

## BRIEF

### AN INTRODUCTION TO SBRI

SBRI is a mechanism which enables public sector bodies to connect with innovative ideas and technology businesses to provide innovative solutions to specific Public Sector challenges and needs.

The Public Sector is able to find innovative solutions by reaching out to organisations from different sectors including small and emerging businesses. New technical solutions are created through accelerated technology development, whilst risk is reduced through a phased development programme. SBRI also provides applicants with a transparent competitive and a reliable source of early-stage funding.

SBRI competitions are open to all organisations that can demonstrate a route to market for their solution. The SBRI scheme is particularly suited to small and medium-sized business, as the contracts are of relatively small value and operate on short timescales. Developments are 100% funded and focus on specific identified needs, increasing the chance of exploitation. Suppliers for each project will be selected by an open competition process and retain the intellectual property generated from the project, with certain rights of use retained by the contracting Authority. This is an excellent opportunity to establish an early customer for a new technology and to fund its development.

### SUMMARY

#### Funding Body



The Home Office is the government department responsible for leading on immigration and passports, drugs policy, crime policy, Counter Terrorism and ensuring visible responsive and accountable policing in the UK. Within the Home Office, the Office for Security and Counter Terrorism is responsible for countering terrorism and serious organised crime. We work with a range of other government departments and law enforcement bodies to ensure that the UK and its citizens are protected from terrorism and serious organised crime.

The UK Government Decontamination Service (GDS) helps the UK prepare for recovery following a deliberate act involving chemical, biological, radiological and nuclear (CBRN) material, or an accidental release of hazardous material (HazMat). If an incident occurs, GDS will support local authorities by advising on and

## Background and Challenge



facilitating access to the most appropriate procedures for decontaminating contaminated materials in partnership with assured private sector contractors.

Where contamination poses a risk to human life and the wider environment, GDS's priority is to support local authorities in their responsibility to decontaminate any surfaces as effectively as possible and ensure any contaminated areas are reinstated and normality regained as soon as possible.

The Home Office and the UK Government Decontamination Service (GDS) are seeking to address two challenges:

- 1) To update our fundamental understanding of how best to decontaminate building materials that have been contaminated with chemical agents. This will focus on the behaviour of chemical agents and decontamination systems on building materials and will build on existing modelling work referenced at <http://www.maths-in-industry.org/miis/671/1/ESGI100-UKGDS-Report.pdf>.
- 2) To develop new or improved chemical simulants that accurately mimic both the reactivity of chemical agents of concern with typical decontaminants and their persistence on common building surfaces.

Bidders are invited to submit proposals to address either or both challenges but please note that individual proposals should be submitted separately.

## Scope



### **CHALLENGE 1**

The first challenge this call is seeking to address is to update and improve our fundamental understanding of how best to decontaminate building materials that have been contaminated with chemical agents. Project proposals are invited to build on the research at <http://www.maths-in-industry.org/miis/671/1/ESGI100-UKGDS-Report.pdf> to identify the key parameters controlling the behaviour of both chemical agents and decontamination processes on building materials. This will involve defining the key physical and chemical characteristics of building materials and chemical agents of concern. Further details for this requirement are in Annex 1.

#### **Expected outputs**

- Models (or other tangible deliverables) that support or improve our understanding of chemical and building material interactions, to better understand the contamination process.

## **CHALLENGE 2**

Our second challenge asks for the development of chemical simulants that will help GDS further improve its capability to verify its decontamination tasks. Simulants are needed because direct work with toxic or harmful chemicals poses a high safety risk, or can be prohibitively expensive for use in testing or exercising. Therefore, compounds/formulations that share relevant physical and chemical properties of chemical agents of concern that are relevant to decontamination will need to be identified. Further details for this requirement are in Annex 2.

We are interested in approaches to develop simulants for the chemical agents listed in the following document:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/340709/Chemical\\_biological\\_radiological\\_and\\_nuclear\\_incidents\\_management.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/340709/Chemical_biological_radiological_and_nuclear_incidents_management.pdf)

Note that we are not interested in proposals to develop new Biological or Radiological simulants under this requirement. However, innovative approaches that have been used to develop Biological or Radiological simulants are of real interest if they can be repurposed to address this specific chemical challenge.

### **Expected Outputs**

A series of simulants that mimic both chemical reactivity and persistence of chemical agents listed, that are suitable for use in testing and exercising of decontamination approaches.

## **FUNDING, TIMING AND PHASING**

The call will be launched on 21<sup>st</sup> September 2015 on the Innovate UK SBRI website and will close on 18<sup>th</sup> November.

For challenge 1 we are seeking to fund phase 1 proposals that demonstrate the potential to build on our existing models and identify the relevant key parameters. Phase 2 might then explore the design of a future experimental programme to provide robust evidence to support the selection of decontaminant if an incident were to occur.

For challenge 2 we are seeking to fund phase 1 proposals that will lead to the development of simulants that can be used in practical experiments, tests and exercises.

We are interested in hearing about any innovative approaches that address these challenges including those that have been developed to address other areas (e.g. biological threats and hazards). **To note:** We are currently reviewing our Biological Decontamination policy and are not issuing any specific requirements in this area as part of this call. But Biological research may well feature in a call next year.

