics in 1989 for the invention of a method that had crucial applications in the construction of atomic clocks. And Lester Pearson, one of the 'Three Wise Men' suggesting to enhance NATO cooperation in non-military areas such as science in the first place, received the Nobel Peace Prize in 1957 for contributing to a peaceful resolution of the Suez crisis.

On its 60th anniversary, SPS is far from considering retirement. I am convinced that the Programme will remain on a successful path and continue to promote NATO's strategic objectives and partnerships and to demonstrate its flexibility in the foreseeable future.

Dr Antonio Missiroli

NATO Assistant Secretary General for Emerging Security Challenges

This article was first published on the NATO Homepage on 29 March 2018.
It is available at https://www.nato.int/cps/en/natohq/news_153331.htm

The Three Wise Men Report and the Origins of the NATO Science for Peace and Security Programme

On 13 December 1956, the North Atlantic Council endorsed a report to enhance non-military cooperation and coordination within NATO. Known as the Report of the Three Wise Men, it proposed concrete activities to enhance cooperation in the areas of politics, economics and science. One of the direct results of the Report was the creation of the NATO Science Programme. Sixty years later, the legacy of the Report lives on in the NATO Science for Peace and Security Programme.

"*We think that you were wise before we asked you to undertake it. We think that you have wisely done the job and we think your wisdom will persist.*" – these were the words of Mr. Selwyn Lloyd, UK Foreign Secretary at the December 1956 Council meeting which endorsed the Report of the Three Wise Men. They still hold sway today and are particularly true for NATO's cooperation in the field of science and technology, which became institutionalised as a consequence of the recommendations made by the so-called Three Wise Men.

The Committee of Three was officially formed on 5 May 1956 to put flesh on the bones of Articles 2 and 4 of the Washington Treaty, which foresee collaboration and consultation among Allies. Three Ministers were therefore appointed to submit a report and advise the Council on ways and means to improve and extend NATO cooperation in non-military fields. The three ministers selected for the job were Lester B. Pearson, Foreign Minister of Canada, Gaetano Martino, Foreign Minister of Italy, and Halvard Lange, Foreign Minister of Norway. They soon became known as the Three Wise Men.

Lester B. Pearson (Canada), Gaetano Martino (Italy), and Halvard Lange (Norway) became known as the Three Wise Men for their report on non-military cooperation among NATO Allies

Enhancing scientific and technical cooperation

The issue of scientific and technical cooperation was on NATO's agenda early in the preparations of the Report. A questionnaire that was to be filled out by every member nation to collect input on their positions regarding various proposals for non-military cooperation covered a broad range of subjects. It addressed political, economic and cultural aspects and also encompassed questions directed at scientific cooperation. There was also broad support for the idea of strengthening scientific cooperation among Allies. Some nations emphasised that cooperation in this area could help to "*stimulate private initiative or to achieve paramount common objectives as, for instance, the preservation of the West's scientific and technological superiority*" and highlighted "*the education of technicians, including the exchange of personnel and students*" as a priority objective.

The discussions leading to the Report of the Three Wise Men also reflected Allied concerns in times of the Cold War extending to the scientific field. For instance, an explanatory note attached to the questionnaire stated that "*Soviet leaders have invested substantial resources in a rapid development of their educational system to ensure the recruitment on a long-term basis of scientists, technicians and specialists*". It went on to propose that "*it might be useful to consider if and how NATO might assist in finding ways and means to deal with it*". The questionnaire also sought Allied views on coordinating measures "*to increase the recruitment and training on a long-term basis of scientists, technicians and specialists, bearing in mind the developments in these fields in communist countries*."

Overcoming political challenges

However, given the political climate and the difficult task at hand it was not self-evident that the Committee of Three would become a successful undertaking. Some NATO member states were concerned that their freedom to react to an emergency would be constrained if they were forced to consult with Allies on matters of foreign policy. Minister Martino himself was very open and frank about the challenges ahead. As an oral report by the Committee of Three notes: "*Mr. Martino (Italy), speaking as Chairman of the Committee, said that the task before the Committee was a difficult one. Essentially, it*

The Report of the Three Wise Men led to the establishment of the NATO Science Committee in 1958

was to ensure collaboration in the political and economic fields between 15 member governments, each of which had its own preoccupation and its own interest".

Differences in national interests came to the fore a few months later: while the Three Wise Men drafted their report, the Suez crisis erupted, laying bare differences and conflicting positions among some Allies. On 29 October 1956, France and the United Kingdom together with Israel invaded Egypt to secure the Suez Canal, but did not give an advanced warning to other NATO Allies. A resolution was found to the Suez crisis eventually. However, it also demonstrated the need for enhanced coordination and served as a reminder of the importance of consultation to address differences among Allies.

The NATO SPS Programme - A legacy of the Three Wise Men Report

The final Report of the Three Wise Men included a dedicated subchapter on scientific and technological cooperation. It starts by laying out the "*special importance*" of science and technology for the Atlantic community and its implications for security and international affairs. The Three Wise Men identified an "*urgent need*" to enhance the quality and availability of qualified scientists, engineers and technicians. Progress in these areas was deemed imperative and "*so crucial to the future of the Atlantic Community that NATO members should ensure that every possibility of fruitful cooperation is examined*".

The NATO Science Programme was launched in direct response to the Three Wise Men's recommendations in 1957 and against the background of the launch of Sputnik I, which showed the gap between Soviet and Allied missile technology. The Programme was aimed at promoting scientific projects and collaboration among scientists from NATO countries to facilitate exchange and maximise the return on research investments. One year later, the NATO Science Committee was established to increase Allied scientific cooperation.

Over the years, the Science Programme adapted to the changing political, security and strategic environment of the Alliance. Today, the NATO Science for Peace and Security (SPS) Programme is a unique partnership programme of NATO. It brings together scientists and experts from NATO and partner countries to address common security concerns through practical cooperation in the areas of civil science, technology and innovation.

The SPS Programme can look back at a long history of successful grantees and has supported the research of numerous Nobel Prize winners over the last decades. Most recently, Professor Aziz Sancar, a NATO Science Fellowship holder in the 1970s and a grantee of two NATO Collaborative Research Grants in 1986 and in 1990, received the 2015 Noble Prize in Chemistry for his ground-breaking research on DNA repair mechanisms. Lester Pearson, one of the Three Wise Men, was awarded the Nobel Peace Prize in 1957 for resolving the Suez crisis peacefully and "saving the world" as the Nobel Committee put it. He was the mastermind behind the idea of moving United Nations Emergency Forces into the Canal Zone, laying the ground stone for what would later become UN Peacekeeping Missions.

This article was written by Randi L. Gebert and first published on 13 December 2016 on the NATO Homepage. It is available at https://www.nato.int/cps/su/natohq/news_139363.htm

Diplomacy by Other Means? NATO's Science Sixty Years on…

The end of March marks the 60th anniversary of the establishment of the NATO Science Committee and the creation of the position of Science Adviser to the NATO Secretary General in 1958. Looking back at the evolution of NATO's sponsorship of scientific research over the past six decades, science historian Simone Turchetti explains how it has also served to foster constructive dialogue among Allies, furthering the integration of the Alliance.

NATO's Science for Peace and Security (SPS) Programme currently sponsors research activities between scientists from Allied member states and NATO partner countries across the world. The details of ongoing studies and funding opportunities are widely disseminated, but we know far less about the scheme's origins. When did it begin and how did it develop?

A limited portion of the documents of its predecessor programme developed under the aegis of the Science Committee, is now available at the NATO Archives and sheds new light on the wider legacy of the Alliance's investment in science. Crucially, it reveals the importance of this sponsorship, which started exactly sixty years ago, for the advancement of science as much as for the Allies' relations at the height of the Cold War. We now know that the promotion and elaboration of a science programme informed past efforts to establish a constructive dialogue between delegations exactly when the Allies needed it, virtually working as a device for parallel diplomacy.

By the late 1950s, when the scheme was first set up, NATO was much in demand of diplomatic work especially in light of the difficulties preventing its integration. French and British officials disputed that the United States alone should control its nuclear deterrent. Italy and Turkey agreed to host it notwithstanding these anxieties, but Norwegians and Danes did not want nuclear weapons on their soil. The Suez crisis made these disagreements spectacularly apparent and led NATO's "Three Wise Men" - the foreign ministers of Italy, Norway and Canada - to write a report emphasising the importance of finding better ways to integrate the Alliance. It hinted, notably, to an investment in scientific research to strengthen it.

The first Science Committee meeting took place on 29 March 1958. NATO's first Science Advisor was Professor Norman F. Ramsey, who was later awarded the Nobel Prize for his contributions to Atomic Physics. © NATO

The ministers were prophetic indeed as, after the launch of the first Soviet satellite Sputnik, the North Atlantic Council instructed the setting up of a Science Committee. And from April 1958, a newly-appointed Assistant Secretary General for Scientific Affairs (or NATO Science Adviser) invited prominent Western scientists to meet regularly to elaborate a sponsorship programme.

Over the following fifty years, no less than three generations of illustrious researchers contributed to the shaping of the NATO science programme, which resulted in a multi-layered scheme comprising fellowships to study abroad, the organisation of lecture-driven seminars (the Advanced Study Institutes) and research grants for innovative projects.

By the early 1960s, NATO's investment rose to five million US dollars each year and grew even more, especially when inflation hit Western economies harder leading to proposals for budget increases. The delegates' conversations on research grants in particular helped establish a constructive dialogue among Allies, as they worked together to identify which subjects to prioritise and set up sub-groups devoted to specific studies. Consensus building produced political synergies or, at least, helped to evade deeper disagreements in critical moments of the Alliance's history.

Changing trajectories

In its early days, the Committee's recommendations aligned to the post-Suez rapprochement between US and UK administrations that had just, in great secrecy, signed a mutual defence agreement. This support steered NATO science in the direction advocated by US representatives moulding what the third Science Adviser, US physicist William Nierenberg, dubbed as the scheme's "mixed philosophy". It meant sponsoring science as a way to propel integration and, at the same time, address defence requirements. For instance, it paid projects designed by a committee's sub-group devoted to oceanographic research since these studies improved NATO's naval operations (and especially anti-submarine warfare).

Some of the first scientific cooperation initiatives included: a model of the Anglo-American satellite "UK2" put into orbit in 1964 (left) and a pulse mode modulator facilitating the transmission of television picture (right). © NATO

Spearheaded by the Nobel prize-winning US radar pioneer Isidor Isaac Rabi, with the assistance of British zoologist (and operational research maestro) Baron Solomon ('Solly') Zuckerman, this funding philosophy was soon revised, however, partly because the US-UK partnership did not last for long. John F. Kennedy's decision to remove nuclear missiles from Turkey without prior Allied consultation on the occasion of the 1962 Cuban missile crisis, and the renunciation of the production of the Skybolt missile (which had been promised to the United Kingdom) upset transatlantic relations and, in turn, materialised a dissent on the trajectory of NATO's science programme.

Moreover, during the second half of the 1960s, other delegates hoped to steer the science programme towards different directions. Allies with less developed economies (Italy, Greece, Portugal and Turkey) jointly asked to revisit NATO's investment in science so as to address their mounting technology gap with the United States. But Rabi and officials at the US State Department were against using this investment as assistance to economic development. The confrontation further isolated the US delegation, especially as, with the conflict in Vietnam ongoing, West Germans canvassed support for establishing a dialogue with Eastern bloc countries and the Belgian foreign minister, Pierre Harmel, was about to release a report recommending that the Alliance should play a greater role in promoting political détente.

NATO's political and scientific affairs had by then already reached breaking point. In October 1966, a tense Science Committee meeting took place in Portugal and the Nobel-laureate French physicist, Louis Néel, stated that his administration would vehemently oppose a budget increase. French President Charles de Gaulle then announced France's exit from the Alliance's integrated military structure – and as a consequence, NATO's headquarters moved from Paris to Brussels. But the quarrel on the Committee's future continued as an "Exploratory Group of Six", formed by the Committee's leading members, now proposed its dissolution.

A new environmental focus

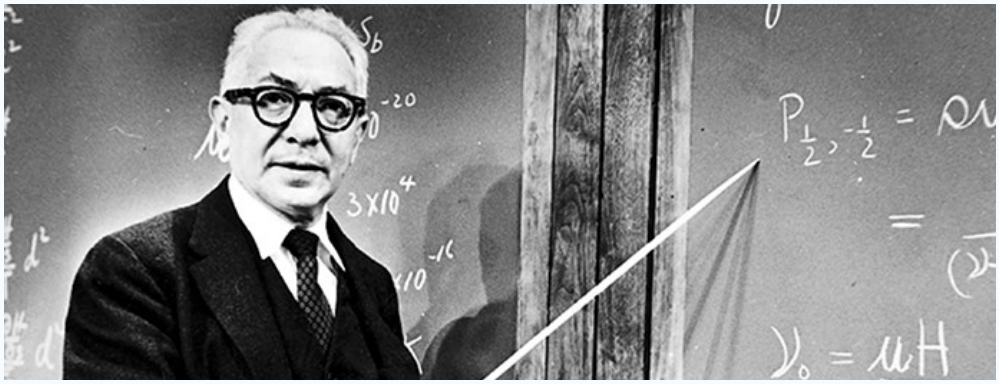
The Committee did not shut down, however, partly because of Rabi's protracted efforts to keep it alive. Aware that NATO's science programme could no longer align to defence concerns and unconvinced about development, he now argued for prioritising

scientific research to address environmental problems during the 1968 celebrations of the Committee's 10th anniversary.

Had Rabi solicited such an investment because he believed a dialogue on environmental sustainability would provide diplomacy returns no longer available through science? Or was he genuinely embracing the environmental sentiment then spreading across Western countries? What we know is that Rabi was as prophetic as the Three Wise Men had previously been. The following year, US President Richard M. Nixon advocated the launch of a NATO environmental programme and a Committee on the Challenges of Modern Society (CCMS) was set up to coordinate actions in the environmental field.

This anticipated the Science Committee's re-organisation too. In October 1969, the Committee met for the first time at the US State Department and on that occasion the German engineer, Eduard C. Pestel, openly supported Rabi's propositions. This was partly because he had recently contributed to environmental sustainability studies in the context of the prestigious Club of Rome. However, their consensus echoed wider synergies on environmental policies and political affairs then developing between West Germans and the US administration.

The shift in NATO's sponsorship agenda also informed changes in research practices leading, for instance, to innovative environmental monitoring exercises. Instrumentation and techniques used in previous studies were now made available to CCMS sub-groups charting air and sea pollution. One of them even rose to fame when, in 1974, it plotted the environmental impacts associated with the sinking off the Adriatic coasts of a Yugoslav cargo, Cavtat, containing noxious fuel additives.



Nobel Prize-winning physicist and US radar pioneer Isidor Isaac Rabi helped keep the Science Committee alive in the late 60s and argued for prioritising scientific research to address environmental problems.

Promoting stability

With the 1980s approaching, the focus of NATO's investment in science shifted once more. The Committee's 20th anniversary led to a diversification of its programme and the Science Committee now advocated the beginning of "Science for Stability". An assistance scheme alien to Rabi's funding philosophy, it targeted Greece, Portugal and Turkey alone. It was introduced when the Turkish mechanical engineer, Nimet Özdas – who had contributed to the technology gap debate of a decade earlier – was in office as NATO's Science Adviser. It was elaborated in the recognition that the promotion of science could work as a stabilising force in times of greater political volatility.

Science for Stability tailed off with the rise to power of UK Prime Minister Margaret Thatcher and US President Ronald Reagan, which re-ignited the Cold War demanding greater political and economic strength. The long-standing Cyprus dispute had by then weakened the Alliance as a multi-lateral organization due to the ongoing conflict between Turkey and Greece. Meanwhile unemployment was rampant in most Allied countries. NATO's new scheme sought indirectly to address these issues and evolved in three phases (1979-1986, 1987-1993, 1994-1997), for a total investment of 46 million US dollars.

In 1980, French physicist Robert Chabbal eventually replaced Özdas as Science Adviser. His appointment in a historical period, when France was not integrated in NATO's military structure, further demonstrated how the promotion of science at NATO could work as a device of parallel diplomacy. It anticipated, notably, the re-alignment of French and US governments that followed French President François Mitterrand's instatement at the Elysée Palace.

Science for Peace and Security

In the 1990s, the blending of science and political affairs at NATO was more compelling than ever as a solid-state physicist turned politician, the Spanish Javier Solana – who, as foreign minister, had led Spain's integration process in 1986 – was appointed NATO Secretary General. With him at the helm of the Alliance, more countries became members, especially after the collapse of the Warsaw Pact and the Soviet Union.

NATO was now "*able to successfully reinvent itself, to change with the times before obsolescence risked to take over*," according to Jamie Shea (currently serving as NATO's Deputy Assistant Secretary General for Emerging Security Challenges). Science was instrumental to NATO's "*reinvention*" as the Science Committee first, and the Science for Peace and Security (SPS) Programme from 2006, prioritised the sponsorship of collaborative research with Eastern European countries to promote closer partnership and cooperation with the Alliance.

As part of NATO's new Emerging Security Challenges Division in 2010, the NATO Science for Peace and Security Programme started prioritising challenges such as cyber defence, counter-terrorism, energy security, and defence against chemical, biological, radiological and nuclear agents. © NATO

For many years, Russia was the largest beneficiary of sponsorship until the illegal annexation of Crimea in 2014 led to the suspension of NATO's collaboration with Russian scientists. At the same time, the SPS Programme stepped up its collaboration with Ukraine that replaced Russia as its main beneficiary. Large-scale SPS projects (e.g. humanitarian demining, mine detection and the development of telemedicine) helped Ukraine build capacity to deal with the consequences of the conflict. From 2010, the SPS programme had already moved to NATO's newly-established Emerging Security Challenges division; something that reconfigured further the Alliance's investment. The programme has since then adopted a stronger security outlook mirroring the portfolio of the Division and prioritising emerging security challenges such as cyber defence, counter-terrorism, energy security and defence against chemical, biological, radiological and nuclear agents.

It would take someone as visionary as Rabi was to see what lies ahead for NATO science in the 21st century. But its past can now be charted with a greater degree of accuracy. Cast, Janus-like, between competing ambitions to bolster security and propel relations between Allies often at odds, NATO's investment now appears to have been inspired by more than just the aspiration to dispassionately support novel research. Indeed, it can now be told that the Alliance's endurance as a multilateral organisation has, to a surprising extent, been supported by the opportunities for constructive exchange that its Science Committee generated over the second part of the 20th century and beyond.

About the Author: Simone Turchetti is a lecturer at the Centre for the History of Science, Technology and Medicine (CHSTM), University of Manchester, Manchester, UK. His studies focus on the role of science and technology in 20th century international relations. He is the author of Pontecorvo Affair (University of Chicago Press, 2012) and several articles in journals and edited collections.

This article was first published in NATO Review in March 2018 and is available at https://www.nato.int/docu/review/2018/Also-in-2018/diplomacy-by-other-means-natos-science-sixty-years-on/EN/index.htm*

* What is published in NATO Review does not necessarily represent the official position of member governments, or of NATO.

Nobel Prize Winners Associated with the NATO Science for Peace and Security Programmme

Since the creation of the NATO Science Porgramme in the late 1950s, a total of 22 renowned scientists and researchers associated with the Programme were awarded with a Nobel Prize. While many of these Nobel Laureates have received NATO research grants or contributed their expertise to SPS-supported events, some of them have also been integral to the development of the Programme itself. The story of the 2015 Nobel Prize winner in Chemistry, Aziz Sancar, below is a good example of how the SPS Programme has supported scientific talent and excellence over the last 60 years.

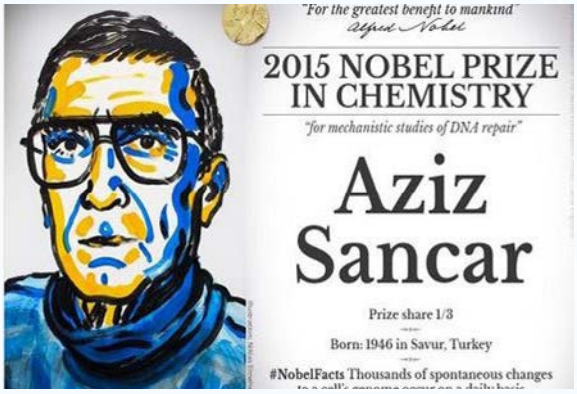
NATO-supported DNA researcher wins Nobel Prize in Chemistry

The 2015 Nobel Prize in Chemistry honours the scientific discoveries of Sancar and two colleagues, Tomas Lindahl and Paul Modrich, for their mechanistic studies of DNA repair. Pr. Sancar's contribution lies in the mapping of the mechanism that cells use to repair UV damage to DNA. His work has therefore provided a better understanding of how our bodies fix DNA mutations that can be the cause of serious illnesses and aging.

