HMGCC Co-Creation

Challenge: Upgradeable sensors to rapidly detect chemical and biological hazards

Summary of the challenge

Could you develop the next generation of sensors to protect against chemical and biological hazards?

Early detection of chemical and biological hazards is the most effective way to limit harm and enact a proportionate response to protect lives and assets.

HMGCC Co-Creation want to develop next-generation sensors to enhance our ability to detect a broad range of chemical and biological substances in real-time.

The aim is a demonstrator at Technology Readiness Level 4 (basic laboratory validation) that could be integrated into existing safety-monitoring networks.

Applicants from diverse sectors, including healthcare, food, environment and agritech are welcomed, that can bring new perspectives and expertise to the resilience and security sectors.

HMGCC Co-Creation will provide funding for time, materials, overheads and other indirect expenses for successful applicants.

Technology themes

Applied research, biology, chemistry, data analytics, electronic engineering, healthcare, materials science and engineering, software development, systems engineering and quantum technologies.

Key information

Total budget (ex VAT), up to	£60,000
Project duration	12 weeks
Competition opens	Monday 22 June 2026
Competition closes	Thursday 23 July 2026

Context of the challenge

The UK National Risk Register highlights the importance of maintaining effective capabilities to identify and respond to the release of hazardous chemical and biological materials to protect public safety in the UK and abroad. While large-scale incidents are uncommon in the UK, emergency services regularly respond to smaller hazardous events, for example illicit drug-lab releases and accidental spills.

Improving resilience by enabling the earliest and most informative warning possible will ensure the most effective cross-agency response from healthcare, policing and other emergency services.

This challenge launched by HMGCC Co-Creation, is to develop a novel sensor that can be deployed in any environment, providing rapid and early sensing of any chemical and biological hazard as part of a wider networked sensing capability.

This work builds on existing UK sensing capabilities and complements the government's wider interests in sensing and detection technologies, sitting alongside separate bio-specific innovation delivered through UK Defence Innovation's (UKDI) funding call on Biosecurity Frontiers and chemical-specific detection delivered through UKDI's previous Rapid Detection of Toxic Gases competition.

For more information, see here: www.gov.uk/government/publications/national-risk-register-2025.

The gap

Current chemical and biological detection technologies can face challenges, such as:

- Too specific – many current technologies are designed to detect specific chemical or biological substances, which can limit flexibility across a broader range of scenarios.
- Time-consuming to upgrade – adapting systems to incorporate improvements or respond to newly identified substances can be time-consuming, with development and deployment timescales that may not always align with emerging needs.
- Too long to detect – timely detection is important to support an effective and coordinated response to potential hazards.
- Cost, size and power trade-off – as sensors become more advanced the trade-off may reduce the number of locations and users that can use the sensor.

There is a need to enhance current capabilities to extend performance across a wider range of scenarios by developing a cutting-edge, upgradeable sensing system that can rapidly detect a wide variety of chemical and biological agents, with improved sensitivity, low error rate, and requiring limited maintenance.

Example use case

Mo is a senior security officer responsible for the safety of an installation that supports a range of government, humanitarian and logistical activities. The site is a self-contained complex that houses staff, visitors and critical equipment, and it operates in an environment where the risk of a chemical or biological hazard may arise and require appropriate management.

A new prototype chemical and biological sensor hub is installed to explore improved detection and monitoring capabilities. The main unit is linked to a security-operations console, with sensor nodes deployed both internally and externally throughout the site. During a brief calibration period the hub learns the local ambient profile, temperature, humidity and background particle levels.

Two weeks after commissioning, the sensor detects a sudden rise in a volatile signature, identifying a potentially hazardous substance in concentrations above expected environmental levels. Within seconds of detection, the hub sends an alarm with encrypted data to Mo, who initiates containment and emergency procedures.

A post-event review shows the signature matched an industrial pesticide that had been inadvertently released nearby. The system autonomously logs this new data and has the ability to learn from these events.

The trial proves to be a success, and with the relatively low cost of purchase and installation of this commercially available product, there is a plan to role the chemical and biological sensor hubs out to other sites.

Project scope

This challenge is focused on developing the next generation of chemical and biological sensors that could have wide utility across a number of sectors.

We welcome innovators working on early proofs of concept for detecting chemical and biological substances, which are airborne in gas, vapour and aerosol forms, as well as those in liquid or solid states.

Innovators working in parallel sectors, such as healthcare, food, environment or agritech, that have sensing expertise are encouraged to apply.

This challenge is seeking a demonstrator after a 12-week project, to a minimum Technology Readiness Level (TRL) 4 - technology basic validation in a laboratory environment, with a future roadmap of development.

