

## Innovative Solutions Canada

**CHALLENGE NAME:** ADVANCED COATINGS AND MATERIALS FOR PERSONAL PROTECTIVE ENSEMBLES

**CHALLENGE SUMMARY STATEMENT:** Identify and develop innovative solutions and technologies for materials and coatings to enhance Personal Protective Ensembles to counter Chemical/Biological/Radiological threats.

**CHALLENGE NUMBER:** *To be determined*

**CHALLENGE CLOSING DATE AND TIME:** *To be determined*

**CHALLENGE SPONSOR:** Department of National Defence (DND)

**MAXIMUM CONTRACT VALUE:**

Multiple contracts could result from this Challenge.

The maximum funding available for any Phase 1 Contract resulting from this Challenge is \$150,000.00 CAD (plus tax) including shipping, travel and living expenses, as applicable.

The maximum funding available for any Phase 2 Contract resulting from this Challenge is \$1,000,000.00 CAD (plus tax) including shipping, travel and living expenses, as applicable. Only eligible businesses that have completed Phase 1 could be considered for Phase 2.

This disclosure is made in good faith and does not commit Canada to contract for the total approximate funding.

**TRAVEL:** No travel anticipated.

### PROBLEM STATEMENT

Personal Protective Ensembles (PPE) must be worn by Canadian Armed Force (CAF) personnel when they operate in Chemical/Biological/Radiological (CBR) permissive threat environments to minimise the adverse physiological health effects that may result from possible exposure to toxic chemicals and materials. Effective PPE requires a balance between functionality (ability to stay on task and complete a mission), protection and burden (physiological, physical and psychological).

The challenge is to identify and develop innovative solutions and technologies for materials and coatings to enhance PPE to counter CBR threats. These solutions could include “smart” materials that alter their state in response to an external trigger, either driven by the environment or activated by the user, which would, through a change in physical properties or wear characteristics, significantly enhance the functionality/ease of wear, protection or reduction in burden for users in a CBR hazard environment. Associated technologies could include coatings or materials which have selective permeability to enhance evaporative heat transfer from the body whilst preventing penetration of toxic chemicals to the skin; reactive constituents that neutralise toxic chemicals on contact; super-adsorbents/absorbents that trap and isolate chemicals to minimise exposure; super-repellant (super-amphiphobic) coatings that will resist wetting by very low surface tension chemicals; or, other solutions that disclose the physical presence of CBR contamination in the environment on surfaces of military relevance, thereby enhancing hazard mitigation and management.

## **DESIRED OUTCOMES & CONSIDERATIONS**

Soldier's tasks and missions will continue to become ever more complex and the need for PPE to integrate seamlessly with the myriad of sophisticated equipment fielded during operations more pressing. DND/CAF need to continue the development and advancement of its suite of PPE to ensure that systems will provide the functionality necessary to meet a continuum of mission requirements whilst maintaining a balanced approach to protection based on the threat and expected hazards, and burden when worn in high threat state. It is expected that smart coatings or materials that enhance functionality, protection or reduce burden, which also may include such technologies as selective permeability, reactive constituents, super-absorbency/absorbency, super-repellency or disclosure will have been explored as solutions.

## **BACKGROUND & CONTEXT**

Military operations involving nonconventional warfare are demanding new approaches to providing the soldier protection against possible exposure to toxic chemicals and biological pathogens. Asymmetric attacks are expected to be less severe in magnitude and shorter in duration, but their occurrence almost impossible to predict. In effect, some limited level of protection would be of benefit all of the time during asymmetric operations, rather than the current situation which finds soldiers with no immediately available protection most of the time. To capably interdict or respond to emerging asymmetric threats and operate in the face of the many hazards that may arise from these, the Canadian Armed Forces has a need for specialised clothing and equipment for the soldier that will ensure operational tempo is maintained whilst providing balanced protection from harm and mitigation of the physiological impact from burden. Technologically advanced coatings and materials that lead to lighter weight, thinner and highly robust fabrics will be the foundation for the next generation of protective systems.

## **ACQUISITION STRATEGY**

It is anticipated that a CFP will be posted on the Buy and Sell website in January 2018. The CFP will describe the proposal submission instructions and the evaluation procedures and criteria against which proposals will be assessed.