"*The basic research carried out by the 2015 Nobel laureates in chemistry has not only deepened our knowledge of how we function, but could also lead to the development of lifesaving treatments*," the Nobel Committee said, adding: "*Their systematic work has made a decisive contribution to the understanding of how the living cell functions, as well as providing knowledge about the molecular causes of several hereditary diseases and about mechanisms behind both cancer development and ageing*".

About Professor Sancar

After working as a doctor in his home province of Mardin in Southeast Turkey, where he was born in 1946, Professor Aziz Sancar was awarded in January 1971 a PhD scholarship by the Turkish Scientific and Technological Research Council TUBITAK through the NATO Science Fellowship Programme. Thanks to this grant, he moved to the United States in 1973, where he studied molecular biology and completed a Ph.D. on the photo-reactivating enzyme of E.coli from the University of Texas in 1977. After his graduation, Sancar took up a laboratory technician's position at the Yale University School of Medicine, one of the leading centres for DNA repair research.



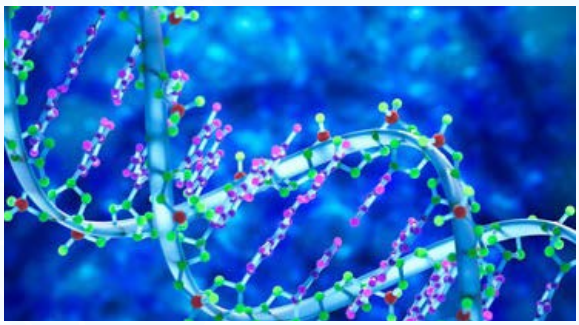
Aziz Sancar - 2015 Nobel Prize in Chemistry

Later Sancar accepted an offer to join the University of North Carolina School of Medicine, Chapel Hill, as an associate professor in Biochemistry in 1982 where he could pursue his interest in photolyase. Since then, he has been researching DNA repair and regulation of the circadian clock and is now Sarah Graham Kenan Professor of Biochemistry and Biophysics.

NATO seed money

In February 1986, Professor Sancar and Dr Paul Heelis (North East Wales Institute, United Kingdom) received a NATO Collaborative Research Grant, supporting them to engage in a multi-year research project entitled "The photochemical studies of the mechanism of DNA photolyase". The grant also allowed Prof. Sancar to visit his colleague in the UK several times to conduct experiments together.

In a report submitted to NATO in November 1986, the research team foresaw the



Prof. Sancar received the Nobel Prize for his research on DNA repair mechanisms

investigation of "the mechanisms of repair of DNA dimers by the fully reduced enzyme" using flash photolysis. The final report of the NATO grant noted that "considerable progress has been made in understanding the mechanism of DNA repair" during the project.

In 1990, Prof. Sancar and Dr Heelis successfully applied for another NATO Collaborative Research Grant on the topic of "Photoenzymic Repair of UV-Damaged DNA". This allowed the team to continue its work in the first half of the 1990s on this eventually Nobel Prize-winning subject.

Other NATO-supported Nobel Prize winners

In the 1990s, a total of nine researchers who had benefitted from NATO grants, received a Nobel Prize in the field of physics or chemistry.

For instance, Norman Ramsey, the first Chairman of the NATO Science Committee (founded in 1958) received a Nobel Prize for Physics in 1989.

Nobel Prize winners have also participated in NATO-funded workshops, including eight distinguished laureates who attended an event on discoveries in Particle Physics in 1994 and, more recently, the 1985 Nobel Prize winner in Physics, Klaus von Klitzing spoke at an SPS Advanced Research Workshop on the security applications of nanotechnology that took place in August-September 2015 in Odessa, Ukraine.

Nobel Prize Laureates associated with NATO SPS Programme

Nobel Prize for Physics

1989 Norman Ramsey (USA)
First Science Committee Chairman 1958-59
1991 P.G. De Gennes (France), *1988 Director of a NATO Advanced Study Institute (ASI)*
1997 Claude Cohen-Tannoudji (France) & William D. Phillips (USA), *NATO grantees in 1986 and 1994, respectively*

Nobel Prize for Chemistry

1995 Paul Crutzen (Dutch), *1994 Workshop Director*
1996 Harold Kroto (UK) & Robert Curl (USA) & Richard Smalley (USA)
Various NATO grants between 1963 and 1987
1999 Ahmed Zewail (USA-Egypt), *two NATO grants in the 1980s*
2015 Aziz Sancar (Turkey-USA), *NATO fellowship (1971-1973) & 2 Collaborative Research Grants (1986 and 1990)*

Nobel Peace Prize

1957 Lester B. Pearson (Canada), *one of the Three Wise Men*

Three Nobel Prize winners served on the former Panel on Nanoscale Science,1991-96

1973 L. Esaki
1985 K. von Klitzing
1986 H. Rohrer

Eight Nobel Prize winners participated in a 1994 workshop on Particle Physics

1957 T-D. Lee & C.N. Yang
1969 M. Gell-Mann
1976 S.C.C. Ting
1979 S.L. Glashow & S. Weinberg
1988 M. Schwartz
1990 J.I. Friedman

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* What is published in NATO Review does not necessarily represent the official position of member governments, or of NATO.

CHAPTER 3

Priorities and Main Achievements in 2017

In 2017, the SPS Programme was aligned with the political guidance provided by Allies and implemented its activities in line with NATO's strategic and political objectives. This included the decisions reached during the May Meeting of NATO Heads of State and Government and Ministerial Meetings.

As the Alliance seeks to contribute more to the efforts of the international community in projecting stability and strengthening security outside NATO territory, the SPS Programme, as **a flexible and versatile cooperation programme, has adapted and responded successfully to evolving priorities**. It has translated guidance from NATO Heads of State and Governments, Foreign and Defence Ministers into concrete projects, underlining the continuing need to provide support to NATO's southern partners in building counter terrorism capacity and strong defence institutions. It has furthermore substantiated NATO's commitment to projecting stability through building local capacity and institutions in different partner countries and in cooperation with a number of international stakeholders.

Highlights 2017

- Strong alignment with NATO strategic objectives and partnership priorities
- Practical contributions to the Defence Capacity and Related Security Building Initiative in Iraq, Jordan and the Republic of Moldova.
- Engaging partners in the South, including through the NATO-ICI Regional Centre
- Supporting activities in the fight against terrorism
- Projecting Stability in NATO's neighbourhood

Assuming a balanced 360 degree approach, the SPS Programme remained open to cooperation with all partners and placed a particular focus on the development and implementation of large-scale multi-year flagship projects with strong political, practical and public diplomacy impact.

Projecting Stability and Defence Capacity Building

Throughout 2017, SPS activities have made concrete contributions to key NATO partnership policies and priorities, such as Allied efforts to project stability and the Defence and Related Security Capacity Building Initiative.

Defence and Related Security Capacity Building Initiative

A SPS project "Improvised Explosive Devices (IED) Disposal and Search Capacity Building for **Iraq**" acted as a rapid response to a critical capability gap and immediate Iraqi priority area. The project delivered 154 kits of equipment and trained 100 Iraqi security forces personnel at the Iraqi Ministry of Defence Bomb Disposal C-IED facility in Besmayah, Iraq. Following the two cycles of training in Jordan, the third cycle of the training was delivered in Iraq at the beginning of 2017.

Iraqi security personnel is putting on a bomb suit received through the NATO SPS project

The Programme actively engages with **Jordan** in the areas of counter-terrorism, cyber defence, mine and unexploded (UXO) ordnance detection, and border security. This active cooperation also includes SPS activities that contribute to the Defence and Related Security Capacity Building (DCB) initiative for Jordan. As part of this support, in July 2017, the multi-year project "Support for Implementing a Cyber Security Strategy for Jordan" was successfully completed. The project helped

Jordan develop capabilities to defend its infrastructure, mitigate the impact of cyber-attacks, and enhance the overall security situation in the country. An SPS Project assisted the implementation and further development of Jordan's cyber defence strategy. Through this project, 84 officers were trained to establish a Jordanian Armed Forces (JAF) Computer Emergency Response Team, serving both the military and the government.

The Head of the NATO Cyber Defence Section is meeting JAF personnel during the inauguration of the SPS-supported CERT in Amman, Jordan in July 2017

Furthermore, in April 2017, a C-IED field exploitation course was delivered by the NATO C-IED CoE for the Jordanian Armed Forces specialists. The training was followed by a Mobile Advisory Team (MAT) visit to Jordan, to discuss the development of a national inter-agency C-IED policy. This is part of the SPS Programme's structured approach to develop Jordan's C-IED capabilities. In addition to activities under the DCB package, SPS has the "Hybrid Sensor Networks for Emergency Critical Scenarios" project, led by the U.S., Italy and Jordan, successfully ongoing and contributing to counter-terrorism efforts.

Field training of JAF EPD personnel

Also within the framework of the DCB package, a border security workshop for the Jordanian Armed Forces was held in March 2017. The activity was led by the U.S. and Jordan, in coordination with the Defence against Terrorism Centre of Excellence. The workshop identified Jordan's overall strategy current capabilities, bilateral support it receives, and requirements in the area of border security.

The project team from the Republic of Moldova and the United States working on the SPS project to develop a National Action Plan for the implementation of UNSCR 1325 on Women, Peace and Security

As part of the Defence and Related Security Capacity Building for the **Republic of Moldova**, SPS established a state-of-the-art cyber defence laboratory at the Technical University of Moldova and provided a tailor-made training in cyber incident management for government experts. A new initiative is foreseen to establish a Moldovan Armed Forces Cyber Incident Response Capability, within the Moldovan Ministry of Defence. The government of the Republic of Moldova and civil society actors are further receiving SPS support to create a multi-agency national strategy to implement the UN Security Council Resolution 1325 on Women, Peace and Security.

Enhanced engagement with MD and ICI Partners

In 2017, the SPS Programme further enhanced its practical cooperation with NATO's partners in the MENA region on a broad range of emerging security challenges.

As part of the SPS project to set up a national crisis management coordination centre in Mauritania, Mauritanian civil emergency protection experts received three final training sessions in October 2017. The multi-year project, led by France and the Ministry of Interior of Mauritania, and co-funded by Canada, established four regional operation coordination centres across the country, located in Nouakchott, Nouadhibou, Rosso and Néma and supplied them with portable kits for mobile crisis coordination. This crisis management system contributes to the fight against emerging security threats and serves as a model for the wider Sahel region, just as presented to the Civil Protection General Directions of West Africa in November 2017 in Mali by the French project do-director. Following the inauguration of the national centre in Nouakchott and the three regional satellite centres, a potential new SPS initiative in the field of civil emergency response is under discussion.

The SPS Programme has two successfully ongoing multi-year projects with Egypt. A trial of the system developed by the "Enhanced Explosive Remnants of War (ERW) detection and access capability in Egypt" project took place in El Alamein, Egypt in March 2017. This ongoing project, led by the Netherlands and Egypt, trains engineers from the Ministry of Defence on selected mine detection systems, and provides Egypt with landmine clearance equipment. Once completed, this initiative is expected to have a positive impact on the development of the Egyptian Western Desert for the benefit of the civilian population. In November 2017, SPS supported a dedicated C-IED training course for 15 Egyptian experts in the C-IED Centre of Excellence in Madrid, Spain. The training provided the course participants with IED evidence recovery and processing skills, as well as specialist equipment. Through this initiative, SPS addressed a critical capacity gap of the Egyptian Armed Forces in explosive ordnance disposal.

An Egyptian military engineer is testing a Ground Penetrating Radar mine detector

Senior SPS & Partnership Cooperation Advisor Deniz Beten at the award ceremony for training Egyptian soldiers

In Morocco, SPS cooperation has focused on cyber defence, counter-terrorism and defence against CBRN agents. A multi-year project, led by the U.S., France and Morocco, addressing big data and cyber threat forecasts is successfully ongoing. Moreover, two tailor-made advanced-level cyber defence training courses for Morocco were approved by Allies in late-2017. The two modules will be delivered in 2018 by the Naval Postgraduate School and the NATO School Oberammergau. These internationally certified courses will provide Moroccan experts with know-how on network security, cyber incident handling and disaster response. Furthermore, in December 2017, the SPS Programme delivered an advanced training course enhancing technical competence and skills of Egyptian trainees in the field of radiation protection. The course helped developing safety and security standards based on international requirements and improving interoperability.

Israel remained an active partner in the SPS Programme, with several ongoing activities in the fields of cyber defence or advanced technologies with security applications, such as detection and sensors against terrorist threats and UAV engine development. In addition, four new multi-year projects with Israel in the fields of security-related advanced technologies, and cyber defence were approved by Allies. Two of these are advanced technology projects with security implications, led by Italy and Israel. Another is a multinational effort, led by scientists from the U.S., Italy, Israel and Pakistan in the field of cyber defence. The fourth project is led by Spain, Canada and Israel and focuses on maritime critical infrastructure protection. In addition to the above-mentioned projects approved in 2017, Israel hosted a counter-terrorism advanced training course in November and co-organised the cyber security Summer School Marktoberdorf together with Germany.

Kick-off meeting of the first SPS project with Algeria on terahertz imaging and detection technology

The first SPS activity with Algeria, in the field of advanced technology with security applications, was launched in 2017. Experts from France, Algeria and Sweden will work on the design and development of a terahertz imaging and detection system. This new system will be able to detect hazardous objects like concealed weapons or

explosives and will help to secure vulnerable places from terrorist threats, such as airports, railway stations, critical infrastructure as well as government buildings. Young researchers from Algeria will work on the project, helping them to build their academic career while fostering international scientific networks.

In Jordan, in addition to activities under the DCB package, SPS has the "Hybrid Sensor Networks for Emergency Critical Scenarios" project, led by the U.S., Italy and Jordan, successfully ongoing and contributing to counter-terrorism efforts.

Moreover, the SPS Programme engaged partners from the Istanbul Cooperation Initiative (ICI) in a number of concrete activities, demonstrating its flexibility and agility to address partners' needs. Following the opening of the NATO-ICI Regional Centre in January 2017 – marked by a visit of the NAC to Kuwait – possible areas for SPS cooperation were explored in staff-to-staff talks. In September, the SPS Programme organized an Information Day as part of the NATO Week at the Centre which resulted in the development of five tailor-made training courses for ICI partners in the areas of cyber defence, energy security and CBRN defence. The first of these training courses on CBRN Response was delivered in December in cooperation with the JCBRN Centre of Excellence in Vyskov, Czech Republic. The remaining four courses will be implemented throughout 2018.

Participants in the SPS-supported CBRN Response training receive their certificate of completion at the NATO-ICI Regional Centre in Kuwait

Regional cooperation with partner countries in the Western Balkans and Caucasus

The SPS Programme has actively engaged partners from the Western Balkans and the Caucasus, encouraging a regional approach where possible to help project stability.

U.S. Undersecretary Bill Bryan and SPS staff observe the demonstration of the NICS system at the NATO consequence management field exercise in Tuzla, Bosnia and Herzegovina

In the area of civil emergency response, the SPS Programme continued to support a top-down, key flagship project to customize and implement the Next Generation Incident Command System (NICS) in the Western Balkans. Led by the MIT Lincoln Laboratory and co-funded by the US Department of Homeland Security Science and Technology (DHS S&T), the project involves experts and government representatives from Croatia, Montenegro, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia*. The NICS technology allows for the exchange of real-time information in case of an emergency, helping to build situational awareness which is crucial for first responders to be able to deal effectively with natural or man-made disasters. In autumn, the capabilities of this flagship project were successfully live tested during the NATO EADRCC disaster response exercise in Tuzla, Bosnia and Herzegovina. High-level representatives, including the then ASG/ESC, Ambassador Sorin Ducaru, as well as U.S. Under Secretary Bill Bryan and Science and Technology Director of Research and Development, Mr. Joseph Martin of the Department of Homeland Security observed the exercise, demonstrating their strong political support for this SPS project. The EADRCC exercise also featured another SPS project in the sphere of telemedicine entitled Smart I (eye) Advisory Rescue System (SIARS) involving partners from the Western Balkan region. That project aims to develop a state-of-the-art telemedical information systems by modelling, and integrating selected existing Information Systems.

* Turkey recognizes the Republic of Macedonia with its constitutional name.

In the Caucasus, the SPS Programme supports amongst others a successful multi-year project to protect critical energy infrastructure against geohazards. The Enguri Hydroelectric facility is located in immediate proximity to the Abkhazia region and a recent landslide poses a potential danger to the dam. Researchers from Italy, Georgia, Azerbaijan, Kazakhstan, the United Kingdom and the United States are closely monitoring geological movements around the dam, take measurements and develop scenarios of geohazards and how to respond to them. This project is offering concrete solutions to deal with a pertinent risk in the region, while bringing together a group of experts and training a number of young scientists from partner countries in the Caucasus.

Dr Eyup Turmus examining a mobile telemedical application with the developers and end-users

In November, Armenia hosted a SPS Advanced Research Workshop on biomarkers of radiation in the environment. This event was led by the United Kingdom and Armenia, and brought together international experts on the subject in Yerevan who discussed amongst others tools for risk assessment. A key focus in this event was on rapid, reliable, non-invasive sampling methods for determining low dose exposure. The workshop also evaluated currently available and developing biomarker methods.

Strong practical cooperation with Ukraine

Ukraine remained the largest beneficiary of the SPS Programme with 16 new SPS activities launched in 2017. As part of the Comprehensive Assistance Package for Ukraine, a multinational telemedicine system, with a dual-use potential that spans both military and civilian, provided training to 30 Ukrainian medical specialists. The SPS Programme further provided equipment for a humanitarian demining project in Ukraine to enhance the capacity of the State Emergency Service of Ukraine (SESU) in undertaking demining operations in Donetsk and Luhansk regions. In response to the Balaklia arms depot explosion in March 2017, the SPS Programme responded urgently to the equipment request of Ukraine to enable Ukrainian demining teams to successfully clear the territory of Balaklia town and nine settlements in the vicinity. Moreover, as a long-term response to landmine detection, a three dimension radar to allow for the faster, cheaper and safer clearance of former conflict zones is being developed and a prototype was demonstrated during the visit of ASG/ESC Ambassador Sorin Ducaru to Ukraine.

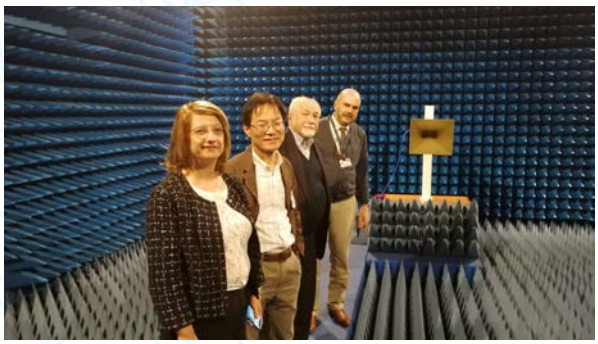
The SPS Programme responded urgently to the request for assistance from Ukraine following the explosion at the Balaklia Arms Depot in March 2017

In July, Kyiv hosted the NATO-Ukraine Joint Working Group on Scientific and Environmental Cooperation which served to take stock of ongoing cooperation while discussing potential new initiatives. Co-chaired by ASG/ESC Sorin Ducaru and the Deputy Minister of Science and Education of Ukraine, Dr. Maxim Strikha, and attended by representatives from the Foreign Ministry and National Academy of Sciences of Ukraine, the meeting served to obtain an overview of ongoing cooperation and exchange priorities for future collaboration.

Support to the Fight Against Terrorism

Terrorism continues to pose a direct threat to the security of the citizens of NATO countries, and to global stability and prosperity. NATO is adapting partly by strengthening its collective defence in Europe and partly by stepping up its efforts to project stability outside NATO territory through practical cooperation with its neighbours and fighting terrorism.

At their meeting in May 2017, Allied Heads of State and Government agreed to enhance NATO's role in the fight against terrorism, as a contribution to the international community's holistic approach to security. To this end, Allied Leaders endorsed a Report and Action Plan on enhancing NATO's role in the international community's fight against terrorism. Among these contributions, a strong emphasis is given to NATO's engagement with partners and international organisations, in order to further leverage the full potential of each stakeholder in the global counter-terrorism effort. The Action Plan makes concrete reference to SPS activities in the field of counter-terrorism and the programme has been a **key platform for increasing counter-terrorism relevant practical cooperation with partners**. Emphasis is put on shared awareness, capacity building, civil emergency planning and crisis management to enable partners to identify and protect vulnerabilities and to prepare to fight terrorism more effectively and promote stability. The SPS Programme enhances cooperation and dialogue between scientists and experts from Allies and partners, contributing to a better understanding of the terrorist threat, the development of detection and response measures, and fostering a network of experts.



Senior Advisor of the SPS Programme Dr. Deniz Beten during a project visit in the framework of the SPS flagship project for the stand-off detection of explosives

2017 also saw the launch of a SPS "special call for proposals" on **counter-terrorism**. This call solicited applications in support of NATO's activities to contribute to the fight against terrorism, including both technical solutions as well as human and social aspects of terrorism-related matters. The projects submitted in response to this call will be evaluated and presented to Allies for approval in the first half of 2018.

