HMGCC Co-Creation

Antenna-boosting materials sought in latest challenge

Summary of the challenge

Innovators are being invited to apply for HMGCC Co-Creation's new challenge, focused on the latest developments in antenna technology.

National security needs antenna technology for communications systems which have to send data securely and discreetly – often when there is a lot of signal congestion.

For this reason, we need antennas to be able to function at many different frequencies, so they can be used reliably, even in busy environments.

To boost antenna performance, we want to hear from experts in materials and antennas, that could develop dielectric materials enabling ultrawideband antennas with frequency agility.

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

Technology themes

Antennas, communication systems, electronic engineering, materials science and engineering, radio frequency science and engineering.

Key information

Total budget (ex VAT), up to	£60,000
Project duration	12 weeks
Competition opens	Monday 15 December 2025
Competition closes	Thursday 29 January 2026

Context of the challenge

Antenna technology is critical for successful communications in national security and defence.

There is always a trade-off between many factors when designing antennas, including footprint available, transmitted bandwidth and energy efficiency. Recent publications have suggested that using novel, solid and uniform materials with frequency dependent dielectric constants could widen the bandwidth of antennas, giving many advantages.

HMGCC Co-Creation is launching this challenge to identify experts in the field who are developing, or could develop, ultrawideband antennas to a minimum Technology Readiness Level (TRL) 4 – technology basic validation in a lab environment.

The gap

Patch antennas are commonly used in devices where low size and weight are key requirements. But there are several limitations to consider.

- There is a trade-off between size and frequency. There is often a narrower bandwidth especially when using materials with a higher dielectric constant.
- As a result, site surveys are often required to tailor antennas to the appropriate frequency.
- Environmental factors, such as body worn antennas, can cause frequency shifting.
- Software defined radios offer wide operational bandwidth, but typically multiple antennas are used for different bands, which result in size, weight and power increases.

Example use case

Harry is deploying a sensor in a remote, contested area, to be left in place for several years, with the aim of detecting and transmitting critical information. It must not be discovered by an adversary.

To ensure reliable communication, Harry works with Suzie, an antenna specialist at HMGCC, to design a bespoke patch antenna that would fit within the sensor’s small footprint.

To ensure maximum efficiency, a site radio-frequency (RF) survey is conducted. But because of the contested area and location, site surveys are not straightforward and can result in significant planning and risk management.

Harry feeds this information back to Suzie, but he also notifies her of a possible future environmental change that could affect the RF situation. With limited time to deployment, they must mitigate against this risk in the engineering design stage.

Suzie has recently taken delivery of new dielectric materials, used to provide ultrawideband frequency for antennas. These have little impact on the size of the antenna, still allowing deployment within the specified space available. A clear benefit of using the materials is they allow remote frequency agility and reduce the likelihood of being intercepted by adversaries.

Suzie rapidly develops this bespoke antenna, tests in an RF range, and delivers it to Harry, ready for integration with the sensor, and further deployment.

Project scope

This challenge focuses on research to discover and develop the next generation of materials used for ultrawideband patch antennas.

Due to the low maturity of existing technology, the minimum aim of this 12-week project is Technology Readiness Level (TRL) 4 – technology basic validation in a lab environment.

This will allow an assessment of feasible technology that could be invested in further, or technology roadmaps pivoted if not feasible.

Challenge responses should either:

- Deliver the challenge over a 12-week period (for example three sets of four-week continuous sprints), or
- Deliver the 12 weeks over a longer period, for example 18-24 weeks, to allow for non-chargeable ‘fallow’ periods between each four-week sprint. This approach may allow for academic reflection or equipment lead-times, if required.

Please make the delivery timescale and approach clear in your proposal.

Essential requirements:

- Materials that enhance bandwidth of traditional antenna structures.
- Dielectric material must be a solid.
- Frequencies within the range of 200MHz – 6GHz.
- Demonstrate technical feasibility – either through physical testing or robust computer modelling.
- Material investigated must be viable. For example, must not use extremely rare materials that will likely be cost or process prohibitive.

- Power handling of at least 1W.

Desirable requirements:

- If developing new materials, the final milestone should include delivery of a working prototype to HMGCC for assessment purposes.
- The development of multiple material options, which can be narrowed down as the project progresses.

Constraints:

- No fluids in the material.
- No moving parts in the material.

Not required:

- Not full antenna systems.
- Not solely a literature review.

Dates

Competition opens	Monday 15 December 2025
Clarifying questions deadline	Friday 9 January 2026
Clarifying questions published	Friday 16 January 2026
Competition closes	Thursday 29 January 2026
Applicants notified	Friday 6 February 2026
Pitch Day	Wednesday 25 February 2026
Pitch Day outcome	Monday 2 March 2026
Commercial onboarding begins*	Monday 9 March 2026
Target project kick-off	Mid-April 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:

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.

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.

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.
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 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.

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.