Essential requirements:

- Must show a working prototype and then deliver the prototype to the sponsors for independent verification.
- A sensing unit must detect multiple chemical and biological substances in the same unit.
- Must detect, identify, quantify and monitor hazardous chemical and biological substances in situ with no requirement for lab-based analysis.
- Must be able to detect substances in gas, vapour, and aerosol phase.
- Must be small enough to be deployed into the existing infrastructure of a building.
- Sensors must be able to be networked to each other and a central system.
- Consider low maintenance and easy use by a non-technical user.
- Must be operable in busy, noisy, dirty and potentially polluted environments.
- Produce a roadmap that shows targets to:
    - Sense hundreds or thousands of chemical and biological substances.
    - An upgradable unit, ideally remotely through software.
    - Projected future costs of units.

Desirable requirements:

- Consider route to minimise false alarms of non-damaging substances such as pollen.
- Potential to detect non-volatile liquid or solid substances without contact between the sensor and the hazardous substance.
- Potential to develop further iterations that are deployable and/or handheld.
- Consider cybersecurity framework.

Not required:

- A high technology readiness sensor unit that does not fulfil long term requirements and cannot be upgraded.
- A standalone horizon scan of research and available sensors. This can form part of the work, but must not be the sole objective.

Dates

Competition opens	Monday 22 June 2026
Clarifying questions deadline	Tuesday 7 July 2026
Clarifying questions published	Tuesday 14 July 2026
Competition closes	Thursday 23 July 2026
Applicants notified	Friday 7 August 2026
Pitch Day	Thursday 13 August 2026
Pitch Day outcome	Monday 17 August 2026
Commercial onboarding begins*	Friday 21 August 2026
Target project kick-off	September 2026

*Please note, the successful solution provider will be expected to have availability for a one-hour onboarding call via MS Teams on the date specified to begin the onboarding/contractual process.

Eligibility

This challenge is open to sole innovators, industry, academic and research organisations of all types and sizes. There is no requirement for security clearances.

Solution providers or direct collaboration from countries listed by the UK government under trade sanctions and/or arms embargoes, are not eligible for HMGCC Co-Creation challenges.

How we evaluate

All proposals, regardless of the application route, will be assessed by the HMGCC Co-Creation team. Proposals will be scored 1-5 on the following criteria:

Feasibility	• What is the technical credibility of the minimum viable product proposed?
	  ○ Is it technically possible?
	  ○ Are there key technical risks overlooked?

	• Likelihood of the minimum viable product reaching or exceeding the minimum required Technology Readiness Level (TRL)?
	  ○ Does the proposal aim to reach the minimum TRL?
	  ○ Assessors' confidence in the proposal from technical perspective?
	  ○ Will the proposal exceed the minimum TRL?
	• Credibility of the team regarding technical and project management skills?
	  ○ Does the team have all the relevant expertise?
	  ○ How experienced are they?
	  ○ Have they delivered something similar before?

Desirability	• How closely does the proposal directly address the challenge?
	  ○ Does the proposal achieve all essential requirements?
	  ○ How many desirable requirements are achieved?
	  ○ Is this something the user's want?
	• How well is the benefit for government and dual-use described?
	  ○ Is the benefit to the user's well described?
	  ○ Have the applicants identified dual-use markets?
	• Ambition of the proposed solution?
	  ○ Does the solution provide an incremental step in capability or significant leap?
	  ○ Is the proposed solution unique to the applicants?

Viability	• How well is the exploitation route described?
	  ○ Is the proposal just aiming to deliver the minimum for the project? Or have they got a project plan post phase 1?
	  ○ Are they thinking about commercial exploitation routes?
	  ○ Are there rough costings for future work?
	• How well does the proposal demonstrate value for money and are the costs broken down and justified?
	  ○ How much time and resource is spent on a project for the cost?
	  ○ Is there a perceived high ambition for the cost?
	  ○ Is there a robust costing plan?
	• How well is the project delivery described leading to the minimum viable product?

	○ Is there a Gantt chart or similar? ○ Are there proposed outcomes after each sprint? ○ Are the applicants experienced in Agile methodology?
Budget	• Are the project finances within the competition scope?

Invitation to present

Successful applicants will be invited to a pitch day, giving them a chance to meet the HMGCC Co-Creation team and pitch the proposal during a 20-minute presentation, followed by questions.

After the pitch day, a final funding decision will be made. For unsuccessful applicants, feedback will be given in a timely manner.

Clarifying questions

Clarifying questions or general requests for assistance can be submitted directly to cocreation@hmgcc.gov.uk before the deadline with the challenge title as the subject. These clarifying questions may be technical, procedural, or commercial in subject, or anything else where assistance is required. Please note that answered questions will be published to facilitate a fair and open competition.