In 2017, the first elements for a follow-on system for the Stand-off Detection of Explosives (STANDEX) were approved and launched within the SPS Programme. The STANDEX follow-on initiative will be composed of building block projects towards a new international consortium. This effort will encompass a number of projects and related institutions, both from NATO countries and partner countries, linked together in a consortium agreement. As part of this framework, the first project awarded is the "Microwave Imaging Curtain" project which has the ambition to demonstrate the performance of an affordable solution to the challenge of detecting firearms and explosives concealed by a person in a mass-transit environment, without disturbing the continuous flow of surrounding walking people. This project, carried out by ONERA (France), IRE NASU (Ukraine) and Seoul National University (Republic of Korea), will design, develop and test in a representative environment, a radar-based imaging device addressing non-checkpoint detection of explosives and firearms. The project will integrate off-the-shelf high performance microwave modules (working in the Ku band, i.e. from 12 to 18 GHz) and it will develop specific signal processing algorithms in order to reconstruct 3D images of objects carried by moving persons and to automatically recognize dangerous objects.

Engaging with Partners across the Globe and International Organisations

With a view towards ensuring a balanced, 360 degree approach to its cooperation with partners, the SPS Programme further enhanced its outreach to partners across the globe in 2017.

The Programme engages in capacity-building initiatives as well as research and development (R&D) and knowledge sharing by bringing together NATO member and partners across the globe. Accordingly, **Japan** became increasingly active within the SPS Programme. Several SPS Advanced Research Workshops with Japan, notably on Leadership Development with regard to UNSCR 1325 on Women, Peace and Security

co-led by Norway, as well as on cyber defence, co-led by Germany, were approved by Allies. Moreover, Japanese experts contributed to the successful implementation of a number of SPS projects in the fields of CBRN defence and advanced technologies with security applications. In October, Tokyo hosted a table-top exercise on CBRN Defence, as part of an ongoing SPS project on international CBRN resilience, led by the U.S. and Japan. Japanese scientists from the Radiation Research Institute in Takasaki also contribute to a SPS project for enhanced border & port security (e-SiCure) led by Croatia, Portugal, Slovenia, Australia and Japan. Moreover, an international team of researchers from Belgium, Italy, Japan and Spain is working on innovative methods for rapid skin wound healing. The scientists are creating human disposable skin or mucosa patches for immediate applications in case of emergency. These patches will provide fast relief to civilians and military personnel injured by chemical or physical agents destroying for example their skin or other surface tissues.

SPS staff meeting Japanese scientists at the Quantum and Radiological Science and Technology (QST) Institute in Takasaki

NATO HQ also hosted experts from **Australia** and **New Zealand** in February 2017 to present the result of a study on perceptions of NATO in the Asia-Pacific Region. Moreover, a new project co-led by Iceland and New Zealand on the role of small states in international security was launched in 2017. In addition, a cyber defence capacity building project led by the NATO Communications and Information Agency (NCIA) and **Mongolia** was launched. The project will improve the cyber security posture of the Mongolian Ministry of Defence (MoD) and the General Staff of the Mongolian Armed Forces (GSMAF) by creating a Cyber Security Centre. As part of this centre, a fully equipped Computer Incident Response Team (CIRT) will be established within the HQ of the GSMAF, and a Secure Business CIS Infrastructure will be created. Network administrators and cyber security specialists will be trained to protect and prevent the MoD/GSMAF from any internal or external computer-based attack and to enhance and monitor the cyber security posture of the MoD/GSMAF. Additionally, this project will establish secure communications between the MoD, the General Staff HQ and the 20 remote army bases located within Mongolia.

Special Call for Proposals: Cyber Defence

The SPS Programme also launched a “special call for proposals” on **cyber defence**. This call solicited applications in the area of operational cyber security, cyber security technology, Quantum Safe Solutions, as well as cyber security strategies and policies. 21 applications received in response to the call were reviewed by an experts’ panel in December; 6 proposals were recommended for Allies’ consideration in early 2018. Alongside the expert’s review panel, the Programme organized a subject-specific “cyber defence cluster workshop” that directly corresponded to the third recommendation of the SPS Performance and Financial IBAN Audit to systematically analyse the results of SPS activities. The cluster workshop brought together ISEG members and subject matter experts representing Allied scientific institutions. The workshop provided a platform to take stock of NATO SPS activities in the field of cyber defence and to identify the latest trends in cyber defence training, research and technological applications. As a result of the event, the SPS team received valuable guidance on the further implementation of the priorities set out by the Allies in the field of cyber defence.

Cyber experts and ISEG members met in December 2017 at NATO HQ for a cluster workshop and the evaluation of submissions to the SPS special call on cyber defence

Impact Assessment of Completed SPS Projects

By bringing together scientists, experts, government representatives and civil society on key issues of security, SPS Programme activities leave a significant positive impact on local populations, scientific communities, academia and national governments. This is particularly true for SPS multi-year projects which help to forge strong networks between the scientific communities in NATO and partner countries and often result in the development of innovative, cutting-edge technology, demonstrated by the application for patents and the high number of scientific publications.

All SPS activities respond to NATO's Strategic Objectives. While SPS capacity building projects focus in particular on the provision of equipment and tailored expert training in identified priority areas, R&D activities help to foster research, innovation, applied science and technology, as well as knowledge exchange to address mutual security challenges.

In 2017, a total of 28 SPS projects were completed with concrete deliverables and high public diplomacy value. SPS projects not only offer equipment for research, but also contribute to capacity building and provide training for young scientists and experts. End-users support and further develop the deliverables of SPS projects; their commitment – explicitly expressed in a support letter – ensures the sustainability and long-term impact of SPS projects in NATO and partner countries.

The implementation and impact of all SPS projects is carefully monitored and evaluated. SPS project directors are required to submit technical and financial progress reports on a regular basis, which are reviewed by SPS staff and experts from the Independent Scientific Evaluation Group (ISEG). ISEG members also conduct site visits to selected SPS projects in their area of expertise to ensure that they meet the criteria of success and are well managed in line with the SPS management handbook.

At the end of a SPS activity, the co-directors submit a final report and complete a detailed questionnaire to assess the output and results of a project. The following activity assessments are based on such feedback SPS received from the Project Directors. These activities are selected examples of completed multi-year projects and workshops including examples of multi-national capacity building, security-related advanced technology and environmental security activities enhancing support for NATO-led operations and missions and countering-terrorism.

Protection of Underground Structures from Fuel Cloud Explosion

Multi-year Project G4595

Country Directors	USA, Georgia

SPS support allowed Georgian scientists to acquire equipment to test and refine their underground explosion confinement system

Thermobaric explosive devices are relatively inexpensive and widely distributed compared to other options for attacking critical infrastructures. Their neutralization therefore represents a significant increase in the physical security. In addition, a successful countermeasure can be used to protect civilian critical infrastructures from similar explosions, accidental or deliberate.

Scientists from the U.S.A. and Georgia designed a prototype system to protect the entrances of bunkers, caves, and other underground critical infrastructures such as refineries and chemical plants from detonation of thermobaric explosive devices. The designed system creates a liquid barrier (from a dispersed water mist) to prevent the explosive fuel cloud from reaching the critical infrastructure entrance, thus reducing the chances of

detonation. A prototype was manufactured and tested in the underground facility of the LEPL Grigol Tsulukidze Mining Institute in Tbilisi, Georgia under real blast conditions. The developed system has proven itself to be efficient, reliable and quick to respond. This project contributes in a novel way to the defence against an unaddressed threat to critical infrastructures, i.e. terrorist and unauthorized explosions. The findings of the project research were presented at twelve international conferences and published in fourteen international journals.

The LEPL Grigol Tsulukidze Mining Institute in Tbilisi has a network of underground tunnels at its disposal to test the innovative explosion protection system developed in cooperation with US scientists

A water mist curtain helps to confine the fuel cloud explosions, as demonstrated at the test site in Tbilisi

The project results were made publicly available through a number of publications and a video clip available on the NATO Youtube Channel (www.youtube.com/watch?v=8s0D-Ns28fQ).

Last but not least, the project gave opportunity to five young scientists to work in their field of interest and train in research centers in the U.S. and across Europe.

Cultural Property Protection in NATO-Led Military Operations

Advanced Research Workshop G4866

Country Directors	Denmark, Bosnia and Herzegovina

Lessons learned from the Balkans, Iraq, Afghanistan, Syria, Mali, Libya, and Iraq have demonstrated the significance of cultural property protection (CPP) in armed conflicts. The current strands of work at NATO on Cultural Property Protection (CPP) in NATO-led operations echo a global debate on the subject matter and offer an opportunity for Allies to engage in this pertinent issue from a defence policy perspective. The overarching purpose of this SPS CPP initiative was to make NATO capable of planning for and managing the strategic, operational and tactical issues related to CPP in mission areas.

This SPS activity created an international Cultural Property Protection (CPP) stakeholder community by bringing together experts from INTERPOL, the International Criminal Court, the International Blue Shield, the European Union, UNESCO and other relevant United Nations entities, Allied Command Transformation (ACT), Allied Command Operations (ACO) and other NATO bodies, as well as from national institutions.

This workshop series provided a platform to evaluate the role of CPP in conflicts zones, to share lessons identified and to recommend a way ahead for an improved operational effectiveness. Pooling the expertise and competencies of the international organisations facilitated the establishment of a NATO doctrine on cultural property protection and comprehensive guidelines, the establishment of a protocol for ensuring that deployed

The role of cultural property has grown increasingly prominent and complex in recent armed conflicts

NATO forces have accurate maps and information including cultural property geo-spatial data layers, as well as the outline of cultural property training programmes. NATO's Strategic Commands, including Allied Command Transformation (ACT) and Allied Command Operations (ACO) are currently in the process of advancing further initiatives to better address CPP at the Bi-SC level.

As the main outcome document, the activity results were compiled in the report "NATO and Cultural Property – Embracing New Challenges in the Era of Identity Wars", published in 2017. The publication provided recommendations on how NATO should approach the question of policy and doctrine related to CPP.

SPS Programme Contributions to the Implementation of the Comprehensive Assistance Package (CAP) for Ukraine

In response to the crisis in Ukraine and the resulting political guidance provided by NATO Foreign Ministers in April 2014 to intensify cooperation, practical collaboration with Ukraine within the framework of the SPS Programme was enhanced. At the 2016 NATO Warsaw Summit, the Heads of State and Government of the NATO-Ukraine Commission reaffirmed their commitment to a strong partnership with Ukraine and endorsed the Comprehensive Assistance Package (CAP) for Ukraine. The aim of this Package is to consolidate and enhance NATO's support to Ukraine through tailored capacity-building measures. This will enable Ukraine to become more resilient, to better provide for its own security, and to carry out essential reforms, in particular in the security and defence sector.

The SPS Programme provides support to the CAP through three top-down initiatives. These include two tailor-made capacity-building projects on **humanitarian demining** in the East of the country and on **telemedicine** and paramedicine. In addition to these capacity-building activities, SPS also supports an ongoing R&D project entitled "Holographic and Impulse Subsurface Radar for Landmine and IED Detection" that aims to build a prototype of a **3D mine detector**.

SPS capacity-building activities in the areas of telemedicine and humanitarian demining have come to a successful completion at the end of 2017. The results and impact of these two top-down SPS activities with Ukraine are highlighted below.

A Multinational Telemedicine System for Emergency Situations

Multi-year Project G4748

Country Directors	Romania, Ukraine, United States, Finland and the Republic of Moldova

Telemedicine picture: change caption to read "Executive Board meeting of the Telemedicine project with Finland, the Republic of Moldova, Romania, Ukraine and the United States chaired by Amb Sorin Ducaru

This key flagship project developed a multinational telemedicine system that enables medical specialists to respond to major disasters or incidents across national borders. The technology developed has a dual-use potential for both civilian and military applications.

The SPS Programme supported the installation of this telemedicine system with communication equipment and portable medical kits that allow first responders to connect to the system and receive expert advice from medical specialists in case of an emergency, in particular in remote areas. Through the use of modern communications technologies, an international network of medical specialists will be able to assess patients, diagnose them and provide real-time recommendations. This will allow first aid and care to reach those who need it most in a timely manner, with the potential to save many lives.

The multinational telemedicine system was live tested during the Euro-Atlantic Disaster Response Coordination Centre (EADRCC) consequent management field exercise "Bosnia i Hercegovina 2017" and proved to be very useful to increase medical support in disaster-affected areas by remotely engaging medical experts from assisting nations.

In February, project participants and high-level representatives from NATO presented key findings and discussed the future of the telemedicine system at a book talk and closing conference at NATO HQ. The book "A Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges", published under the NATO Science Series by the IOS Press, highlights the use of telemedicine technology in response to emergencies and its important contribution to the field of disaster and emergency management. The book was edited by experts in the field and confirms that telemedicine is a highly effective tool that can provide essential support worldwide.

Support to Humanitarian Demining in Ukraine

Multi-year Project (capital P) G5024

Country Directors | NATO Support and Procurement Agency (NSPA), Ukraine

This SPS flagship project provided Ukraine with assistance in the area of humanitarian demining by enhancing the operational capacity of the State Emergency Service of Ukraine (SESU) in undertaking demining operations in Eastern parts of the country.

In response to the Balaklia ammunition depot explosion in March 2017, the SPS Programme responded swiftly to an urgent request and provided valuable medical trauma equipment to the SESU Emergency Training Centre as part of its humanitarian demining project.

In the framework of this project, the demining teams of the SESU were provided with modern specialist equipment for detection and clearance, including bomb suits and team vehicles for operational mobility. In total, 53 types of demining equipment composed of 841 individual items, four vehicles and emergency trauma medical equipment were delivered to SESU. The training provided throughout the project implementation focused on filling the training gaps within the SESU curriculum and enhancing SESU personnel skills to clear newly encountered IEDs in demining operations.

The project significantly contributed to safeguarding the civilian population within areas affected by the conflict in Ukraine, specifically in the oblasts of Donetsk and Luhansk, and allowed the return of displaced persons to their homes.

SESU personnel searching for mines with equipment provided by the SPS Programme

Previous ASG/ESC Ambassador Sorin Ducaru at the signature ceremony of the Humanitarian Demining project in Ukraine

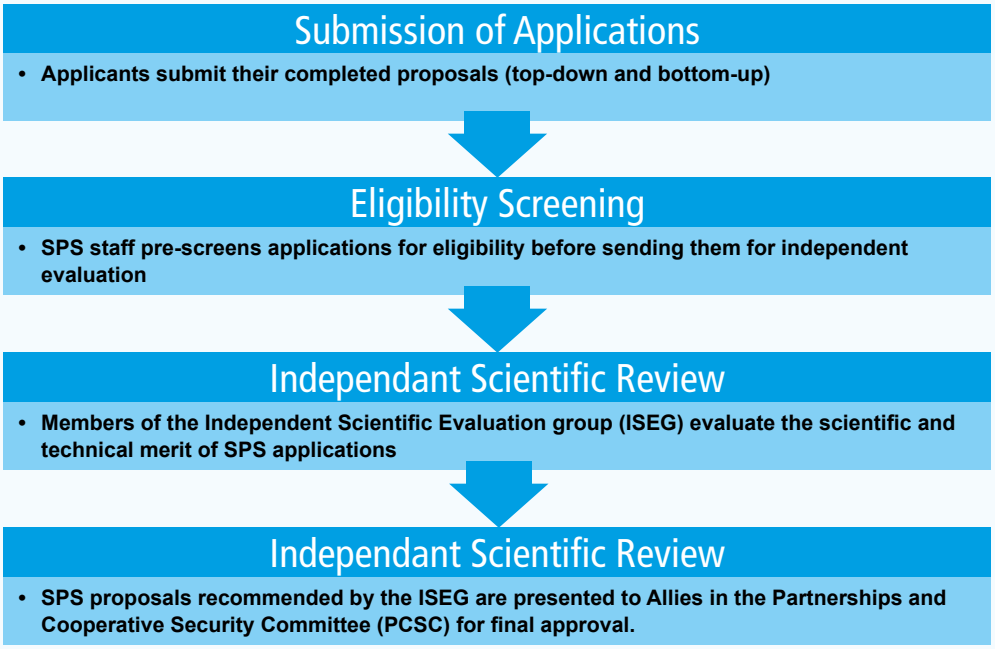
CHAPTER 4

SPS Programme Implementation in 2017

Allies approved a total of 65 new SPS activities in 2017. This chapter provides a detailed overview of the SPS award cycle process over the 2017 calendar year. It also presents a comprehensive breakdown of the implementation of the Programme, including the distribution of new SPS activities according to the key priority areas and partnership frameworks. Examples of new SPS activities for each of the priority areas are also enclosed, as well as an overview of SPS-related meetings hosted over the last year.

SPS Applications Reviewed in 2017

In 2017, the SPS programme received a total of 175 applications in response to three submission deadlines. All applications were initially pre-screened for eligibility by SPS staff. Where appropriate, experts from other sections and NATO Divisions were consulted during this process. Based on this initial screening, 126 eligible applications were presented for peer-review to the experts of the Independent Scientific Evaluation Group (ISEG) and discussed at three ISEG meetings. The ISEG recommended a total of 66 SPS proposals. The final decision for any SPS grant is taken by Allies. The NATO Partnerships and Cooperative Security Committee (PCSC) approved a total of 65 SPS applications for SPS funding. The chart below provides an overview of the 2017 award cycle described above; a complete list of SPS activities approved in 2017 can be found at Annex 1.



In 2017, one third of the applications recommended by ISEG were top-down activities, reflecting Allied guidance to focus more on large-scale projects with a substantive political, strategic and public diplomacy impact. These projects have been developed in close cooperation with stakeholders from government bodies and research institutes in NATO and partner countries. They respond to a request and priority area of cooperation in the involved partner countries.

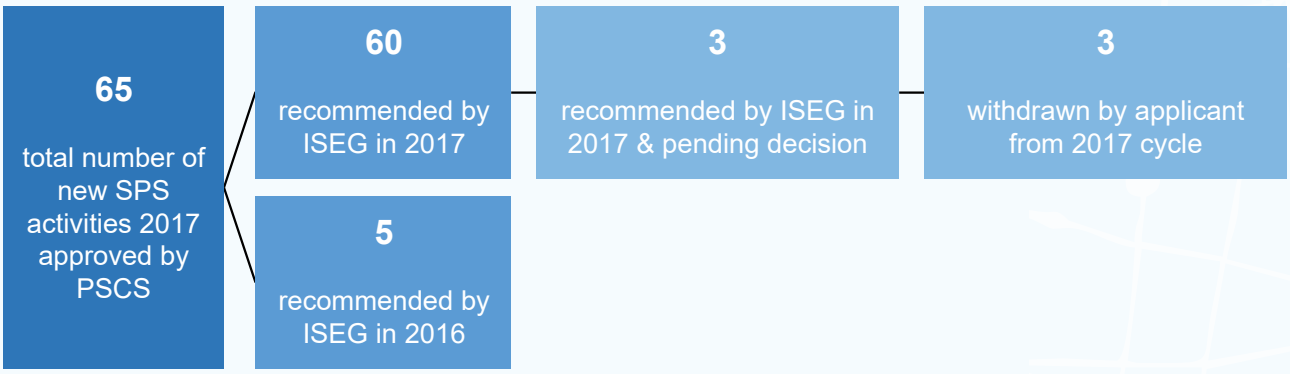
A more detailed breakdown regarding the distribution of top-down versus bottom-up proposals can be found in the following chart:

	SPS Applications received in 2017*	Top-Down	Bottom-Up	Total
Eligibility Screening	Applications Received	26	149	175
	Ineligible Applications	0	49	49
Independent Review	Reviewed by ISEG	26	100	126
	Recommended by ISEG	22	44	66
Political Review	Approved by PCSC in 2017	20	40	60
	Applications pending final decision	1	2	3
	Applications withdrawn by applicants	1	2	3

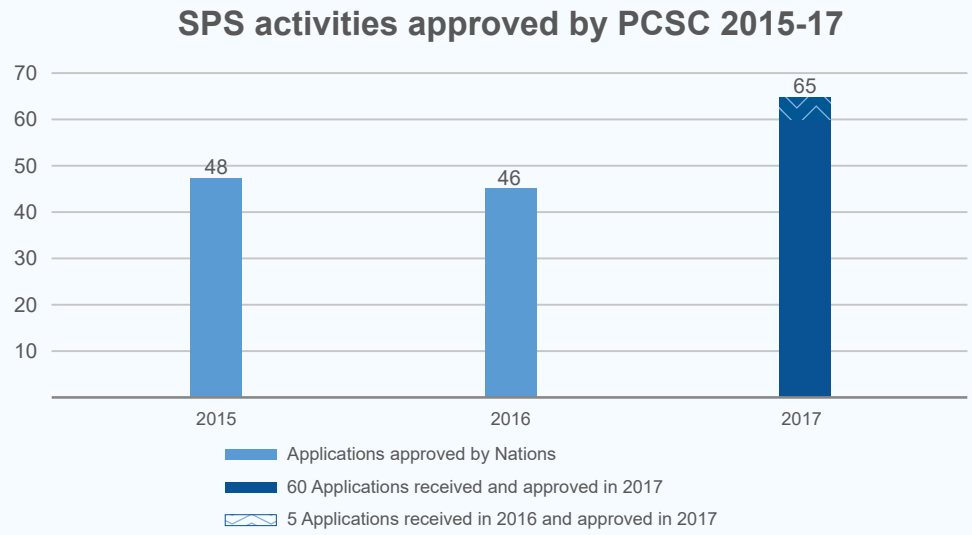
** This table only includes applications from the application cycle 2017*

Activities Approved by the PCSC in 2017

Allies reviewed and approved a total of 65 activity proposals. These included 60 applications recommended by the ISEG in 2017 and 5 proposals recommended by ISEG in 2016. Three applications recommended by ISEG in late 2017 will be considered by Allies in 2018, another three applications were withdrawn by the applicants.



