

NATO SCIENCE FOR PEACE AND SECURITY (SPS) SPECIAL CALL FOR PROPOSALS ON EXPLOSIVES DETECTION

Background

Mines, unexploded ordnances (UXOs), improvised explosive devices (IEDs) and other explosive remnants of war (ERW) pose a direct threat to the security of the citizens of NATO and partner nations, and to international stability and prosperity. Mines and UXOs are a persistent global threat, particularly in war-torn countries, and international cooperation is crucial to effectively address this challenge.

NATO aims to support the development of new capabilities and technologies to tackle the significant threat posed by explosive hazards (e.g. mines, UXOs, IEDs, etc.), and to manage the consequences of their proliferation. NATO cooperates with partners and international organizations to leverage the full potential of each stakeholder engaged in the global effort to manage explosive devices, to improve awareness of the threat, and to develop capabilities for long-term solutions.

There is a growing need for methods to quickly and successfully detect explosives in both military and civilian environments. Explosives detection and disposal is extremely challenging as devices become more sophisticated and deadly due to advancements in materials, shapes, sizes and varieties. The high cost and general inaccessibility of state-of-the-art explosives detection, combined with the high risk and inefficiency of classic demining activities, and a lack of information and education on detection and clearance in danger zones present considerable challenges to peace and security.

Objectives

NATO's Science for Peace and Security (SPS) Programme is issuing a Call for Proposals to address human, scientific and technological advancements in the field of Mine and Unexploded Ordnance Detection and Clearance.

One of the specific objectives of this call for proposals is to encourage applications that bring long-term impact, and have a thematic and geographical strategic perspective.

To this end, applications that promote long-term research in hard sciences, as well as in social disciplines (such as political science, anthropology, sociology, psychology, etc.) are encouraged. Social sciences applications may be in the form of long-term studies, case studies with practical applications (i.e. sharing best practices, developing recommendations, identifying gaps), and field studies, etc.

Applicants should consider their project's relevance to NATO's key tasks of collective defence, crisis management and cooperative security.

The SPS Programme addresses the following **key priorities and areas** in the field of Mine and Unexploded Ordnance Detection and Clearance:

- a) Development and provision of multi-sensor systems, new and advanced technologies, methodologies and best practice
- b) Ensuring end users are given sufficient relevant information and are included in the decision-making process.
- c) Active and ongoing review of past projects to drive future works
- d) Fostering the integration of devices and methods from different projects and technologies into other and future projects
- e) Data analysis
- f) Preparation for Actual Field Conditions
- g) Dissemination and Capacity Building

Scope

This call solicits proposals in the following areas:

- **Multi-Sensor Systems**
 - *Standardization of communications protocols*
 - *Development of modular sensors and other components*
 - *Integration of existing detection technologies*
 - *Testing and evaluation of the effectiveness of various combinations of sensors*
 - *Field procedures or algorithms for pin-pointing of targets*
- **Data Analysis**
 - *Advancement of post-processed detection systems to real-time results*
 - *Novel data fusion methods*
 - *Application of artificial intelligence/machine learning to explosive object identification*
 - *Compilation of test results and target signatures or images into a widely-accessible database*
 - *Identify common shapes or elements of IEDS to enhance detection and discrimination*
 - *Automation of threat detection and response*
- **New or Rapidly Developing Technologies**
 - *Development of drone-mountable systems*
 - *Adapt technologies for remote robotic operations*
 - *Identification of emerging technologies*
 - *Integrate systems using “smart” cyber-physical components*
 - *Elevate technology readiness level for existing but under-developed methods*
 - *Methods for search area or clearance area reduction*
 - *Enhance portability and field applicability of direct explosives detection technologies*
- **Preparation for Actual Field Conditions**
 - *Develop scalability for promising approaches*
 - *Develop or adapt promising lab/test bed technologies to realistic terrain*
 - *Organization of realistic field trials for promising technologies*



The NATO Science for Peace and Security Programme

Funding mechanisms

The SPS Programme aims to foster practical cooperation by developing collaborative networks between academia, think tanks, civil society and government representatives.

The Programme supports collaboration through three established grant mechanisms: multi-year research and development projects (MYP), workshops (ARW), and training courses (ASI/ATC). Interested applicants should develop proposals for activities that fit within one of these grant mechanisms. Application forms for SPS workshops, training courses, and multi-year projects can be downloaded from: <https://www.nato.int/cps/en/natolive/169858.htm>.

When drafting applications in response to this Special Call, applicants should refer exclusively to application manuals and materials published on the abovementioned page, as SPS guidelines and application forms are regularly updated. Only complete applications submitted using the correct templates may be considered as eligible.

Evaluation criteria

Applications will be evaluated on individual merit and on a case by case basis. Applications are evaluated through peer review by an independent scientific group, and are subsequently subject to Allies' approval. Applications will be assessed on their quality and on the basis of their relevance to NATO' strategic objectives, their potential in terms of long-term impact, and added value to NATO. The entire evaluation and approval process can take between 6-8 months.

Programme Requirements

As one of the principal goals of the Science for Peace and Security Programme is to promote cooperation between NATO countries and NATO partner countries, only applications from researchers in those countries (see below) can be accepted. Applications should be submitted to sps.applications@hq.nato.int mentioning in the subject of the email the text "ED Call for proposals 2019"; all relevant enquiries should be addressed to sps.info@hq.nato.int.

**Please note that the applications deadline has been extended to:
1 June 2020 (23:59 Central European Time)**

NATO Countries

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

Eligible NATO Partner Countries

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



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Examples of past and ongoing research and development multi-year projects in the field of explosives management supported by the SPS Programme:

- Holographic and Impulse Subsurface Radar for Landmine and IED Detection
- Portable Sensors for Unmanned Explosive Detection
- Standoff Coherent Detection of Warfare Chemicals Using Photoacoustic Spectroscopy
- Ground Penetrating Radar Attached to a Hexacopter for Automatic Mine Detection
- Magnetic Resonance and MW Detection of Improvised Explosive and Illicit Materials
- Development of New Chemical Sensors and Optical Technologies for Fast and Sensitive Detection of Improvised Explosives
- Development of Mine and IED Recognition System Based on Ultrawideband Technology