HMGCC Co-Creation

Challenge: Development of advanced electromagnetic sensors

Summary of the challenge

The latest research into advanced radiofrequency (RF) sensing capabilities is being sought in a new challenge launched by HMGCC Co-Creation.

In this 16-week, funded project, applicants are invited to come forward if they have developed lab-based sensor technologies, including quantum sensors, operating in wide electromagnetic frequency ranges of at least 1MHz to 4GHz. The aim is to develop research to a prototype stage.

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

Technology themes

Antennas, electronic engineering, manufacturing, materials science and engineering, photonics, quantum technologies, radio frequency science and engineering, systems engineering.

Key information

Budget (excluding VAT), up to	**£250,000**
Project duration	**16 weeks**
Competition opens	**Monday 18 August 2025**
Competition closes	**Thursday 18 September 2025 at 5pm**

Context of the challenge

There are many ways in which national security and defence organisations use technologies such as highly sensitive and precise antennas and electromagnetic (EM) sensors. This can range from electronic security to telecommunications.

There is a potential step change in sensing capability with the emergence of quantum EM sensors and other novel technologies, that could offer better sensitivity, precision, repeatability and ability to tune over classical antenna design. This is both a tool and potential risk.

With these advantages, comes a greater threat protecting against TEMPEST, the passive phenomena of unintended signal emanating from IT equipment which may give away sensitive data [(1)].

To help ensure the UK government ‘s understanding of these technologies, HMGCC Co-Creation is launching a challenge on behalf of multiple UK national security and defence organisations to accelerate existing developments to take from proof of concepts in a lab environment to a usable prototype..

[1] https://www.ncsc.gov.uk/information/tempest-and-electromagnetic-security

The gap

Classical antennas have clearly been highly successful in enabling modern communication and sensing, but there are limitations. This includes the trade-off between the size of the antenna, bandwidth, calibration requirements, inefficient radiating power and directionality.

Advanced sensors, such as quantum Rydberg sensors could overcome these existing limitations. These are typically limited to lab-based set-ups and so HMGCC Co-Creation is looking to invest and collaborate with organisations to develop a statically operated sensor that is field-portable and reliable.

Example use case

UK government carries out a lot of work in protecting against cyber-attacks and data leakage, including adhering to NATO standards in mitigating TEMPEST risk. This typically requires additional shielding of cabling and electronic equipment, reducing the risk of detectable electronic emissions.

Roxanne, an information security officer, is responsible for estates spanning a range of threat environments. She is testing a new, portable sensor to identify vulnerability in existing IT infrastructure. She takes a number of measurements in a real-world environment, followed by measurements in isolation of other environmental variables. Repeatability of measurements is key.

The new sensor could provide one of two results:

- It could detect electrical emissions from devices that were previously thought to be protected, identifying a vulnerability that must be patched and raising the bar for published standards. This would ensure other organisations are also protected.
- Or, the new device may find no vulnerabilities, showing that current shielding specifications are sufficient and future-proofed against novel attack vectors.

Project scope

Applicants for this 16-week challenge should aim to deliver a demonstration of advanced antennas / EM sensors to the sponsors, alongside a report. This is open to technologies at initial Technology Readiness Levels (TRL) from 3 – 5, with the aim to move technologies to a proof of concept for field trails (TRL 6 – 7).

It is acknowledged that the cost of materials may be significant, so part of the £250,000 budget may be used to purchase specialist equipment, with the remaining spent on development. As part of the proposal, please specify the breakdown of expected materials costs and major lead times.

Essential requirements

- Ability to detect frequencies in the range of at least 1MHz to 4GHz.
- Non-contact way to detect electromagnetic fields.
- Stand-off detection ranging from a few centimetres up to several metres.

Desirable requirements

- Compatible with server rack mounting.
- Working towards physically robust unit.
- Considers robustness against electromagnetic pulse attacks.
- Minimise size, weight and power (any future product to be human-portable).

Not required:

- Horizon scanning only.
- Mature technology that is already commercially available.

Dates

Competition opens	Monday 18 August 2025
Clarifying questions deadline	Tuesday 2 September 2025
Clarifying questions published	Tuesday 9 September 2025
Competition closes	Thursday 18 September 2025 at 5pm
Applicant notified	Friday 3 October 2025
Pitch day in Milton Keynes	Tuesday 14 October 2025
Pitch Day outcome	Monday 20 October 2025
Commercial onboarding begins*	Friday 24 October 2025
Target project kick-off	November 2025

*Please note, the successful solution provider will be expected to have availability for a 1-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:

Scope	Does the proposal fit within the challenge scope, taking into consideration cost and benefit?
Innovation	Is the technical solution credible, will it create new knowledge and IP, or use existing IP?
Deliverables	Will the proposal deliver a full or partial solution, if a partial solution, are there collaborations identified?

Timescale	Will the proposal deliver a minimum viable product within the project duration?
Budget	Are the project finances within the competition scope?
Team	Are the organisation / delivery team credible in this technical area?

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.

Routes to apply

HMGCC Co-Creation is working with a multiple and diverse set of community collaborators to broadcast and host challenges. Please follow this link for the full list of community collaborators.

If possible, please submit applications via a community collaborator.

If the community collaborator does not host an application route, please send applications directly to cocreation@hmgcc.gov.uk including the challenge title with a note of the collaborator network where this challenge was first viewed.

All information you provide to us as part of your proposal, whether submitted directly or via a collaborator platform, will be handled in confidence.

How to apply

Applications **must** be no more than six pages or six slides in length. HMGCC Co-Creation reserve 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.
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.

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.

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?**

   This challenge has budget for 1 solution provider. However, if you wish to partner with another solution provider you may do so but within the budget above. There will be no extra funding for more than one solution provider.

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, which varies challenge to challenge, then yes. Either the recording or the transcript will be made available to view at your leisure after it has been broadcasted. This will be made available via the HMGCC Co-Creation community collaborators.

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.

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