The following chart provides an overview of the applications approved for funding over the last three years. The total number of newly approved SPS activities shows a gradually increasing trend since 2015.



The 65 activities approved by the PCSC involve 21 partner countries addressing a broad range of security areas. The following sections provide a detailed breakdown of the SPS activities approved in 2017 by key priority, grant mechanism and partnership objective.

New Activities by Grant Mechanism

The SPS Programme supports collaboration with partners through three established grant mechanisms: multi-year projects, workshops and training courses. The table below provides the breakdown of new activities over the calendar year according to SPS grant mechanism. The multi-year project was the most popular grant mechanism, representing almost half of the newly approved activities, followed by the Advanced Research Workshop. Advanced Training Courses remained a popular tool to build capacity in partner countries and their tailor-made character is underlined by the high proportion of top-down initiatives. On the contrary, all Advanced Study Institutes, lecture-driven courses targeting in particular young students, stemmed from bottom-up applications, reflecting their technical and scientific nature.

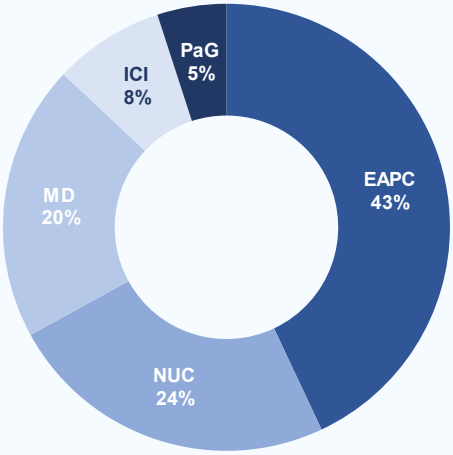
Mechanism		Top-Down	Bottom-Up	Total
MYP	Multi-Year Project	5	26	31
ARW	Advanced Research Workshop	7	12	19
ATC	Advanced Training Course	8	4	12
ASI	Advanced Study Institute	0	3	3

New Activities by Partnership Framework

SPS is one of the most important partnership programmes, promoting practical cooperation with 41 NATO partner countries within partnership frameworks such as the Euro-Atlantic Partnership Council, the Mediterranean Dialogue, the Istanbul Cooperation Initiative and Partners across the globe. In 2017, the SPS Programme initiated 65 new activities in which 21 different partner countries were in the lead. The following chart provides a breakdown of activities approved in 2017 by partnership framework.

Partnership Framework		Top-Down	Bottom-Up	Total
EAPC	Euro-Atlantic Partnership Council	5	23	28
NUC	NATO-Ukraine Commission	2	14	16
PaG	Partners across the Globe	2	1	3
MD	Mediterranean Dialogue	6	7	13
ICI	Istanbul Cooperation Initiative	5	0	5
	Total	**20**	**45**	**65**

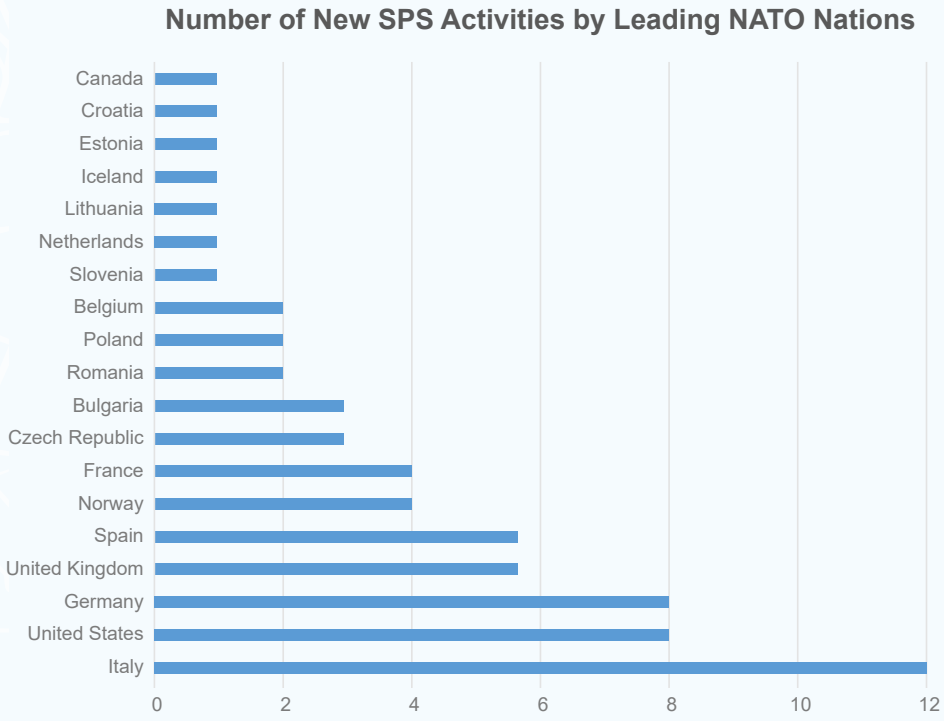
Distribution of SPS activities approved in 2017 by partnership framework

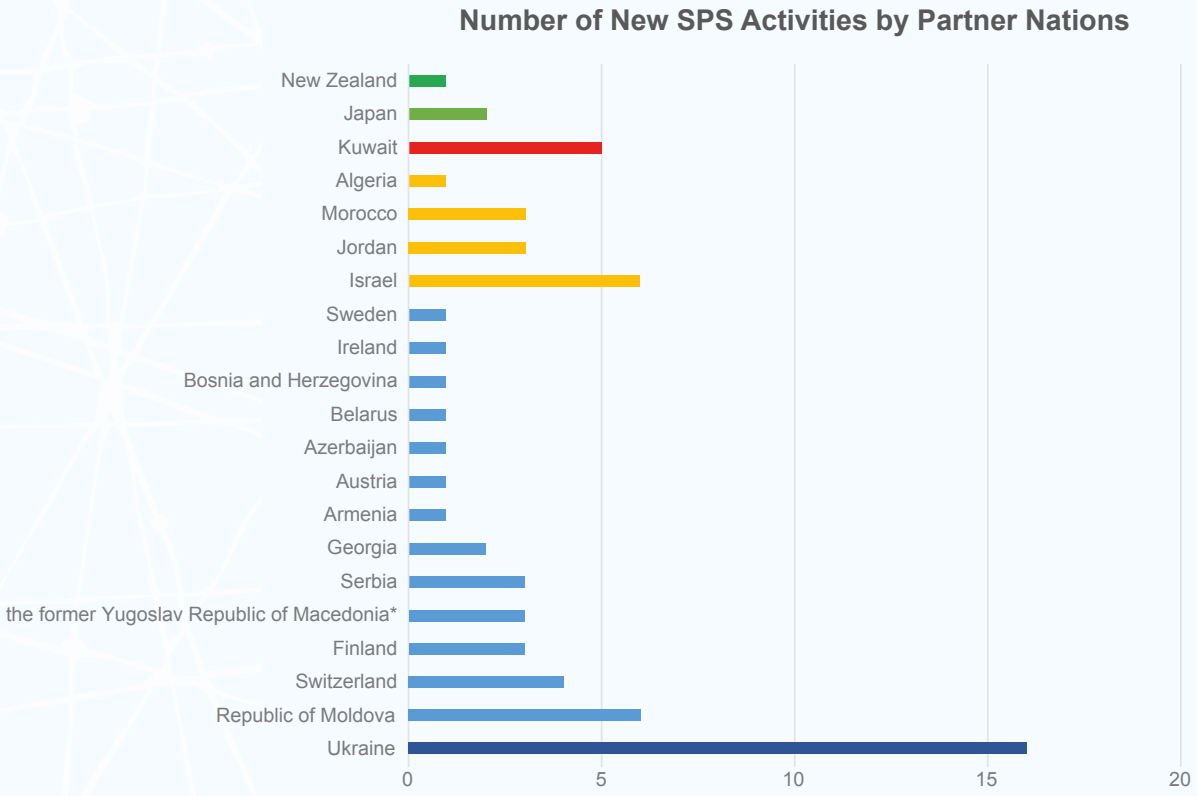


New SPS activities involved partners from all of NATO's partnership frameworks and represented a more balanced approach. About 43% of new activities were developed within the framework of the countries of the Euro-Atlantic Partnership Council (EAPC), engaging a total of 13 partners from Eastern and Western Europe, the Balkans and Central Asia. In line with Allied political guidance, SPS also continued to serve as a valuable programme for enhancing practical cooperation with Ukraine throughout 2017; 24% of new activities fall under the NATO Ukraine Commission, the vast majority being large scale multi-year research and development projects. At the same time, and reflecting a 360 degree approach, the SPS Programme sought a balanced, geographical approach to cooperation.

Reflecting NATO's focus on the South, activities involving countries from the Mediterranean Dialogue (MD) and the Istanbul Cooperation Initiative (ICI) increased from 14% to 20%, and from 2% to 8%, respectively, in comparison to the 2016 figures. Finally, three new activities with Partners across the Globe (5%) were initiated, with the majority being top-down projects with a significant impact.

The following charts present a breakdown of Allied and partner countries that have assumed leading roles in SPS activities approved in 2017. Scientists from Italy, the United States and Germany were most active in initiating new SPS efforts over the last year. In total experts from 19 different NATO countries assumed the role of SPS project director in at least one activity. Amongst the partners, Ukraine remained very active and is leading 16 newly approved activities as partner country director. Scientists from MD partner Israel assumed a key role in 6 SPS projects; likewise, the Republic of Moldova was engaged in 6 newly approved activities.





* Turkey recognizes the Republic of Macedonia with its constitutional name.

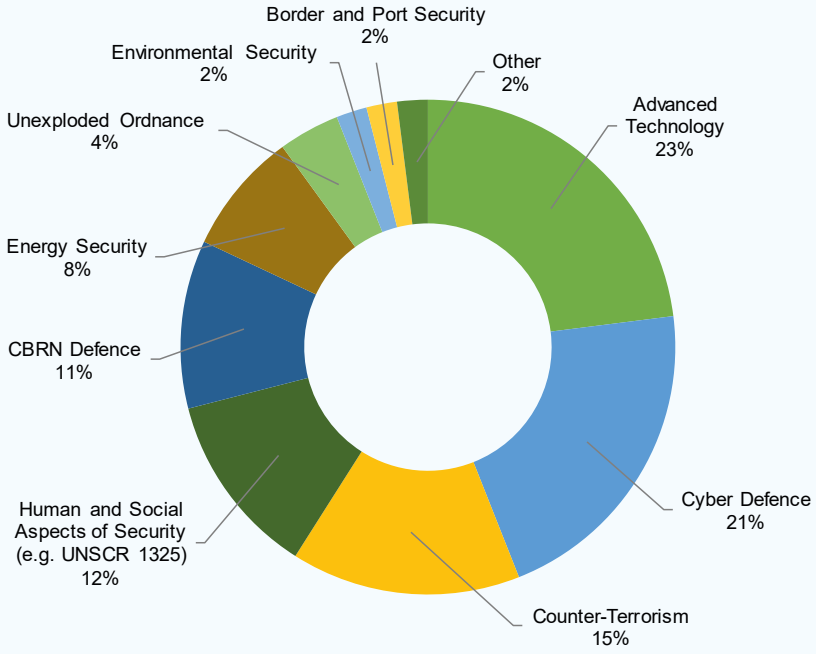
New Activities by SPS Key Priorities

The SPS Programme is embedded in the Emerging Security Challenges Division (ESCD), established in 2010 to address a growing range of non-traditional security risks and challenges faced by NATO and its partners. Terrorism, cyber-attacks, energy security and threats of CBRN agents are major contemporary challenges to international peace and security. The focus of the SPS Programme spans across these new security challenges and strives to bring together scientists, experts, and policy makers from NATO and Partner countries to address emerging security challenges.

	SPS Key Priority	Top-Down	Bottom-Up	Total
1a.	Counter-Terrorism	3	7	**10**
1b.	Energy Security	1	4	**5**
1c.	Cyber Defence	5	9	**14**
1d.	Defence against CBRN Agents	2	5	**7**
1e.	Environmental Security	0	1	**1**
2.	Support for NATO-led Operations	0	0	**0**
3a.	Advanced Technology	1	14	**15***
3b.	Border and Port Security	1	0	**1**
3c.	Mine and Unexploded Ordnance Detection and Clearance	2	1	**3**
3d.	Human and Social Aspects of Security	5	3	**8**
4.	Other Security Threats Related to NATO's Strategic Objectives	0	1	**1**
	Total	**20**	**45**	**65**

One SPS activity in the area of Advanced Technology was withdrawn following the approval of the PCSC

In 2017, the SPS Programme initiated 65 new activities in line with the SPS Key Priorities. Most active areas of cooperation were advanced technologies with security applications, representing 23%, followed by cyber defence with 21%, and counter-terrorism with 15%. The share of SPS activities addressing human and social aspects of security, such as the implementation of UNSCR 1325 on Women, Peace and Security, also increased slightly compared to previous years and shows a particularly high proportion of top-down initiatives. The table above and the chart below provide more information on how the 65 new SPS activities addressed the various key priorities.



Given the breadth of SPS activities in these areas, the following pages provide a thematic overview of SPS cooperation by looking at several key priority areas. They will provide more detailed information about key initiatives developed and implemented over the last year in the area of counter-terrorism, energy security, cyber defence, defence against CBRN agents, security-related advanced technologies, mine and unexploded ordnance detection and clearance, as well as women, peace and security (implementation of UNSCR1325).

Counter-Terrorism

SPS supports NATO's Counter Terrorism (CT) agenda in four distinct categories: human factors against terrorism; development of detection technologies for explosives and other threats; methods for the protection of critical infrastructure, supplies and personnel; and finally, risk management, best practices and technologies in response to terrorism. Additionally, while not falling under the CT Key Priority, others key priorities may also be relevant to the broader fight against terrorism: for example defence against CBRN agents, developments in advanced technologies, border and port security, human and social aspects of security as well as mine and unexploded ordnance disposal. In 2017, 10 activities primarily related to CT were approved. These include both events and multi-year projects. Events tackle a wide spectrum of topics, from human and societal aspects, like enhancing women's roles in countering violent extremism, to resilience, risk management and protection of critical infrastructures. The multi-year projects are exploring technologies for the detection of explosive and firearms.

In 2017, the SPS Programme has actively supported NATO's counter-terrorism efforts through practical cooperation with partners

As part of these multi-year projects, one contributes to the follow-on of the STANDEX (Stand-off Detection of Explosives) programme, finalized and live-tested in 2013. A novel set of systems, integrating several technologies and encompassing a number of projects is being launched. This follow-on programme is aimed at demonstrating an integrated system of detection technologies to identify suicide bombers in large crowds of people such as mass-transit, special events, and other sensitive sites. The first project awarded under this programme is the "Microwave Imaging Curtain" (G5395) project that is currently carried out by institutions from France, Ukraine and Republic of Korea.

Another major initiative launched by SPS in the area of counter-terrorism was the "Special Call for Proposals" to address human, social, cultural, scientific and technological advancements in the fight against terrorism. The Call aims to foster practical cooperation by developing collaborative networks between academia, think tanks, civil society and government representatives. On this basis, the Call solicits for applications that

SPS projects related to counter-terrorism

10 new SPS activities (3 top-down and 7 bottom-up) related to counter-terrorism were approved in 2017.

SPS launched a Special Call for Counter-Terrorism Proposals. Activities in 2017 involved explosive detection, countering violent extremism and critical infrastructure protection.

Newly approved activities involve experts from Morocco, Israel, Ukraine, Armenia, Georgia, Azerbaijan and the former Yugoslav Republic of Macedonia*.

* Turkey recognizes the Republic of Macedonia with its constitutional name.

promote long-term research in hard sciences (advanced technologies), as well as in social disciplines (such as political science, anthropology, sociology, psychology, etc.). The deadline has been set for February 2018 and a special meeting comprising CT experts from the Independent Scientific Expert Group (ISEG) has convened to assess proposals in the first quarter of 2018. Projects resulting from this proposal are expected to be kicked-off in mid-2018.

Through this call, SPS is seeking to further enhance its CT-related cooperation with partners in the South, notably with MD and ICI partners, while maintaining a balanced 360 degree approach. SPS activities are also expected to increasingly involve other international organizations, either as lead-organization, or by inviting relevant experts as speakers or participants.

Energy Security

Energy security related SPS activities facilitate cooperation among experts with the aim to strengthen resilience of critical energy infrastructure, develop advanced power technologies for optimizing the range of surveillance vehicles and reduce the fossil-fuel consumption in the military.

Activities that have been awarded in previous years have progressed according to plan, including multi-year projects to produce high-yield biofuel using obsolete military sites; optimise fuel cells for medium-sized long-range drones; improve the safety of batteries; develop mobile devices for assessing the integrity of pipelines; and to build capabilities for the safety of hydropower stations. In addition, 3 new multi-year projects related to energy security kicked-off in 2017.

The SPS-supported 2017 Zagreb Security Forum looked at energy security

Furthermore, two events on energy security were hosted by the SPS Programme. The workshop “Resilient Critical Infrastructure” (G5265) was held in March 2017 in Zagreb, Croatia. It brought together nearly 100 experts and resulted in a number of publications and a large press coverage. The training course “Critical Energy Infrastructure Security Course” (G5519) was co-organized by the NATO Energy Security Centre of Excellence, Lithuania, and the Ukrainian Ministry of Energy in October 2017 in Kiev, Ukraine. 71 trainees, mainly from Ukraine, were trained by about 30 experts to prepare for a subsequent Table Top Exercise on enhancing Ukraine’s energy resilience.

On 16-21 September 2017 NATO Headquarters organised the NATO Week at the NATO-Istanbul Cooperation Initiative (ICI) Regional Center in Kuwait City, in order to develop opportunities for cooperation within the framework of the SPS Programme. This led, inter alia, to an SPS Advanced Training Course on Critical Energy Infrastructure Protection, to be held at the NATO-ICI Regional Centre in early 2018. The course was developed in cooperation with NATO HQ, NATO School Oberammergau, Naval Postgraduate School Monterey, and the NATO Energy Security Centre of Excellence.

SPS projects related to energy security

5 new SPS activities related to energy security were approved.

Newly approved activities involve experts from Ukraine, Serbia and Kuwait.

Activities in 2017 included a tailored trainings on critical energy infrastructure protection as well as projects on portable energy supplies and fossil fuel independent energy solutions.

Cyber Defence

The cyber defence activities offer the opportunity of collaboration between numerous NATO member and Partner countries in areas of research and technological development of the future. Based on the recommendations of the IBAN Report (2015), a Cyber Defence Cluster Workshop was held on 11 December 2017 at the NATO HQ. This meeting provided a platform for relevant cyber defence experts from NATO countries and other NATO bodies to discuss implementation of NATO SPS projects in the field of cyber defence, map future areas of work in this field, and identify potential new external stakeholders to jointly take forward new activities. The discussions offered a better understanding of NATO requirements in this field and the possibilities of cooperation with the large variety of Partner countries.

The number the SPS activities in the field of cyber defence has increased.

The Cyber Defence Special Call advertised in 2017 contributed to this increase with an additional nineteen applications presented. The scope of the Cyber Defence Call was to invite experts and scientists to apply for projects in various specific cyber defence areas of interest, such as operational cyber security – Support for Computer Security Incident Response Teams (CSIRTS) Incident Management and Response, cyber security technology, Quantum Safe Solutions, cyber security strategies and policies. 6 proposals from the call received positive evaluations and were selected for Allied approval.

The cyber defence projects cover topics of high interest for the security and defence sectors which have a great potential to increase the cyber defences of the NATO and Partner countries. The main subjects of research and technology development include quantum computing, big data analysis, threat detection and cyber awareness, capacity building in governmental defence institutions and tailored training on cyber defence for various Partner countries.