How to apply

Please submit your application on the HMGCC Co-Creation website. Any queries please email Co-Creation@dstl.gov.uk and cocreation@hmgcc.gov.uk.

All information you provide to us as part of your application will be handled in confidence.

Applications **must** be no more than six pages or six slides in length. HMGCC Co-Creation reserves the right to stop reading after six pages if this limit is breached. The page/slide limit excludes title pages, references, personnel CVs and organisational profiles.

There is no prescribed application format, however, please ensure your application includes the following:

Applicant details	Contact name, organisation details and registration number.

This information may be exempt under the Freedom of Information Act 2000 (FOIA) and may be exempt under other UK information legislation. Refer any FOIA queries to the originating department.

Scope	Describe how the project aligns to the challenge scope.
Innovation	Describe the innovation and technology intended to be delivered in the project, along with new IP that will be generated or existing IP that can be used.
Deliverables	Describe the project outcomes and their impacts.
Timescale	Detail how a minimum viable product will be achieved within the project duration.
Budget	Provide project finances against deliverables within the project duration.
Team	Key personnel CVs and expertise, organisational profile if applicable.

Co-Creation terms and conditions

Proposals must be compliant with the HMGCC Co-Creation terms and conditions; by submitting your proposal you are confirming your organisation's unqualified acceptance of Co-Creation terms and conditions.

Commercial contracts and funding of successful applications will be engaged via our commercial collaborator, Cranfield University.

HMGCC Co-Creation supporting information

HMGCC works with the national security community, UK government, academia, private sector partners and international allies to bring engineering ingenuity to the national security mission, creating tools and technologies that drive us ahead and help to protect the nation.

HMGCC Co-Creation is a partnership between HMGCC and Dstl (Defence Science and Technology Laboratory), created to deliver a new, bold and innovative way of working with the wider UK science and technology community. We bring together the best in class across industry, academia, and government, to work collaboratively on national security engineering challenges and accelerate innovation.

HMGCC Co-Creation aims to work collaboratively with the successful solution providers by utilising in-house delivery managers working Agile by default. This process will involve access to HMGCC Co-Creation's technical expertise and

facilities to bring a product to market more effectively than traditional customer-supplier relationships.

FAQs

1. **Who owns the intellectual property?**

   As per the HMGCC Co-Creation terms and conditions, project IP shall belong exclusively to the solution provider, granting the Authority a non-exclusive, royalty free licence.

2. **Who are the end customers?**

   National security users include a wide range of different UK government departments which varies from challenge to challenge. This is a modest market and so we would encourage solution providers to consider dual use and commercial exploitation.

3. **What funding is eligible?**

   This is not grant funding, so HMGCC Co-Creation funds all time, materials, overheads and indirect costs.

4. **How many projects are funded for each challenge?**

   On average we fund two solution providers per challenge, but it does come down to the merit and strength of the received proposals.

5. **Do you expect to get a full product by the end of the funding?**

   It changes from challenge to challenge, but it's unlikely. We typically see this initial funding as a feasibility or prototyping activity.

6. **Is there the possibility for follow-on funding beyond project timescale?**

   Yes it is possible, if the solution delivered by the end of the project is judged by the HMGCC Co-Creation team as feasible, viable and desirable, then phase 2 funding may be made available.

7. **Can we collaborate with other organisations to form a consortium?**

   Yes, in fact this is encouraged, and additional funding may be made available. Please see the maximum budget of the individual challenge.

8. **I can't attend the online briefing event, can I still access this?**

   If a briefing event is held, any questions (and answers) will be captured and published after the event. The call itself is not recorded and use of AI notetakers is not permitted.

9. Do we need security clearances to work with HMGCC Co-Creation?

Our preference is work to be conducted at OFFICIAL, we may however, request the project team undertake BPSS checks or equivalent.

10. We think we have already solved this challenge, can we still apply?

That would be welcomed. If your product fits our needs, then we would like to hear about it.

11. Can you explain the Technology Readiness Level (TRL)?

Please see the UKRI definition for further detail.

12. Can I source components from the list of restricted countries, e.g. electronic components?

Yes, that is acceptable under phase 1 - feasibility, as long as it doesn't break UK government trade restrictions and/or arms embargoes.

Further considerations

Solution providers should also consider their business development and supply chains are in-line with the National Security and Investment Act and the National Protective Security Authority's (NPSA) and National Cyber Security Centre's (NCSC) Trusted Research and Secure Innovation guidance. NPSA and NCSC's Secure Innovation Action Plan provides businesses with bespoke guidance on how to protect their business from security threats, and NPSA and NCSC's Core Security Measures for Early-Stage Technology Businesses provides a list of suggested protective security measures aimed at helping early-stage technology businesses protect their intellectual property, information, and data.