Funding of up to £300,000 has been allocated to cover both challenges for phase 1 and we expect projects to last for up to six months and cost up to £60,000.

Where projects show significant potential at the end of phase 1 we will consider further Phase 2 funding.

We have close relationships with our international partners, including the US Environmental Protection Agency (USEPA). We may wish to share proposals or project progress with such partners. As a default, suppliers should assume that their proposals may be shared with the USEPA but if a supplier has any specific concerns with this, they should contact us at the earliest opportunity at [sbri@innovate.gov.uk](mailto:sbri@innovate.gov.uk).

## APPLICATION PROCESS

Directions on how to enter this competition can be found in the Invitation to Tender (SBRI\_HO\_285\_001).

More information on this and other competitions may be obtained at [www.innovateuk.gov.uk](http://www.innovateuk.gov.uk)

## **ANNEX 1**

### ***Surface Interactions for Building Decontamination***

**Problem Description** - The Government Decontamination Service is responsible for ensuring rapid access to an assured CBRN recovery capability in the event of a CBRN incident or major HAZMAT event. If toxic chemicals are released in such settings and contaminate common building surfaces such as concrete, glass, uPVC and brick, there may be a need for decontamination before everyday activities can be resumed. The established processes for decontamination are regularly reviewed to take account of new scientific approaches and developments.

Experimentally, the number of different combinations of contaminants, decontaminants and surfaces is very large so some rational way to identify key physical and chemical parameters is required to reduce the number of permutations. Once these parameters have been identified, a focussed experimental programme can be commissioned to provide robust evidence of how best to decontaminate common building surfaces.

The behaviour of chemicals in controlled industrial processes is well understood. In contrast the behaviour of hazardous chemicals in the built environment has been less extensively researched. Therefore, this call seeks to gather further data or evidence on the interactions between contaminants and decontaminant chemicals on building surfaces to expand our current knowledge and potentially improve our assurance capabilities.

**Research Requirement** – This requirement is for scientific research to identify key physical and chemical characteristics controlling the decontamination process. The Government Decontamination Service, part of Defra's CBRN Recovery Programme, has previously funded mathematical studies on this problem, details of which can be found at (<http://www.maths-in-industry.org/miis/671/1/ESGI100-UKGDS-Report.pdf>).

Proposals are invited to extend this research towards identifying those parameters most important in controlling decontamination processes so that existing and new decontamination systems can be rigorously tested in operationally relevant settings prior to an incident occurring.

- Common building surfaces of interest include but are not limited to: concrete; brick; plaster; uPVC and glass.
- Contaminants of interest include persistent hazardous chemicals such as vesicants, organophosphate pesticides and carbamates.

Proposals may be of a theoretical mathematical nature or may be of a more applied experimental nature building on previous findings as described above.

**Benefits of research and exploitation route** – If successful, this research should enable future experimental work on the behaviour of chemicals on building surfaces to be highly focussed, significantly reducing the numbers of experiments required and costs. This experimental programme will need to produce rigorous evidence supporting the selection of decontaminants for use if a chemical release were to occur in an urban environment.

## **ANNEX 2**

### ***Chemical Simulants for Decontamination Scenarios***

**Problem description** - The Government Decontamination Service is responsible for ensuring rapid access to an assured CBRN recovery capability in the event of a CBRN incident or major HAZMAT event. To be able to assure operational chemical recovery capability it is essential that simulants that better mimic the relevant physical and chemical properties of hazardous agents are available (ie: chemical reactivity and persistence of chemical agents). Testing and exercising using real agents is prohibitively expensive and complex due to health and safety concerns.

Simulants are routinely used for various development programmes in counter CBRN applications but the vast majority of these chemicals simulate only a single physicochemical characteristic such as vapour pressure or molecular mass. In contrast there are few validated simulants which can be used for the robust assessment and assurance of decontamination and remediation techniques in operational settings, as both the **persistence** and **chemical reactivity** of toxic chemicals need to be simulated.

**Research Requirement** – Research to develop a suite of simulants which accurately model both the chemical reactivity of toxic chemical towards typical decontamination systems and persistence of the chemical agents on common building surfaces.

- Common building surfaces of interest include but are not limited to: concrete; brick; plaster; uPVC and glass.
- Contaminants of interest include persistent hazardous chemicals such as vesicants, organophosphate pesticides and carbamates.
- Decontamination systems of interest include but are not limited to oxidisers, caustic solutions and sources of free chlorine. Both liquid and gas/vapour phase decontaminants should be considered.

Proposals are invited which attempt to identify simulants which relate both the active moieties of toxic chemicals to potential simulants and the colligative properties of those materials adsorbed onto common building surfaces to potential simulants. New simulants are likely to be formulations comprising more than one material so that both physical and chemical properties are simulated.

Consideration should be given to how results using any new simulant can be related back to historical work using other simulants in laboratory settings.

**Benefits of research and exploitation route** – If successful, the work should enable more efficient operational trialling and exercising of decontamination and remediation technologies by GDS in collaboration with its industrial partners. This work will generate both qualitative and quantitative data for assuring the UK's capability to recover from a chemical release.