Activities focused on cyber defence capacity building and training aimed to strengthen the overall resilience and capabilities of partners to defend against cyber threats. The multi-year projects “Development of the Moldovan Armed Forces Cyber Defence Capabilities” with the Republic of Moldova (G5340) and “Creation of Computer Incident Response Team and Securing the IT Infrastructure” (G5281) with Mongolia are flagship examples in this vein. The aim of these projects is to enhance the cyber defence posture of these two partner countries, through the provision of equipment and training.

In the area of tailor-made, modular, hands-on cyber courses, NATO SPS supported the training of the Serbian civil servants from the Office of the National Security Council and Classified Information Protection (G5331). The experts were trained to deal with information systems security (INFOSEC) in real life situations. The course addressed

SPS projects related to cyber defence

Cyber Defence Cluster Workshop (11 December 2017).

14 new SPS activities (5 top-down and 9 bottom-up) related to cyber defence were approved.

6 SPS applications in response to the special call for proposals on cyber defence were recommended for approval.

Newly approved activities involve experts from Kuwait, Morocco, Mongolia, Israel, Ukraine, Serbia, Republic of Moldova, Finland, and the former Yugoslav Republic of Macedonia*.

Activities in 2017 involved cyber defence capacity building and training systems security training.

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specific cyber security concerns, such as crisis management and protection of classified information that the participants have encountered or are currently dealing with.

In addition to these projects, two SPS events covered areas of high interest for nations such as Computer Emergency Response Teams and Cyber Defence in Industry 4.0 systems (G5340; G5173).

Defence against CBRN Agents

In line with NATO's political agenda, the central objective of SPS activities in defence against chemical, biological, radioactive and nuclear (CBRN) agents is to improve the ability of NATO and its partners to protect their populations and forces from CBRN threats. At the Warsaw Summit, Heads of State and Government reiterated that the Alliance will continuously improve its capabilities and technologies to counter a wide range of state and non-state CBRN threats. In 2017, 7 new SPS activities were approved in support of this objective.

Trainings and workshops aim at increasing the resilience and responsiveness against CBRN agents

Activities aimed at delivering high-quality scientific research, capacity building and training of young researchers in the area of CBRN defence strengthen the overall resilience and capabilities of partners to defend against CBRN threats. Developing detection technologies for the identification and monitoring of CBRN threats was the objective of several SPS initiatives approved this year. Moreover, a SPS Advanced Research Workshop fostered new research collaboration on medical countermeasures against CBRN agents that tend to be both expensive and highly time consuming to develop (G5350).

Implementation of SPS CBRN activities has been pursued in close alignment with NATO`s partnership priorities. At the Warsaw Summit, Heads of State and Government reaffirmed NATO's commitment to further develop its partnership with countries from the Istanbul Cooperation Initiative (ICI). It is in this vain that tailor-made SPS Advanced Training Courses will deepen collaboration, forge networks among experts and enhance security and defence capacities of ICI countries in priority areas of cooperation. Two of these courses are in the CBRN domain, improving national capabilities and processes to respond to and recover from CBRN incidents (G5518; G5520).

SPS initiatives in this area also provide situational awareness on safety and security developments and contribute to CRBN response capabilities of partners through enhancing their technical competence and skills. In the radiation field, a SPS-sponsored Advanced Training Course contributed to the CBRN capacity development of the Mediterranean Dialogue partners Morocco and Tunisia through sharing of the advanced methods, techniques and best practices for an enhanced response to radiation protection challenges (G4960). Such SPS activities assist NATO countries and partner nations to improve their interoperability and effectiveness in responding to CBRN incidents.

SPS projects related to CBRN defence

A total of 7 new SPS projects (2 top-down and 5 bottom-up) related to defence against CBRN agents were approved.

Newly approved activities involve experts from the Republic of Moldova, Serbia, Sweden, Ukraine and Kuwait.

Activities address themes such as novel methods for detection, radioactive waste management, and medical countermeasures against CBRN agents.

Security-related Advanced Technologies

SPS activities in advanced technologies are an important part of the SPS Programme. They represent a unique opportunity to support cutting-edge security-related research and development activities to bring mutual benefits both to NATO and Partner nations. They respond directly to the strategic objective of ensuring that NATO has the full range of capabilities necessary to deter and defend against any threat to the safety and security of its own populations. Activities under this Key Priority bring a tremendous added value in terms of scientific advancements, development of disruptive technologies for dual-use civil-military applications, creation of a vibrant scientific community which shares common interests and a solid know-how.

Development of autonomous UAVs aimed at covering hazardous areas for security and disaster recovery situations

In 2017, 15 advanced technologies activities were approved. These broadly cover four sub-areas: unmanned and autonomous platforms, sensors and detectors, nanotechnologies and advanced materials. The sub-areas represent some of the most widely recognized emerging topics in the field of security research at the global level.

The SPS Programme activities widely cover unmanned aerial vehicles (UAVs) and their integration in surveillance systems from command, control, and their deployment in dynamic architectures, to their integration in wide sensor systems concepts up to investigation of novel potential applications (G5381; G5427; G5428).

Several projects are related to sensors and detectors, including optical and imaging systems; in particular, “Implementation of a terahertz imaging and detection system” (G5396) aims at the design and development of a terahertz (THz) imaging system and sees the collaboration between universities and institutions in France, Algeria and Sweden. Other projects are developing and demonstrating innovative concepts like compact Airborne Laser Scanning, high altitude balloon-borne radar and multi-static and multi-band coherent radar (G5248; G5322).

Finally, in the field of nanotechnologies, two SPS multi-year projects are investigating the suitability of nano-composites (G5351) and nano-structures (G4735) for security applications. Among the events hosted in 2017, the Advanced Study Institute “Quantum Nano-Photonics” (G5187) brought more than 60 researchers together to explore the potential interactions of quantum optics and modern semiconductors and nano-electronics. The lectures spanned from didactic introductions into the fundamental principles to the current state-of-the-art given by pioneers and leaders in the field.

Involvement of young scientists in advanced technologies activities is key and it is very much supported by SPS, as they contribute with fresh perspectives to push forward breakthrough ideas and technological innovation. SPS Programme offers young scientists an excellent opportunity to start their career, expand their network, have access to training opportunities, visit different laboratories and work together with leading experts in their field.

SPS projects related to security-related advanced technologies

A total of 15 new SPS projects (a top-down and 14 bottom-up) on security-related advanced technologies were approved.

Newly approved activities involve experts from Israel, Ukraine, Australia, the Republic of Moldova, Algeria, Finland, Bulgaria and the former Yugoslav Republic of Macedonia*.

Activities address themes such as UAVs, sensors and detectors, and nanotechnologies.

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Mine and Unexploded Ordnance Detection and Clearance

In the areas of mine and explosive ordnance disposal (EOD) and countering improvised explosive devices (C-IEDs), SPS Programme initiatives support not only the development of advanced technology, but also capacity building in partner countries. The goal of SPS activities is to set a working model often by providing an initial operational capability in partner countries with a train-the-trainer approach.

A number of SPS activities facilitates cooperation in capacity building for the partners. In 2017, the Programme responded to a political guidance from Allies upon a request from the Iraqi authorities to provide both equipment and expert training in Iraq. The SPS Project "Improvise Explosive Devices Disposal and Search Capacity Building for Iraq" acted as a rapid response to a critical capability gap and an immediate Iraqi priority to implement the post-conflict search and clearance requirements allowing the return of displaced populations (G5185). In February 2017, NATO began in-country training of Iraqi EOD personnel from the Ministry of Defence, Ministry of Interior and the Counter-Terrorism Service. A total of 100 Iraqi EOD personnel were trained and 154 kits of light-scale explosive ordnance disposal (EOD) equipment were delivered through the project.

Iraqi EOD personnel during a C-IED training session

The SPS Programme launched another capacity-building project in June 2017 as a follow-up C-IED effort (G5387) in Jordan. This initiative aims to support the development of a national C-IED policy, inter-agency doctrine, and a training curriculum. The SPS project also includes a comprehensive training package with the "train-the-trainer" focus. So far, a total of 83 experts from the Jordanian Armed Forces have been trained within the scope of the project. Such SPS activities provide tailor-made solutions based on a train-the-trainer approach to harness a multiplier effect and ensure the sustainability of the trainings.

In response to the Balaklia arms depot explosion in March 2017, the SPS Programme urgently responded to the assistance request of Ukraine. As a long-term response to landmine detection, another SPS project aims to develop a state-of-the-art digital ground penetrating radar system to detect mines, improvised explosive devices (IED) and explosive remnants of war (ERW). The device will provide a visual 3D image and automatically recognize the type of the detected object in up to three meters depth. Ultimately, this technology will allow faster, cheaper, and safer clearance of former conflict zones.

In 2017, the SPS Programme further stepped up its strong cooperation with NATO's partners in the South, and specifically in the MENA region. SPS conducted a dedicated C-IED training course for 15 Egyptian experts at the C-IED Centre of Excellence in Madrid, Spain (G4899). Through this SPS Programme initiative, NATO addresses a critical capacity gap of the Egyptian Armed Forces in explosive ordnance disposal. This training complements NATO's wider efforts to support Egypt in the area of mine and

SPS projects related to mine and UXO clearance

3 new SPS projects (2 top-down and 1 bottom-up) related to mine and UXO clearance were approved.

Newly approved activities involve experts from Bosnia and Herzegovina and Jordan.

Activities in 2017 involved research and training for explosive detection and C-IED capability building.

unexploded ordnance (UXO) detection. The SPS Programme previously supported a project that trained the Egyptian Armed Forces in detecting landmines quicker and more accurately. It equipped Egypt with minimum operational capacity on demining, and considerably reduced the duration of demining operations in the Egyptian Western Desert.

UNSCR 1325 on Women, Peace and Security

The implementation of United Nations Security Council Resolution 1325 on Women, Peace and Security (WPS) and related resolutions represents an important policy priority for NATO and partner countries. The SPS Programme has been supporting the WPS agenda since 2013 with a total of 13 activities. By engaging strategic partners on matters related to UNSCR 1325. SPS activities have made substantial contributions to key objectives of the WPS agenda and partnership goals while providing partners with opportunities for practical cooperation in line with NATO's strategic objectives.

Through its activities, the SPS Programme is providing an important platform for debate and exchange of views on lessons learned regarding the implementation of UNSCR1325 SPS activities in this field also allow for the engagement of young researchers and civil society.

SPS activities in this area were developed and implemented as part of key NATO partnership initiatives such as the Defence and Related Security Capacity Building Initiative and NATO's wider efforts to project stability. These include for instance a project to support the development of a National Action Plan for the implementation of UNSCR 1325 in the Republic of Moldova as part of the country's DCB Package. In Georgia, a new SPS multi-year project to conduct an organizational assessment with regard to gender equality in the Georgian Armed Forces was launched.

Last year also saw the implementation of a pilot training as part of a SPS efforts to support the development of gender awareness applications for the NATO community.

This second iteration of the pilot training was targeted at NATO officials and staff, as well as partner Delegations. In April, NATO Deputy Secretary General Rose Gottemoeller

In December 2017, NATO hosted a gender awareness pilot session as part of a SPS project led by Canada, the United States and Australia

SPS projects related to Women, Peace and Security

4 new SPS activities related to Women, Peace and Security were approved.

Newly approved activities involve experts from Georgia, Switzerland, the United Arab Emirates, Ukraine and Japan.

Activities in 2017 involved a pilot training on gender awareness at NATO HQ as well as a high visibility event with NATO DSG as keynote speaker in San Diego.

also spoke at a SPS-supported high visibility event on WPS in San Diego, attracting a large audience.

In November 2017, Allies in the PCSC received a report on SPS cooperation in support of the WPS agenda, taking stock of activities in this field to date, its outcomes and contribution to NATO's strategic objectives.

SPS activities in this area are closely coordinated with the Office of the Secretary General's Special Representative on Women, Peace and Security and are in line with the NATO/EAPC Policy and Action Plan on Women, Peace and Security.

SPS Events in 2017

Throughout 2017, a total of 24 SPS-supported events took place in NATO and partner countries. While the majority of these were Advanced Research Workshops, the SPS Programme also provide tailor-made training through its Advanced Training Courses. Moreover, young scientists in particular got the chance to engage with researchers and lecturers of high international standing at SPS-supported Advanced Research Institutes. Annex 2 provides a complete list of SPS-supported events that were hosted over the last year.

Apart from these SPS events supported by SPS grants, the Programme also organises and participated in meetings throughout the peer-review and approval process of SPS activities.

Meetings of the Independent Scientific Evaluation Group (ISEG)

In 2017, three meetings of the Independent Scientific Evaluation Group (ISEG) were held in Brussels. The first one took place 1-2 February, the second one on 19-20 June and the last one on 25-26 September. Composed of 37 experts and scientists from NATO countries, the main role of ISEG is to evaluate the scientific and technical value of the applications received through peer-review. The ISEG is also following and evaluating ongoing SPS projects in their area of expertise as so-called 'godparents'. This direct involvement of the scientific community is invaluable in maintaining the integrity and high scientific standard of the Programme. In 2017, a total of 126 SPS applications were reviewed by ISEG members, of which 66 were recommended to the Allies.

ISEG Meeting, Brussels, September 2017

During the meetings, invited applicants presented their SPS proposals to the ISEG, and SPS staff provided regular updates on the implementation of the SPS Programme and its flagship projects. ISEG members also shared updates and summaries on the implementation of SPS activities that they had visited as an evaluator.

Selected ISEG members have also been invaluable in designing and supporting the 2017 SPS Special Call for Proposals on Cyber Defence. They helped to identify focus areas of future research in this area and took part in a thorough evaluation of the applications received in response to the call.

ISEG experts meet regularly to evaluate project proposals

PCSC Meetings

In 2017, the Partnership and Cooperative Security Committee (PCSC) met ten times under the Chairmanship of ASG ESCD Ambassador Sorin Ducaru and DASG ESCD Jamie Shea to discuss SPS award recommendations and related business. During these meetings, Allies were presented with and approved 65 SPS award recommendations for funding. Allies also provided important guidance and directions for the implementation of the SPS Programme. This included for example the approval of the annual SPS Work Programme and the nomination and selection of new ISEG members. Furthermore the PCSC is updated regularly on ongoing projects and on the results of completed SPS activities.

ASG/ESC, Ambassador Sorin Ducaru, chairs his last meeting of the Partnerships and Cooperative Security Committee in October 2017

Inter-Ministerial Meetings

In 2017, the SPS Programme took part in various meetings with inter-ministerial delegations from partner countries in the MENA region. These visits from partner country delegations served to raise awareness of opportunities for practical cooperation under the SPS Prgroamme and allowed for a discussion of concrete proposals for potential future SPS activities. Furthermore, priority areas of cooperation in the context of Individual Partnership Action Plans (IPAPs) and Individual Partnership Cooperation Plans (IPCPs) between partner countries and NATO, including in the context of SPS were raised at these meetings. SPS participation in inter-ministerial talks are closly coordinated with the NATO PASP Divisision, MENA Section.

Experts Meeting with Algeria

On 9 March 2017, representatives from the Algerian Ministry of Defence, the Algerian Ministry of Foreign Affairs and Algerian Academia convened with experts from French and Belgian Universities to discuss possible Algerian cooperation within the framework of the SPS Programme. During the meeting several project proposals were discussed and consolidated, linking them to different research projects in NATO countries and elaborating on the selection criteria of the ISEG evaluation.

Experts from Algeria, France and Belgium discussed project proposals in the framework of the SPS Programme

As a follow-up to this meeting Algeria and France successfully initiated a SPS project in the field of advanced technologies with security applications, which was kicked off in October 2017 at the NATO Headquarters. The project will develop an innovative detection system of hazardous objects in order to increase the technological and scientific capacity of Algeria in the fight against terrorism.

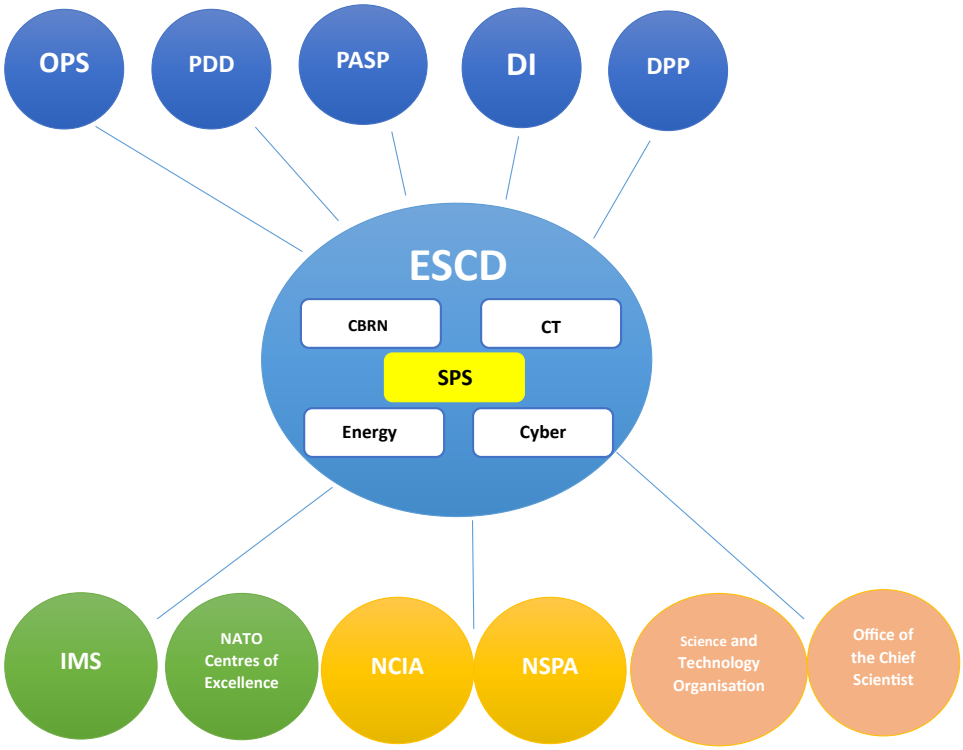
CHAPTER 5

Cooperation with NATO Bodies and International Organizations

Cooperation and Coordination with NATO Bodies

Coordination and cooperation with other NATO bodies, agencies, divisions and delegations is of vital importance for the successful implementation of the SPS Programme. The Programme has an established, fruitful cooperation with the Science and Technology Organization (STO) and the Office of the Chief Scientist. This cooperation comprises programmatic coordination, such as the inclusion of two STO representatives in the ISEG, as well as, on a case by case basis, practical collaboration on concrete SPS activities. The Senior SPS Programme and Partnership Cooperation Advisor is an ex-official of the Science and Technology Board (STB).

The SPS Programme is regularly consulting with other NATO Divisions and Offices (e.g. the Office of the NATO Secretary General's Special Representative on Women, Peace and Security) in the development of new SPS top-down activities as appropriate, making sure that they are aligned with NATO's strategic objectives and political priorities. The Programme also greatly benefits from the expertise within individual sections of the ESC Division, including notably the Cyber Defence, Energy Security, and Counter Terrorism Sections.



Beyond the Headquarters, the SPS Programme regularly works together with NATO agencies such as the NATO Support and Procurement Agency (NSPA) and the NATO Communication and Information Agency (NCIA), as well as with the NATO School in Oberammergau, Germany to develop high-quality SPS projects.

In 2017, the SPS Programme continued to draw on the expertise of NATO-accredited

The C-IED Centre of Excellence led training activities in Iraq

Centres of Excellence (CoE) such as the Counter Improvised Explosive Devices (C-IED) CoE in Spain, and the Joint Chemical, Biological, Radiological and Nuclear (CBRN) Defence CoE in the Czech Republic.

The C-IED CoE has supervised the training activities within the framework of the project 'IED Disposal and Search Capacity Building for Iraq'. The Iraqi Security Forces participated in a series of C-IED courses in the third and final training cycle that took place at the Iraqi Ministry of Defence Bomb Disposal School in Besmayah.

In November, the C-IED CoE hosted an IED training for 15 experts from the Egyptian Armed Forces to collect, assess and disseminate information and intelligence on improvised explosive devices. In December, the NATO Joint CBRN Defence CoE supported the delivery of a tailor-made CBRN defence training course to a group of experts from Kuwait at the NATO-ICI Regional Centre.

Cooperation with International Organisations

The SPS Programme regularly engages with other international organisations (IOs) in order to foster dialogue and cooperation. In 2017, practical cooperation with the United Nations (UN), the Organization for Security and Cooperation in Europe (OSCE), and the European Union (EU) contributed to enhancing international security and complementarity of efforts. In regular staff-to-staff talks all IOs emphasized a need for continued coordination and discussions, and recognized the value of this exchange in order to enhance synergies and avoid duplication of work.

United Nations (UN)

SPS cooperation with the UN and its related Agencies continued throughout 2017. NATO-UN experts met to discuss possible future areas of cooperation on the Women, Peace and Security agenda. UN Women staff attended an SPS workshop in Chisinau, Republic of Moldova in May 2017 to take stock and discuss the progress and challenges related to the Republic of Moldova's National Action Plan on Women, Peace, and Security.

In 2017, cooperation with the United Nations Mine Action Service (UNMAS) was maintained. UNMAS was consulted and has provided its expertise within the framework of the SPS flagship project to train and equip Iraqi Security Forces in the area of C-IED.

Organization for Security and Cooperation in Europe (OSCE)

In March 2017, the OSCE participated in the SPS workshop 'Jordanian Armed Forces Symposium on Border Defence'. The workshop provided a platform to develop a shared understanding of Jordan's border defence strategy, objectives, and challenges. The event was successful in initiating a dialogue to encourage effective synchronization of Allied and bilateral border assistance to Jordan.

European Union (EU)

In line with the EU-NATO Ministerial Declaration of July 2016, NATO and EU staff exchanged information on several occasions on SPS activities with selected partner countries, namely Bosnia and Herzegovina, the Republic of Moldova and Tunisia.

An important example of cooperation with the EU is given by the multi-year project "Resilient Civilians in Hybrid and Population-Centric Warfare" approved in 2017.

The project involves, among a large number of stakeholders, the European Centre of Excellence for Countering Hybrid Threats, established by the EU with NATO support and inaugurated in October 2017 with the key involvement of NATO SG and EU High Representative Federica Mogherini. This project will provide NATO with an opportunity to understand better how civilian resilience can help nations prevent and mitigate their consequences.

African Union (AU)

Following the agreement of NATO heads of State and Government in May 2017 on enhancing NATO's contribution to the international community's fight against terrorism, engagement with the African Union was reinforced on the counter terrorism practical cooperation. An SPS experts meeting took place in December at the African Union affiliated African Centre for the Research and Study of Terrorism, in Algiers, with a view to explore cooperation in Countering Terrorism Education and Training and Countering Improvised Explosive Devices.

CHAPTER 6

Public Diplomacy

Thanks to its focus on practical cooperation, capacity-building and collaboration with scientists and civil society, the NATO SPS Programme holds significant public diplomacy value. It helps to balance the primarily military perception of the Alliance and demonstrates the tangible impact and benefit of NATO's partnerships. As a result, SPS activities enjoy a high degree of visibility, both in NATO and partner countries. Moreover, the Programme seeks to promote key projects, especially top-down flagship initiatives with a visible, political, and strategic impact in partner countries.

To this end, the SPS Programme is cooperating closely with the Public Diplomacy Division and is making active use of all communication tools at its disposal, including social media.

Visibility of SPS Activities

- SPS projects in NATO crisis management exercise
- Highlighting SPS cooperation with Ukraine
- Launching new public diplomacy tools
- Active Twitter Presence
- Attracting mainstream media coverage
- SPS Information Days & other outreach events

Public Diplomacy Highlights 2017

SPS participation in EADRCC Exercise – September 2017

ASG/ESC Ambassador Sorin Ducaru and Romanian State Secretary Dr. Raed Arafat witness a live demonstration of the telemedicine system at the EADRCC exercise

Over five days, around 1200 participants from NATO and partner countries tested international cooperation and interoperability in disaster response, including water rescue and CBRN detection, protection and decontamination.

The exercise provided the opportunity to test and employ several projects supported by the SPS Programme. These include a capacity building project in the field of emergency response in the Western Balkans, by customizing and implementing the "Next Generation Incident Command System". Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia* and Montenegro each had teams testing the sharing platform for first responders during the exercise.

ASG/ESC, Ambassador Sorin Ducaru, as well as Under Secretary Bill Bryan and Science and Technology Director of Research and Development, Mr. Joseph Martin of the US Department of Homeland Security observed the exercise.

As in previous years, the exercise also included the testing of the telemedicine capabilities developed in a SPS project that will increase medical support in disaster-affected areas by remotely engaging medical experts from assisting nations.

The Exercise carried strong public diplomacy value and attracted considerable media attention. Most of the published news items focused on the EADRCC's role and the features of the exercise. A majority also highlighted the idea that strengthening interoperability between partners

and NATO countries benefits the ability to respond to natural disasters and emergencies and that effective cooperation and coordination during emergency situations benefits from joint multinational exercising. There was also broad coverage with quotes from the ASG ESC's press conference.

* Turkey recognizes the Republic of Macedonia with its constitutional name.

The SPS projects were highlighted in web stories on the NATO website, a video produced by NATO TV, on social media as well as in mainstream media.

For instance, the English-language news platform *OSCE BiH* published an article on the Exercise with a specific focus on the contributions of various SPS projects.

The Department of Homeland Security, Science & Technology (DHS S&T), issued a press release in the days leading up to the Exercise, highlighting the involvement of the NICS. Moreover, both the SPS Programme and DHS S&T covered the exercise on their respective social media accounts, showing photos from the field.

The SPS projects involved in the EADRCC exercise received attention on social media, including from the US Department of Homeland Security, Science & Technology

Launch of an Interactive Map for the SPS Programme

2017 also saw the launch of a new interactive map, showcasing a number of ongoing or recently completed SPS activities with various NATO partner countries. Developed in cooperation with PDD, the map is a user-friendly tool to explore SPS cooperation across the world, provides a good overview of possible areas of collaboration, and contains interesting background information about the link of SPS activities with NATO's strategic objectives and political priorities. In order to promote the map, a promotional

The new interactive map of the SPS Programme invites users to explore SPS cooperation across various partner countries

email was sent to more than 12,000 recipients. Comparing these promotional efforts to other NATO outreach/newsletter emails, the SPS map performed very well. Moreover, the SPS Programme worked together with the NATO PDD/Social Media to highlight the SPS map as part of a series entitled '#MapMonday' where an engaging photo and a short question are combined to invite users to find the answer by exploring the map.

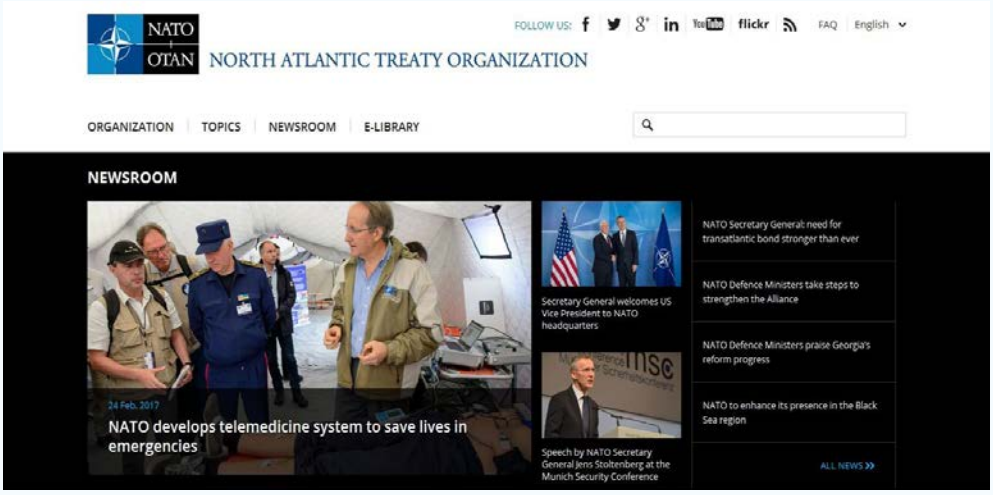
The map will be updated on a regular basis in the future to feature a wide selection of current SPS activities.

Telemedicine demo and book talk at NATO HQ – 24 February 2017

As the SPS project to develop a multinational telemedicine system for disaster response neared its successful completion, a book discussion and closing conference for the project took place on 24 February 2017 at NATO HQ.

A large number of participants attended the book discussion and live demonstration of the telemedicine system at NATO HQ

The event attracted high-level participants, including H.E. Iurie Renita Ambassador of the Republic of Moldova to NATO, Dr. Olga Bogomolets (Chair of the Committee of the Verkhovna Rada of Ukraine on Heath Care & Advisor to the President of Ukraine on Humanitarian Issues), and Dr. Lasse Ilkka from the Ministry of Social Affairs of Finland. Dr. Raed Arafat, State Seceretary at the Ministry of Internal Affairs of Romania, and Prof. Charles Doarn from the University of Cincinnati presented the main results and outcomes of the telemedicine projects and presented the book. A photo display and live demonstration of the telemedicine capabilities were also part of the event.



NATO's main website featuring an article on the SPS telemedicine project on its front page

In addition to attracting a considerable audience from across NATO, the event also resulted in substantial media coverage, including both mainstream media in, for instance, Romania, and specialised outlets such as ICT & Health or mHealthIntelligence.com, a platform for mobile health news. The project was also featured on the main NATO homepage.

Visit of ASG/ESC to Ukraine 3-5 July 2017

In July 2017, ASG/ESC, Ambassador Sorin Ducaru, travelled to Kyiv. His visit generated substantial media coverage, especially in the context of SPS cooperation with Ukraine. ASG/ESC observed demonstrations of SPS projects, co-chaired the 15th meeting of the Joint NATO-Ukraine Working Group on Scientific and Environmental Cooperation, and had several media engagements.

The meeting of the Joint Working Group was preceded by a joint press point with Deputy Minister Strikha. The directors of the SPS project developing a 3D mine detector further demonstrated a prototype, attracting strong media attention.

During the meeting of the 15th Joint NATO-Ukraine Working Group on Scientific and Environmental Cooperation, participants exchanged views regarding several

The prototype demonstration of the 3D mine detector developed under a SPS CAP project, attracted strong media attention at the press conference in Kyiv

ASG/ESC Ambassador Sorin Ducaru and SPS staff briefed Ukrainian Deputy Minister of Science and Education, Dr Maxim Strikha and Ukrainian representative on SPS cooperation with Ukraine

Science for Peace and Security (SPS) projects. These projects address a wide variety of emerging security challenges such as counter-terrorism, cyber defence, and the detection and clearance of mines and unexploded ordnance, with the aim of forging networks, supporting capacity-building and helping the country to deal with the negative effects of the Russia-Ukraine crisis.

Apart from highlighting SPS cooperation with Ukraine, the visit by ASG/ESC also served to mark the first achievements of the NATO cyber defence Trust Fund for Ukraine and to celebrate the 20th anniversary of the Charter on a Distinctive Partnership between NATO and Ukraine at the Verkhovna Rada.

SPS Website

SPS Website

The SPS website (www.nato.int/science) is the main point of reference for up-to-date information and news about the SPS Programme and provides access to all necessary forms for applicants and SPS grantees.

2017 saw a major reorganization of the SPS website with a view towards making information more easily accessible and providing more resources. For instance a number of publications are now available online, including reports produced as a result of SPS activities, various SPS flyers and brochures, as well as detailed information about the NATO Science Series. Following the make-over, upcoming SPS events have also become more visible and are now presented in a calendar of events.

Throughout 2017, a total of 16 SPS news stories were published on the SPS website. Several news stories about SPS flagship projects were also featured on the NATO main homepage.

NATO TV

In 2017, The SPS Prgoramme continued to work together with NATO TV to highlight the practical applications and tangible outputs such as proto- or demo-types, resulting from SPS projects. A total of 5 videos highlighting SPS activities were produced by NATO TV in 2017:

- *Enhancing Civil Emergency Response in the Western Balkans.* This video was produced following the launch of the NICS project and included i.a. interviews the Ambassador of the former Yugoslav Republic of Macedonia* to NATO, ASG/ESC Ambassador Sorin Ducaru, and the Director of the First Responders Group (FRG) in the Science and Technology Directorate, U.S. Department of Homeland Security (DHS), Daniel Cotter. Accessible at: https://www.youtube.com/watch?v=7Ox1Bl9ME-w
- *NATO Counter-IED instructors deploy to Iraq.* This clip featured the SPS-supported project providing C-IED training and equipment as part of the DCB Package to Iraq. With more than 6,600 views, this was the most-watched video on a SPS project in 2017. Accessible at: https://www.youtube.com/watch?v=7Ox1Bl9ME-w
- *Countering the evolving threat of improvised explosive devices (C-IED).* Another video produced by NATO TV that featured the SPS DCB project on C-IED in Iraq. Accessible at: https://www.youtube.com/watch?v=ItTiyHSsdBY
- *NATO and Jordan cooperate on Cyber Defence.* An interview with the Head of the NATO Cyber Defence Section on the completed SPS project in Jordan which resulted in the inauguration of the Computer Emergency Response Team (CERT). Accessible at: https://www.youtube.com/watch?v=zuSZAWUZKxs
- *Innovations in Disaster Relief.* This video presented a number of innovative solutions tested at the EADRCC disaster response exercise in Tuzla, Bosnia and Herzegovina, including the SPS NICS project and telemedicine capabilities. Accessible at: https://www.youtube.com/watch?v=j5n3BPhI2Mc

The SPS Programme on Social Media

In 2017, the SPS Programme continued to engage on social media, especially through its Twitter account @NATO_SPS.

SPS activities, including the Information Day in the Netherlands, were promoted on Twitter, reaching a large audience

The Twitter presence of the SPS Programme serves to update interested stakeholders on ongoing SPS activities, upcoming events, and important policy developments, and serves to promote the SPS Programme in general. Following the creation of the SPS account in 2014, a more strategic approach has been adopted in recent years to enhance the impact and reach of the account. Where possible, posts are aligned with SPS-related milestones, key NATO events, and meetings of high-level NATO representatives with partner countries. Similarly, tweets are coordinated with NATO's Social Media team and multipliers, such as NATO Delegations and Missions or SPS-supported researchers and universities. Most tweets were accompanied with visuals, such as photos or infographics. The graphic below was developed to promote the publication of the SPS Annual Report 2016 and was the top media tweet in July.

In 2017, the number of followers of the SPS Twitter account continued to rise throughout the year, as almost 1000 new Twitter users are now receiving SPS updates, bringing the total to around 2900 by the end of the year. The main audience on Twitter remained scientists, experts, think tankers, interested individuals and Delegations of NATO and partner countries. SPS-related updates were shared on a regular basis, with a new post added or retweeted about four times (3.8) per week on average.

The most successful tweet in 2017 promoted a video on the SPS project to implement the Next Generation Incident Command System in the Western Balkans. A tweet on the SPS Information Day in the Netherlands also received substantial attention.

* Turkey recognizes the Republic of Macedonia with its constitutional name.

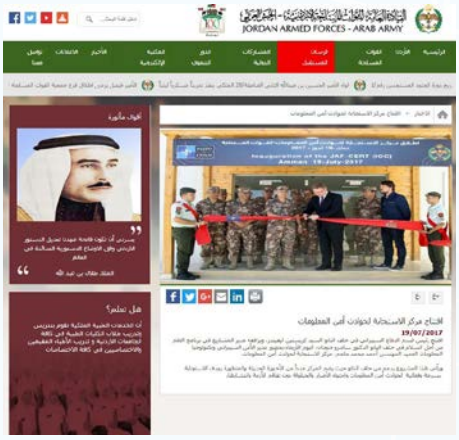
Mainstream Media Coverage

In 2017, SPS activities continued to attract considerable media attention by mainstream outlets, international, regional as well as local press.

In Jordan, the inauguration of a SPS-supported CERT resulted in substantial media coverage, both by national TV and online outlets, as well as on the homepage of the Jordanian Armed Forces.

The US Department of Homeland Security, Science and Technology Directorate, highlighted the involvement of the Next Generation Incident Command System (NICS) in the EADRCC civil emergency response exercise on its homepage.

Moreover, SPS project directors are increasingly promoting their projects by reaching out to national or local media outlets, through online platforms and through social media. This included for instance articles on the website of the California State University, the University of California, Irvine and the IMDEA Networks Institute.



Many SPS flagship projects were covered by the media in both NATO and partner countries, as this example from Jordan shows

Annex 4 contains a non-exhaustive list of mainstream media coverage in 2017.

A number of SPS grantees also maintain a website or social media account for their activity. For example, the directors of a SPS project studying the role of small states in international security are making their series of policy briefs available to the public on their website (http://www.canterbury.ac.nz/arts/research/ssanse/), and a multi-year effort to develop a sensor capable of detecting illicit trafficking of nuclear materials across borders using nuclear screening systems is promoting their work both on a dedicated website and via Twitter (http://www.e-sicure.science/ and https://twitter.com/e_sicure).

Science Publications, Country Flyers & Other SPS Publications

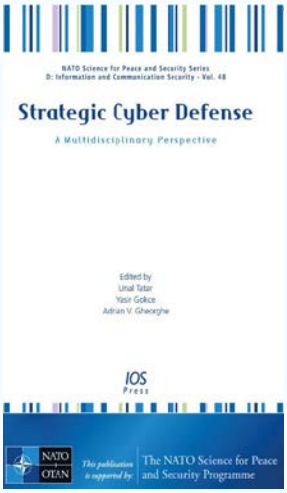
The SPS Programme maintains various publications, flyers and brochures to inform the public about its activities, eligibility criteria and application and selection processes. This information material comprises both leaflets with general information about the Programme, as well as project-specific publications to highlight selected SPS projects.

In 2017, this included notably a SPS leaflet created for the NATO Week at the NATO-ICI Regional Centre in Kuwait. On the same occasion, an info sheet on the SPS flagship project customizing and implementing an emergency coordination system in the Western Balkans (NICS) in cooperation with the MIT Lincoln Laboratory and the US

Department of Homeland Security, Science & Technology, was translated into Arabic.

All 41 SPS country flyers providing information about selected SPS activities with individual partner countries were thoroughly updated in the course of 2017 and made available on the SPS website. Another, general SPS information leaflet also underwent substantial revisions and updates.

Moreover, the results of various SPS-supported workshops and training courses were published in the NATO SPS Science Series. In total, 19 books were issued in 2017, with the majority of these addressing human and societal dynamics of security.



The NATO SPS Science Series allows project directors to publish the proceedings of SPS events with IOS Press and Springer

SPS Information Days 2017

SPS Information Days have become an established forum to raise awareness of the Programme and bring together scientists, experts and government representatives to discuss potential future SPS collaboration. Information Days are taking place in both NATO and partner countries. In 2017, the Programme engaged with key stakeholders in five countries on opportunities for SPS Cooperation.

The Netherlands – 15 March 2017

ASG/ESC, Ambassador Sorin Ducaru opens the SPS Information Day in The Hague, The Netherlands

The Netherlands and NATO's SPS Programme look back at years of fruitful cooperation. Previous SPS projects have already led to exploring common solutions to various security challenges, for instance on clearing unexploded ordnance in Egypt and Montenegro. Other SPS activities with the Netherlands have provided policy recommendations on the development of counter-terrorism strategies.

On 15 March 2017, Dutch scientists and experts offered their insights on new ways to address emerging security challenges during a SPS Information Day held in The Hague. Organised in cooperation with the Permanent Representation of the Netherlands to NATO and the Ministry of Foreign Affairs of the Netherlands, the SPS Information Day provided an opportunity for partners to build networks with Dutch scientists and to discuss potential new SPS initiatives. ASG/ESC, Ambassador Sorin Ducaru, and Deputy Permanent Representative of the Netherlands to NATO, Mr Michel Rentenaar, opened the event.

Current and past SPS grantees from the Netherlands were also able to speak about their past projects and experience with the SPS Programme. Dutch scientists and 60 participants from NATO partner nations, including experts from Serbia, attended the event.

Bosnia and Herzegovina – 19 May 2017

In May, scientists and other experts from Bosnia and Herzegovina offered their insights into new ways of addressing emerging security challenges during a SPS Information Day held in Sarajevo. Organised together with the Mission of Bosnia and Herzegovina to NATO and the Ministry of Foreign Affairs of Bosnia and Herzegovina, the event allowed to build networks and explore further joint cooperative projects. Grantees from Bosnia

and Herzegovina, the Netherlands and the United States who had previously worked with the SPS presented their projects and experience with the Programme.

The discussions highlighted the impact of cooperation between the country and NATO's SPS Programme that has amongst others developed solutions to shared security concerns in the areas of cyber defence, counter-terrorism and unexploded ordnance (UXO) detection. Bosnia and Herzegovina is also involved in a key SPS flagship project which is supporting capacity-building in the area of emergency response and management in the Western Balkans region.

The SPS Information Day in Sarajevo provided a platform to discuss SPS cooperation with Bosnia and Herzegovina

Norway – 14 June 2017

Scientists and experts from Norway and NATO partner countries discussed opportunities for practical cooperation to address common emerging security challenges during a Science for Peace and Security (SPS) Programme Information Day held in Oslo on 14 June 2017. Previous, successful cooperation between Norway and NATO's SPS Programme includes activities in the areas of Women, Peace and Security and unexploded ordnance (UXO) detection.

Organised in cooperation with the Norwegian Delegation to NATO and the Norwegian Research Council, the SPS Information Day provided an opportunity to exchange on possibilities for capacity-building and research cooperation with partners in defence and advanced technologies such as cyber defence, unmanned aerial vehicles (UAV) technology and chemical, biological, radiological and nuclear (CBRN) defence. Human and social aspects of security, including civil-military relations, counter-terrorism and Women, Peace and Security were a focus of discussions.

Rune Resaland, Head of Department for Security Policy and the High North, Norwegian Ministry of Foreign Affairs and DASG/ESC, Dr. Jamie Shea opened the Info Day. A number of representatives from NATO partner countries also attended the event. SPS project directors, including the team working on an ongoing effort to develop a 3D mine detector with Ukraine, shared their experience of working with the SPS Programme with the participants.


The SPS Information Day in Oslo attracted a large number of interested researchers from Norway along with representatives from the Norwegian government and partner countries to learn about SPS cooperation

Iceland – 24 August 2017

In August 2017, the University of Iceland hosted a SPS Information Session at its premises. The event served to raise visibility of the SPS Programm and to highlight opportunities for collaboration.

The Dean of both the School of Engineering and Natural Sciences, Mr. Sigurdur Magnus Gardarsson, and the School of Social Sciences, Mr. Dadi Mar Kristofersson, spoke at the event.

Iceland is currently leading one SPS project studying the role of small states in international security and the information session aimed at expanding the engagement of Icelandic scientists in the Programme.


Researchers from the University of Iceland attending an information session on the SPS Programme

Kuwait – 18-19 September 2017

The NATO-ICI Regional Centre in Kuwait hosted the NATO Week and SPS Information Day in September

Senior SPS Adviser Dr. Deniz Beten with Sheikh Fawaz al Sabah, Acting Head of Information and Security Follow-up Sector at the National Security Bureau of Kuwait

As part of the Opening Week of the NATO-ICI Regional Centre in Kuwait in September 2017, a two-day SPS Information session was organised. The event served to spread information about the Programme among key stakeholders and identified concrete steps towards enhanced practical SPS cooperation with ICI countries.

Government officials, policy officers, representatives from academic and private institutions and experts from both NATO, ICI countries and other states of the Gulf Cooperation Council (GCC) attended the event, which enabled the initiation of new activities in priority areas of cooperation. Tailor-made SPS advanced training courses in the domains of cyber defence, energy security as well as defence against CBRN agents were developed. The courses will deepen collaboration, forge networks among experts and enhance security and defence capacities of ICI countries through tailored support. While Kuwait has been a member of the ICI framework of cooperation, launched in 2004, these will be the first concrete activities in the framework of the SPS Programme.

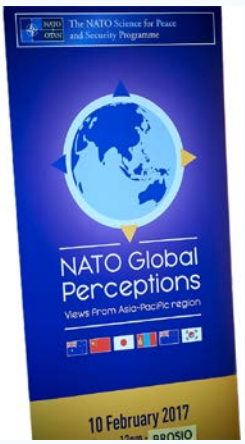
The Opening Week of the NATO-ICI Regional Centre also provided the opportunity to review the Individual Partnership Cooperation Programme with Kuwait. The bilateral document aims to deepen cooperation with the country and sets out the framework for Kuwait's collaboration with NATO.

Visibility of SPS Activities in NATO & Partners Countries

Throughout 2017, the SPS Programme actively participated in events and conference to raise the profile of its activities in NATO and Partner countries. At the same time, the project directors of several SPS initiatives supported and contributed to outreach and visibility efforts. Moreover, SPS cooperation was highlighted on the occasion of several visit by high-level NATO representatives. For instance, during the visit of DSG Rose Gottemoeller to Serbia in November 2017, the Serbian Prime Minister highlighted the strong and successful cooperation within SPS, a testimony to the strong public diplomacy value of the Programme.

NATO Global Perceptions - Views from the Asia-Pacific Region - 10 February 2017

Between 2014 and 2016, the SPS Programme supported an 18-month project researching the perception and image of NATO in the Asia-Pacific region. On 10 February 2017, the final conference of this SPS project, organised in cooperation with NATO PDD, took place at NATO HQ. It presented the results of the comprehensive study that looked at the views and perceptions of NATO in Australia, New Zealand, Japan, South Korea, Mongolia and China. Three researchers from the region, as well as the NATO country director from Estonia presented their findings at the event which was also attended by ASG/ESC, Ambassador Sorin Ducaru, and the Deputy



An international team of researchers studied the perception of NATO in the Asia-Pacific region

Ambassador of the Embassy of New Zealand to Belgium. In total, the conference brought together 60 participants from across the NATO HQ. The results of the SPS project were later also published in a special issue of the renowned Asian Security Journal.

NATO Deputy Secretary General participation in SPS-supported event on Women, Peace and Security – 27 April 2017

In April 2017, the directors of the SPS project to develop Gender Awareness Applications for the NATO Community (G5080) organised a high-visibility event at the University of San Diego on Gender Awareness in the Security and Defense Field. NATO Deputy Secretary General (DSG) Rose Gottemoeller delivered the keynote address.

Poster announcing the keynote of DSG Rose Gottemoeller in the SPS-sponsored event

The event brought together members of the security and defense sectors, students, academics and leading global practitioners. Together, they analysed how greater gender awareness can enhance operational effectiveness for military operations and discussed best practices, challenges and lessons-learned in building gender awareness across national and transnational organizations. At the same time, the event provided an opportunity to highlight and pilot new research and gender training protocols developed by a multinational team of researchers through the SPS project.

National Technology Parade at the German Jordanian University – 4 May 2017

Young scientists involved in a SPS collaboration between Italy and Jordan entitled “Hybrid Sensor Networks for Emergency Critical Scenarios” (G4936) presented their work at the 10th National Technology Parade hosted by the German Jordanian University in Amman in May 2017. They received both visibility and an award for their work.


These two researchers working for a SPS grantee in Jordan received an award for their work at the National Technology Parade in May

Two young researchers participating in the SPS project won the industrial relationship award for their research in a competition held on the level of all the Jordanian Universities for students' graduate projects as part of the Parade. Other young scientists involved in the project also made it into the final round of the competition.

NATO Committee on Gender Perspectives – 30 May – 2 June 2017

On 30 May 2017, the SPS Programme presented an overview of its activities in the area of Women, Peace and Security to the NATO Committee on Gender Perspectives. Moreover, the project directors of several SPS projects in support of the Women,

Peace and Security agenda spoke at the event and provided insights into their work and research results. Deputy Assistant Secretary General (DASG) Dr. Jamie Shea further chaired a public panel with gender experts as part of this event.

The annual conference brought together the gender representatives from NATO member states, partner countries, international organisations and academia under the theme of “Beyond the Stereotypes – Integrating Gender Perspectives in Projecting Stability”. In total, the more than 100 participants gathered for this event at NATO Headquarters.

Participants and speakers at the 2017 NATO Committee on Gender Perspectives included SPS staff and project directors as well as DASG/ESC Jamie Shea.

Participants and speakers at the 2017 NATO Committee on Gender Perspectives included SPS staff and project directors as well as DASG/ESC Jamie Shea

CHAPTER 7

The SPS Programme in 2018 - The Way Ahead

In 2018, the SPS Programme will continue to support NATO partnership priorities and strategic objectives through practical cooperation. The Programme will take into consideration the outcomes and political guidance resulting from the **NATO Brussels Summit** in July 2018. The implementation of SPS activities will be carried out in line with the 2018 SPS Work Programme, taking into account the political and strategic priorities of NATO and the guidance received by Allies at the January 2018 **North Atlantic Council** meeting on the SPS Programme.

Supporting NATO's Strategic Objectives

In 2018, the SPS Programme will maintain a balanced approach and be open to cooperation with all partners, reflecting the 360-degree approach of the Alliance. The Programme will continue to **project stability** by supporting the fight against terrorism, enhancing practical regional cooperation, and continuing to implement activities for a number of defence and related capacity building (DCB) packages.

The SPS Programme aims to support the Alliance's efforts in the **fight against terrorism** through new SPS activities, also resulting from the SPS *Special Call for Proposals on Counter-Terrorism*. These will include development of advanced technologies to address terrorist threats, such as the follow-on to the standoff detection of explosive devices programme, as well as human and social aspects related to counter-terrorism.

The Programme will continue to foster **regional cooperation** on security-related issues, notably with the Western Balkans, MD and ICI countries, thereby encouraging cooperation among partners. In particular, the SPS Programme will implement tailor-made training activities for all ICI partners at the NATO-ICI Regional Centre in Kuwait.

The SPS Programme will develop new **capacity-building** initiatives with partners such as Tunisia, Algeria, Iraq and Egypt on priority areas of cooperation, and in coordination

Highlights and Foreseen Activities from the SPS 2018 Work Programme:

- A follow-on consortium to the standoff detection of explosive devices programme.
- A hands-on cyber defence training for a group of Iraqi system and network administrators followed by an advanced-level training.
- An advanced research workshop on countering violent extremism, led by Spain and United Arab Emirates.
- A package of tailor-made SPS training courses in the areas of CRBN defence, energy security, and cyber defence for all ICI countries, in partnership with the NATO-ICI Regional Centre in Kuwait.
- The 2018 Innovative Energy Solutions for Military Applications (IESMA) Conference, led by Lithuania and Georgia.
- A multi-year project to conduct an assessment of gender integration in the Georgian Armed Forces.

with the Hub for the South. In 2018, these will notable include activities on cyber defence, C-IED training, and UNSCR 1325 on Women, Peace and Security.

SPS Programme Outreach

The SPS Programme will continue to make use of all public diplomacy tools at its disposal, including social media, and will continue to collaborate with the Public Diplomacy Division (PDD) with a view towards enhancing the visibility of the SPS Programme and its activities. In 2018, the **60th Anniversary of the SPS Programme** will provide excellent opportunities for public visibility events and specific communication efforts. Activities surrounding the 60th anniversary will be closely coordinated with NATO Archives and PDD.

For the 60th anniversary contributors, affiliates and supporters of the SPS Programme from today and the last decades will gather in the new NATO Headquarter on the 29th of November for a celebratory event at the occasion of this remarkable milestone in the history of the Programme. Keynote speaker will share their personal experience with SPS related activities and high level NATO officials will recall the Programme's history and relevance. Furthermore the anniversary will be accompanied by several publications and will be closely followed on the respective Social Media accounts.

Annex 1: New SPS Activities Approved by PCSC in 2017

Security Area	Key Priority	SPS Reference	Top-Down	Grant Mechanism	Title	NATO Country	Partner Country	Other Countries	Partnership Framework
CT	1.a.	G5356		ARW	Emerging Technologies for Determining Identity in the Context of Security	GBR	SWI		EAPC
CT	1.a.	G5361		MYP	Technology of High-Selective Imprinted Nanoantenna for Explosives Detection	GBR	UKR	ESP	NUKR
CT	1.a.	G5370		ARW	Enhancing Women's Roles in International Countering Violent Extremism Efforts	ESP	ARE		ICI
CT	1.a.	G5385		ARW	Risk Management of Terrorism Induced Stress - Guidelines for the Golden Hours (Who, What and When)	NLD	UKR		NUKR
CT	1.a.	G5391		ATC	Countering Terrorism: Trainings and Informative Operations	BEL	ISR		MD
CT	1.a.	G5395	×	MYP	Microwave Imaging Curtain	FRA	UKR	KOR	EAPC
CT	1.a.	G5401		ARW	Defence Againts Terrorism: Enhancing Resilience of Democratic Institutions and Rule of Law	ITA	FYR*		EAPC
CT	1.a.	G5423		MYP	Portable Sensors for Unmanned Explosive Detection	ITA	AZE		EAPC
CT	1.a.	G5438		ARW	Black Swans on the Eastern Flank	ROU	GEO		EAPC
CT	1.a.	G5439		ATC	Critical Infrastructure Protection - Best practices and Innovative Methods of Protection	POL	MAR		MD
ES	1.b.	G5233		MYP	Portable Energy Supply	NOR	UKR		NUKR
ES	1.b.	G5308		ATC	Critical Energy Infrastructure Security Course	LTU	UKR	CZE	NUKR
ES	1.b.	G5320		MYP	Radiation Hormesis for Higher Microalgae Biofuels Yield	GBR	SRB	USA	EAPC
ES	1.b.	G5330		MYP	Functional Textiles for Uniforms	USA	UKR	GBR	NUKR
ES	1.b.	G5519	×	ATC	NATO-ICI Regional Centre Kuwait – Critical Energy Infrastructure Protection Course	DEU	KWT		ICI
CYBER	1.c.	G5172		ARW	Cyber Defence in Industry 4.0 Systems	BGR	FIN		EAPC
CYBER	1.c.	G5263		MYP	Analysis, Design and Implementation of an End-to-End 400km QKD Link	USA	ISR	ITA, PAK	MD
CYBER	1.c.	G5269		MYP	Flash Crowds Management via Virtualized Network Resources (FALCON)	CAN	FYR*		EAPC

Security Area	Key Priority	SPS Reference	Top-Down	Grant Mechanism	Title	NATO Country	Partner Country	Other Countries	Partnership Framework
CYBER	1.c.	G5286		MYP	Cyber Rapid Analysis for Defense Awareness of Real-time Situation - CyRADARS	BGR	UKR	USA	NUKR
CYBER	1.c.	G5315		ASI	Logical Methods for Safety and Security of Software Systems (Summer School Marktoberdorf 2017)	DEU	ISR		MD
CYBER	1.c.	G5319		MYP	Threat Predict: From Global Social and Technical Big Data to Cyber Threat Forecast	FRA	MAR	USA	MD
CYBER	1.c.	G5331		ATC	Specialized Cyber Defence Trainings for Civil Servants of Serbia	EST	SRC		EAPC
CYBER	1.c.	G5340	✕	MYP	Development of the Moldovan Armed Forces Cyber Defence Capabilities	BEL	MDA	NLD	EAPC
CYBER	1.c.	G5371		ASI	Engineering Secure and Dependable Software Systems (Summer School Marktoberdorf 2018)	DEU	SWI		EAPC
CYBER	1.c.	G5400	✕	ARW	Cyber Defense Capacity Building in the Asia Pacific Region	DEU	JPN		EAPC
CYBER	1.c.	G5446		ARW	Security and Resilience of Information Systems Affected by Hybrid Threats	USA	UKR		NUKR
CYBER	1.c.	G5452	✕	ATC	Network Security, and Cyber Incident Handling & Disaster Response Courses	DEU	MAR		MD
CYBER	1.c.	G5521	✕	ATC	NATO-ICI Regional Centre Kuwait - Network Security Course	DEU	KWT		ICI
CYBER	1.c.	G5522	✕	ATC	NATO-ICI Regional Centre Kuwait - Network Vulnerability Assessment and Risk Mitigation Course	DEU	KWT		ICI
CBRN	1.d.	G5291		MYP	A Novel Method for the Detection of Biohazards	USA	UKR	BEL, FRA, EST, ITA	NUKR
CBRN	1.d.	G5310		ASI	Advanced Nanotechnologies for Detection and Defence Against CBRN Agents	BGR	MDA	DEU, PRT, USA	EAPC
CBRN	1.d.	G5347		ARW	Functional Nanostructures and Sensors for CBRN Defence and Environmental Safety and Security	DEU	MDA		EAPC
CBRN	1.d.	G5350		ARW	CBRN Exposure Assessment and Medical Countermeasures	FRA	SWE		EAPC
CBRN	1.d.	G5402		MYP	Improved Security through Safer Cementation of Hazardous Wastes	GBR	SRB		EAPC
CBRN	1.d.	G5518	✕	ATC	NATO-ICI Regional Centre Kuwait - Comprehensive CBRN Incident Commanders Course	CZE	KWT		ICI
CBRN	1.d.	G5520	✕	ATC	NATO-ICI Regional Centre Kuwait - CBRN Awareness for First Responders Course	CZE	KWT		ICI
ENV	1.e.	G5432		ARW	Environmental Health and Security in Ukrainian Conflict Zones	USA	UKR		NUKR

Security Area	Key Priority	SPS Reference	Top-Down	Grant Mechanism	Title	NATO Country	Partner Country	Other Countries	Partnership Framework
ADV	3.a.	G5244		MYP	Graphene / Polymer Based Sensor	ESP	FYR*		EAPC
ADV	3.a.	G5248		MYP	Compact Eye-Safe Lidar Source for Airborne Laser Scanning (CALIBER)	ITA	ISR		MD
ADV	3.a.	G5267		MYP	Maritime Security - Multistatic and Multiband Coherent Radar Fleet for Border Security (SOLE)	ITA	SWI		EAPC
ADV	3.a.	G5292		MYP	New Laser Technology - Explosives Detection	USA	UKR		NUKR
ADV	3.a.	G5293		MYP	Autonomous Platform for Securing Marine Infrastructures	ESP	ISR	CAN	MD
ADV	3.a.	G5322		MYP	High Altitude Balloon-Borne Radar	ITA	AUS		EAPC
ADV	3.a.	G5351		MYP	Nanocomposites Based Photonic Crystal Sensors of Biological and Chemical Agents	ITA	UKR	DEU	NUKR
ADV	3.a.	G5373		MYP	Upgrade and Improvements of the hand-held gamma Detector based on HPXe Gas	USA	UKR		NUKR
ADV	3.a.	G5381		MYP	MIDAS - Control of Team of Mini-UAVs to Support Counter-Terrorism Missions	ITA	MDA	GBR	EAPC
ADV	3.a.	G5396	X	MYP	Implementation of a Terahertz Imaging and Detection System	FRA	DZA	SWE	MD
ADV	3.a.	G5406		MYP	Collaborative Augmented Navigation for Defence Objectives	NOR	FIN		EAPC
ADV	3.a.	G5409		ARW	Fundamental and Applied NanoElectroMagnetics II: THz Circuits, Materials, Devices	ITA	BLR		EAPC
ADV	3.a.	G5427		ATC	UAV Systems Development and Deployment to counter Emerging Security Challenges	POL	UKR		NUKR
ADV	3.a.	G5428		MYP	Dynamic Architecture based on UAVs Monitoring for Border Security and Safety	ITA	ISR		MD
ADV	3.a.	G5437		MYP	WITNESS: Wide InTegraton of sensor Networks to Enable Smart Surveillance	ITA	MDA	GBR	EAPC
Border& Port Security	3.b.	G5343	X	ARW	Jordanian Armed Forces Symposium on Border Defence	USA	JOR		MD
UXO	3.c.	G5355		MYP	Biological Method (Bees) for Explosive Detection	HRV	BIH	GBR	EAPC
UXO	3.c.	G5387	X	MYP	Comprehensive Package for Strengthening Jordanian Counter-IED Capabilities	ESP	JOR		MD
UXO	3.c.	G5388	X	ATC	Jordanian Armed Forces (JAF) Counter IED (CIED) Assessment and Training	ESP	JOR		MD

Security Area	Key Priority	SPS Reference	Top-Down	Grant Mechanism	Title	NATO Country	Partner Country	Other Countries	Partnership Framework
HUM	3.d.	G5337	✕	ARW	Arab Geopolitics from Turmoil to Balances, Stability and Regional Order	ITA	SWI	MAR	EAPC
HUM	3.d.	G5341	✕	ARW	Resilience Capacity Building: Best Practices and Opportunities for NATO	CZE	FIN	SWE	EAPC
HUM	3.d.	G5342	✕	MYP	Women, peace & security in the Georgian Armed Forces: organisational assessment	SVN	GEO		EAPC
HUM	3.d.	G5403	✕	ARW	Women Leaders and the Key Role of Civil Society Organisations, Enhancing Civil-Military Cooperation in Ukraine	ITA	UKR		NUKR
HUM	3.d.	G5412		ARW	Armed Groups, Civilian Protection and United Nations Peacekeeping	GBR	IRL		EAPC
HUM	3.d.	G5414		ARW	Challenges in Strategic Communication and Fighting Propaganda in Easter Europe. Solutions for a Future Common Project	ROU	MDA		EAPC
HUM	3.d.	G5442		MYP	Resilient Civilians in Hybrid and Population-Centric Warfare (ResilientCivilians)	NOR	UKR	DEN, USA, FRA, FIN	EAPC
HUM	3.d.	G5451	✕	ARW	Leadership Development Programme on Gender and Diversity, Peace, Risk and Security	NOR	JPN		EAPC
Other	4.	G5228		MYP	Small States and the New Security Environment (SSANSE)	ISL	NZL	LTU,USA	EAPC

Annex 2: SPS Events – ARW, ASI, ATC – Hosted in 2017

Origin	SPS Reference	Grant Mechanism	Title	NATO Country	Partner Country	Location	Dates
Top-Down	G4960	ATC	Innovations in Radiation Protection Procedures – Implementation of Best Practices	Portugal	Morocco	Lisbon, Portugal	18-22 December 2017
Bottom-Up	G5077	ARW	Nanoscale Materials for Warfare Agent Detection: Nanoscience for Security	Belgium	Finland	Levi, Finland	13-17 February 2017
Bottom-Up	G5187	ASI	Quantum Nano-Photonics	United States	Belarus	Erice, Italy	20 July - 04 August 2017
Top-Down	G5219	ARW	Defence against Bioterrorism: Methods for Prevention and Control	Croatia	Serbia	Belgrade, Serbia	16-17 March 2017
Top-Down	G5158	ATC	Senior Leadership ATC on Military and Defence Aspects of Border Security in South East Europe	United States	The former Yugoslav Republic of Macedonia*	Berovo, the former Yugoslav Republic of Macedonia *	24-30 September 2017
Bottom-Up	G5160	ARW	Countering terrorism at the borders: identifying common challenges and solutions	United States	Israel	El Paso, TX, USA	08-09 June 2017
Bottom-Up	G5255	ARW	BRITE (Biomarkers of Radiation in the Environment): Robust Tools for Risk Assessment	United Kingdom	Armenia	Yerevan, Armenia	28-30 November 2017
Bottom-Up	G5257	ATC	Countering ISIS Radicalisation Activities through the Cyberspace in the Region of South-East Europe (CIRACRESEE)	Bulgaria	The former Yugoslav Republic of Macedonia*	Ohrid, the former Yugoslav Republic of Macedonia *	03-07 April 2017
Top-Down	G5278	ATC	Network Security & Network Vulnerability Assessment and Risk Mitigation Course	Germany	Montenegro	Podgorica, Montenegro	27 March - 15 December 2017
Bottom-Up	G5285	ARW	New Generation CERTs: from Response to Readiness - Strategy and Guidelines	Italy	Switzerland	Genova, Italy	28-30 March 2017
Bottom-Up	G5212	ARW	Nanostructured Materials for Security	Slovenia	Ukraine	Kyiv, Ukraine	14-17 August 2017
Bottom-Up	G5277	ATC	Cyber Defence in the Context of Energy Security	Germany	Ukraine	Kyiv, Ukraine	22-26 May 2017
Bottom-Up	G5265	ARW	Critical Infrastructure Protection - 2nd Zagreb Security Forum	Croatia	Israel	Zagreb, Croatia	06-07 March 2017
Bottom-Up	G5266	ARW	Geopolitical Challenges in the East – Implications for Security in the Balkans	Bulgaria	Montenegro	Sofia, Bulgaria	01-04 June 2017

* Turkey recognizes the Republic of Macedonia with its constitutional name.

Origin	SPS Reference	Grant Mechanism	Title	NATO Country	Partner Country	Location	Dates
Top-Down	G5343	ARW	Jordanian Armed Forces Symposium on Border Defense	USA	Jordan	Amman, Jordan	07-09 March 2017
Bottom-Up	G5331	ATC	Specialized Cyber Defence Trainings for civil servants of Serbia	Estonia	Serbia	Talinn, Estonia and Belgrade, Serbia	30 October – 10 November 2017
Bottom-Up	G5172	ATC	Cyber Defence in Industry 4.0 Systems	Bulgaria	Finland	Jyvaskyla, Finland	16-21 October 2017
Bottom-Up	G5308	ATC	Critical Energy Infrastructure Security Course	Lithuania, Czech Republic	Ukraine	Kyiv, Ukraine	16-20 October 2017
Bottom-Up	G5310	ASI	Advanced Nanotechnologies for Detection and Defence Against CBRN Agents	Bulgaria, Germany, Portugal, United States	Republic of Moldova	Sozopol, Bulgaria	12-20 September 2017
Bottom-Up	G5315	ASI	Logical Methods for Safety and Security of Software Systems (Summer School Marktoberdorf 2017)	Germany	Israel	Germany, Marktoberdorf	1-11 August 2017
Top-Down	G5337	ARW	Arab Geopolitics from Turmoil to Balances, Stability and Regional Order	Italy	Switzerland, Morocco	Rome, Italy	05-06 October 2017
Top-Down	G5388	ATC	Jordanian Armed Forces (JAF) Counter IED (CIED) Assessment and Training	Spain	Jordan	Madrid, Spain	17-27 April 2017
Top-Down	G5391	ATC	Countering Terrorism: Trainings and Informative Operations	Belgium	Israel	Herzliya, Israel	05-09 November 2017
Top-Down	G5518	ATC	NATO-ICI Regional Centre Kuwait - Comprehensive CBRN Incident Commanders Course	Czech Republic	Kuwait	Kuwait City, Kuwait	03-07 December 2017

Annex 3: SPS Projects Completed in 2017

	Origin	SPS Reference	NATO Country	Partner Country	Other Countries	Title	Key Priority
1	Top-Down	**G4366**	SVK	MNG		Establish the Geo-Database on Ecological Health of the Military Sites	ENV
2	Bottom-Up	**G4398**	SVN	UKR	CZE	Removal of Heavy Metals and Radionuclides from Water using Ceramic Membranes	ENV
3	Top-Down	**G4440**	ROU	UKR		A Model to predict and prevent possible Disastrous Effects of Toxic Pollution in the Tisza River Watershed	ENV
4	Bottom-Up	**G4481**	ITA	UKR		Nanostructured Materials for the Catalytic Abatement of Chemical Warfare Agents ("NanoContraChem")	CBRN
5	Bottom-Up	**G4511**	ESP	TUN	CZE	Multisensing Platform for Warfare Agent Detection (MPWAD)	CBRN
6	Bottom-Up	**G4537**	ITA	ARM		Development of Biosensors using Carbon Nanotubes	CBRN
7	Bottom-Up	**G4555**	SVN	SRB	GRC, MNE, GBR	Atmospheric Pressure Plasma Jet for Neutralisation of CBW (Chemical Biological Weapons)	CBRN
8	Bottom-Up	**G4560**	DEU	SRB		T-Whex: A Robust Monitoring Robot with Tuneable Compliant Actuators	ADV
9	Bottom-Up	**G4595**	USA	GEO		Protection of Underground Structures from Fuel Cloud Explosion	OPS
10	Bottom-Up	**G4597**	CZE	ARM		Solid State Gas Sensors Against Security and Military Threats	CT
11	Bottom-Up	**G4599**	CZE	SWE		Nanocomposites for Enhanced Decontamination of Toxic Chemicals	CBRN
12	Top-Down	**G4605**	FRA	UKR	USA	A New Method of Detection of Fast Neutrons to Control Illegal Transport of Nuclear Materials	CBRN
13	Bottom-Up	**G4639**	USA	UKR	UKR	Development of a Superselective Adsorbent against CBRN Agents	CBRN

	Origin	SPS Reference	NATO Country	Partner Country	Other Countries	Title	Key Priority
14	Bottom-Up	**G4649**	TUR	UKR	ISR, USA	New Dosimetry for the Triage of Radiation Exposure	CBRN
15	Bottom-Up	**G4662**	USA	ISR		Radiation Resistant High-speed Transistors for Security	ADV
16	Bottom-Up	**G4684**	USA	UKR		Remote Sensing in the Near-Shore Zone for Improved Security	ADV
17	Bottom-Up	**G4698**	SVK	AUT		Novel Terahertz Sources (NOTES)	CT
18	Bottom-Up	**G4735**	FRA	UKR		Novel Nanostructures for Security Applications	ADV
19	Top-Down	**G4746**	USA	AFG		Cross Cultural Training for Military Cadets	OPS
20	Top-Down	**G4748**	ROU	FIN	MDA, UKR	Developing a Multinational Telemedicine System for Emergency Situations	OPS
21	Top-Down	**G4754**	NLD	MNE		Increasing the Clearance Capacity for Unexploded Ordnance in Montenegro	UXO
22	Bottom-Up	**G4796**	ESP	SWI		A Highly Sensitive Hand-Held Pathogen Detection System	ADV
23	Bottom-Up	**G4877**	ROU	UKR		Modelling and Mitigation of Public Response to Catastrophes and Terrorism	CT
24	Top-Down	**G4888**	USA	JPN		CBRN Resilience in NATO and Partner nations	CBRN
25	Bottom-Up	**G4894**	GRC	AUS		Pilot Network for Identification of Travelling Ionospheric Disturbances	ENV
26	Top-Down	**G4895**	DEU	JOR		Support for Implementing a Cyber Security Strategy for Jordan	CYBER
27	Top-Down	**G4898**	LUX	MDA		Developing Capability to Mitigate the Risk of Biological Agents in the Republic of Moldova	CBRN
28	Top-Down	**G5083**	EST	MDA	ROU	Cyber Defence Laboratory and Training at the Technical University of Moldova	CYBER

Annex 4: Examples of Mainstream Media Coverage of SPS Activities in 2017

Activity	SPS Activity	Title of the Article	Date	Outlet/ Magazine	URL
G4748	Developing a Multinational Telemedicine System for Emergency Situations	NATO develops telemedicine system to save lives in emergencies	24 February 2017	NATO Website – Main Page	https://www.nato.int/cps/en/natohq/news_141822.htm?selectedLocale=en
G4748	Developing a Multinational Telemedicine System for Emergency Situations	NATO Ready to Deploy Telemedicine Platform	24 February 2017	mHealthIntelligence.com Webpage	http://mhealthintelligence.com/news/nato-ready-to-deploy-telemedicine-platform
G4748	Developing a Multinational Telemedicine System for Emergency Situations	Sistemul de telemedicină propus de România, în teste la NATO	25 February 2017	Antena3.ro	https://www.antena3.ro/actualitate/sistemul-de-telemedicina-propus-de-romania-in-teste-la-nato-401249.html
G5080	Tailor-Made Gender-Awareness Applications for the NATO Community	NATO awards $210,000 to UCI-linked project promoting women's role in conflict resolution	28 February 2017	University of California, Irvine Webpage	https://news.uci.edu/research/political-sciences-heidi-hardt-helps-global-effort-to-increase-gender-awareness-in-nato/
G5561	Urban Security Management 4.0	Projekty NATO „Veda pre mier a bezpečnosť" – ako ich písať...	6 March 2017	Sprovadajca	www.uniza.sk/spravodajca
G4748	Developing a Multinational Telemedicine System for Emergency Situations	NAVO ontwikkelt multi-nationaal remote telemedicine system	21 March 2017	ICT&Health Online Magazine	https://www.icthealth.nl/nieuws/nieuwsitem/article/NAVO-ontwikkelt-multi-nationaal-remote-telemedicine.html
		Mine Awareness Day	4 April 2017	NATO Website – Main Page	https://www.nato.int/cps/en/natohq/news_143030.htm?selectedLocale=en
G5024	Support to Humanitarian Demining in Ukraine	НАТО передало Україні обладнання для розмінування	4 July 2017	Espreso News Webpage	http://espreso.tv/news/2017/07/04/nato_peredalo_ukrayini_obladnannya_dlya_rozminuvannya
G4895	Support for Implementing a Cyber Security Strategy for Jordan	Opening of the Information Security Incident Response Centre	19 July 2017	Jordanian Armed Forces (JAF) Official Website	https://www.jaf.mil.jo/NewsView.aspx?NewsId=3309#.WXnXDZpDuM9
G4895	Support for Implementing a Cyber Security Strategy for Jordan	Opening of the Information Security Incident Response Centre	19 July 2017	SahafaArabia News Webpage	http://mail.sahafaarabia.net/news4827201.html
G4895	Support for Implementing a Cyber Security Strategy for Jordan	Opening of the Information Security Incident Response Centre	19 July 2017	Jordan News Agency – Petra Government Official Webpage	http://petra.gov.jo/Public_News/Nws_NewsDetails.aspx?Site_Id=2&lang=1&NewsID=310304&CatID=14&Type=Home&GType=1
G4895	Support for Implementing a Cyber Security Strategy for Jordan	Opening of the Information Security Incident Response Centre	19 July 2017	AmmonNews Webpage	http://www.ammonnews.net/article/323444
		Prioritizing Science Within the Alliance	3 August 2017	NATO Association of Canada	http://natoassociation.ca/prioritizing-science-within-the-alliance/?platform=hootsuite

Activity	SPS Activity	Title of the Article	Date	Outlet/ Magazine	URL
G4968	Advanced Regional Civil Emergency Coordination Pilot	News Release: DHS S&T to Participate in NATO Exercise	1 September 2017	U.S. Department of Homeland Security Official Webpage	https://www.dhs.gov/science-and-technology/news/2017/09/01/news-release-dhs-st-participate-nato-exercise#
G4968	Advanced Regional Civil Emergency Coordination Pilot	DHS S&T to Take Part in NATO NICS Exercise (Learn More, Videos)	2 September 2017	American Security Today Webpage	https://americansecuritytoday.com/dhs-st-take-part-nato-nics-exercise-learn-videos/
G5293	Autonomous Platform for Securing Marine Infrastructures	€340.000 to deliver an advanced autonomous platform for securing marine infrastructures	6 September 2017	IMDEA Networks Institute Webpage (promoted by the regional Government of Madrid)	https://www.networks.imdea.org/whats-new/news/2017/eu340000-deliver-advanced-autonomous-platform-securing-marine-infrastructures
G5310	Advanced Nanotechnologies for Detection and Defence Against CBRN Agents	NATO selected Sozopol for fifth time	13 September 2017	Sozopol – Municipal Weekly	
G5310	Advanced Nanotechnologies for Detection and Defence Against CBRN Agents	Scientists from 18 countries discussed the advances in nanotechnologies	27 September 2017	Sozopol – Municipal Weekly	
G5310	Advanced Nanotechnologies for Detection and Defence Against CBRN Agents	Broadcasted reportage on the SPS activity	14/15 September 2017	Kanal 3 – national cable tv station	
G5320	Radiation Hormesis for Higher Microalgae Biofuels Yield	Science for Peace and Security Programme – Opportunity for Serbian scientists	15 December 2017	European Western Balkans - regional web portal	https://europeanwesternbalkans.com/2017/12/15/science-peace-security-programme-opportunity-serbian-scientists/
G5331	Specialized Cyber Defence Trainings for Civil Servants of Serbia	Cyber security: New area of cooperation between Serbia and NATO?	25 December 2017	European Western Balkans - regional web portal	https://europeanwesternbalkans.com/2017/12/25/cyber-security-new-area-cooperation-serbia-nato/

Annex 5: NATO Science Series Publications in 2017

SPS Reference	Title	Editors	Series	Publisher	Volume
G4589	Towards the Monitoring of Dumped Munitions Threat (MODUM)	Jacek Bełdowski, Robert Been, Eyup Kuntay Turmus	Series C: Environmental Security	Springer	
G4748	A Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges	Charles R. Doarn, Rifat Latifi, Filip Hostiuc, Raed Arafat, Claudiu Zoicas	Series E: Human and Societal Dynamics	IOS Press	130
G4883	Nano-Optics: Principles Enabling Basic Research and Applications	Baldassare Di Bartolo, John Collins, Luciano Silvestri	Series B: Physics and Biophysics	Springer	N/A
G4778	Triple Net Zero Energy, Water and Waste Models and Applications	Michael Evan Goodsite; Sirkku Juhola	Series C: Environmental Security	Springer	N/A
G4886	Strategic Cyber Defence	Unal Tatar, Yasir Gokce, Adrian V. Gheorghe	Series D: Information and Communication Security	IOS Press	48
G4986	Resilience and Risk	Linkov, Igor and Palma-Oliveira, José Manuel	Series C: Environmental Security	Springer	N/A
G5036	Rethinking National Action Plans on Women, Peace and Security	Sahla Aroussi	Series E: Human and Societal Dynamics	IOS Press	135
G5050	Countering Terrorism in South Eastern Europe	Travis Morris and Metodi Hadji-Janev	Series E: Human and Societal Dynamics	IOS Press	131
G5109	Dependable Software Systems Engineering	Alexander Pretschner, Doron Peled, Thomas Hutzelmann	Series D: Information and Communication Security	IOS Press	50
G5122	Not Only Syria? The Phenomenon of Foreign Fighters in a Comparative Perspective	Kacper Rekawek	Series E: Human and Societal Dynamics	IOS Press	134
G5150	Countering Terrorism, Preveting Radicalization and Proteting Cultural Heritage	Alessandro Niglia, Amer Al Sabaileh and Amani (Amneh) Hammad	Series E: Human and Societal Dynamics	IOS Press	133
G5136	Implications of Climate Change and Disasters on Military Activities	Orlin Nikolov; Swathi Veeravalli	Series C: Environmental Security	Springer	N/A
G5086	Terrorists` Use of the Internet	Maura Conway, Lee Jarvis, Orla Lehane, Stuart Macdonald and Lella Nouri	Series E: Human and Societal Dynamics	IOS Press	136
G5159	Identification of Potential Terrorists and Adversary Planning Emerging	Theodore J. Gordon, Elizabeth Florescu, Jerome C. Glenn, Yair Sharan	Series E: Human and Societal Dynamics	IOS Press	132
G5183	Benchmarking Telemedicine: Improving Health Security in the Balkans	Carla Sydney Stone	Series D: Information and Communication Security	IOS Press	49

SPS Reference	Title	Editors	Series	Publisher	Volume
G4872	Engineering Crystollography: From Molecule to Crystals to Functional Form	Kevin J Roberts, Robert Docherty, Rui Tamura	Series A: Chemistry and Biology	Springer	N/A
G4913	THz for CBRN and Explosives Detection and Diagnosis	Mauro F. Pereira and Oleksiy Shulika	Series B: Physics and Biophysics	Springer	N/A
G5112	Addressing Emerging Security Risks for Energy Networks in South Caucasus	Jurate Novogrockiene and Eva Siulyte	Series E: Human and Societal Dynamics	IOS Press	137
G5193	The Risk of Skilled Scientist Radicalization and Emerging Biological Warfare Agents	Maurizio Martellini. Jason Rao	Series E: Human and Societal Dynamics	IOS Press	138
G5310	Molecular Technologies for Detection of Chemical and Biological Agents	Banoub, Joseph H. and Caprioli, Richard M	Series A: Chemistry and Biology	Springer	N/A

Annex 6: Don't Forget the Science Bit...

Professor Sir Brian Heap, former UK Representative on the NATO Science Committee, outlines the role science has played in NATO – and where it goes from here.

In the heavily divided post-World War II environment in which NATO was established, its science programme was designed to show practical cooperation across barriers of nationality, language and culture through scientific exchanges.

Initially, NATO's Science for Peace and Security (SPS) Programme drew a clear distinction between supporting civilian science and NATO defence cooperation. Its work concentrated on the physical sciences. Later it took in biological, environmental and social sciences.


Professor Sir Brian Heap

Following the end of the Cold War, the emphasis changed towards solidarity, stability and peace, using scientific research increasingly in diplomacy.

The programme reinvented itself in the 1990s, focusing on partnership with the Commonwealth of Independent States.

The NATO Science programme has had to be flexible in responding to the demands of the times.

After 9/11, the objectives changed again, due to the proliferation of new technologies, the growing gap between the rich and poor, and the information revolution.

At its peak, some 10,000 scientists were involved, with over 6,000 scientists participating in over 100 NATO scientific meetings, and about 100 volumes of scientific papers were published annually. Recently, over 2,500 Fellowships have been funded for partner country scientists, and an annual prize has been established for the most prestigious and relevant research.

The NATO Science programme has had to be flexible in responding to the demands of the times. Today, its mission is to address the new threat of international terrorism, as well as modern threats.

The SPS Programme is overseen by NATO's Public Diplomacy Division (PDD) with an SPS Committee of senior scientists who advise PDD. The programme has a unique network of 57 states: 26 member States, 24 Partner nations and 7 Mediterranean nations.

In terms of results, the construction of the Virtual Silk Highway is a highly successful satellite-based regional system. It allows Internet connections for the first time in three Caucasian and five Central Asian new independent states, with one earth station per country. Afghanistan is now part of the network, which is managed by support from Germany and the EU. The SPS Committee has agreed to continue funding this important initiative and the success of this venture has been unanimously endorsed by all NATO countries and their partners.

The NATO-SPS Programme has had to evolve from its early beginnings to the present day threats. But does it have a future? I would say – yes it does!

Science has become central to many policies, including the demand for new assessments of the environmental impact of climate change.

Why? First, because 'security' includes non-military threats arising from incompetent governance, corruption, organised crime, insecure borders, ethnic and religious

conflict, proliferation of weapons of mass destruction, shortage of natural resources and, of course, terrorism: areas where science has a key role to play.

Second, science has become central to many policies, including the demand for new assessments of the environmental impact of climate change, the need for better models of disease spread, and the provision of food security, particularly in less developed nations.

Third, the current SPS Programme provides a unique opportunity to contribute to world peace by enhancing science and innovation cooperation with all partners. It has a 'horizon-scanning' role raising NATO's awareness of new challenges and opportunities, and is tasked to find solutions to new challenges primarily through non-military means.

However, more is needed to support scientific work in NATO. The science budget represents only around 5% of the total civil NATO budget. This limited funding could be used more effectively to counter international terrorism through greater collaborative efforts. But collaboration with the EU still has a low profile. So too does science in NATO – mention of it is largely missing from NATO's key publications.

With the shift in the NATO Science Committee's priorities towards military and defence strategies, there is a strong case for looking into how integrated public diplomacy and research/technology organisations are.

It is well over a decade since NATO's civil science programme was reviewed by a high level team. Hopefully a new review will recognise the key role of science and technology in global security and stability, and acknowledge that fresh instruments and organisations may be needed for the twenty first century.

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