

[NSTIx Op-Tech Co-creation Space](#)

Challenge Form: Chemical / Biological Breadcrumb Trail

Responding to NSTIx OpTech Co-creation

The NSTIx OpTech Co-creation Space has engaged with a network of Community Partners which includes Innovate UK KTN, to connect organisations from across the UK Science & Technology ecosystem, fostering open and collaborative development of high-impact, user-driven technology solutions critical to national security, at a pace and scale that could not otherwise be achieved.

Our Community Partners work closely with us to assist in coordinating new relationships with Solution Providers, to combine the respective power of specialist public and private sector partners, and support capability development and end user requirements that address our NSTIx Challenges.

By using agile project management methods within the Co-creation model, we are able to create collaboration, agility and pace through the network of Community Partners, in turn extending the reach and impact of OpTech Co-creation Spaces, to organisations beyond the traditional frameworks.

What is the current state for this Challenge?

UK Law Enforcement are sometimes required to track the movement of suspected criminals during the course of an investigation where this is proportionate, necessary, and legally permissible. This may currently be undertaken using a range of capabilities, for example, investigating a suspect's digital footprint, or investigating vehicular movement using Automatic Number Plate Recognition (ANPR).

The purpose of this Challenge is to investigate existing, emerging, or new capabilities in the area of tracking suspects using benign chemical and/or biological markers. An example use-case may be to track the handling of illegal weapons by organised crime groups, by physically identifying who had touched the contraband, along with what other surfaces they may have touched (e.g. tracking the physical movement of a suspect and the associated contraband, leading investigators to identify the location of a much larger arms cache).

There may be similar parallel-worlds that may have relevance/transferability (think about touchpoint's related to COVID), if someone touches their face, what surfaces within an office (for example) do they then touch? Is there a way to track this? Another example may be avian flu – is it possible to track where somebody has walked after they have stepped through the disinfectant mat at the entry to a farm or zoo, in order to track the risk to birds at that location?

What is the gap?

We are interested in exploring the ability to track the physical movements of criminal suspects through the means of tracking unique biological markers (for example, bacterial flora), or by using benign chemical markers that are imperceptible to the human eye.

There are three key themes to consider:

1. The development or identification of suitable chemical / biological markers that are imperceptible to a human without specialist equipment. An example approach would be to use a paint that is invisible to the human eye and imperceptible to touch (invisible ink may be an analogy) and is benign with no health and safety concerns. This could be painted onto someone's hand or footwear; they then go about their daily life without the invisible paint

impacting on their day. The paint on that person will then be deposited onto anything that they have touched.

2. Consider how the chemical / biological marker is tracked and identified after it has been deposited.
3. As a suspect will be unaware that they are exposed to a chemical / biological marker it is paramount that the tracking media must pose no health and safety concerns to that individual.

There are a number of considerations when assessing this capability challenge:

Technology Readiness Level (TRL): A cross-section of TRLs will be considered for this Challenge, ranging from early academic work (TRL 1-3) those in development (e.g. TRL 4-6), or to readily deployable commercial-off-the-shelf products (TRL 9),

Near real-time use: Solutions should aim to provide the capability for near real-time tracking (e.g. where investigators could identify touch-points shortly after a suspect has touched an object).

Standards: Criminal activity identified through this type of solution must be able to stand-up to scrutiny regarding the confidence and reliability of a subject's movements as part of an investigative case.

Legality and Ethics: Where appropriate, the project will engage specialist views on the legality and ethical considerations associated with the potential use of any identified solutions.

[This Challenge](#)

This Challenge will be structured using three workstreams, run in parallel, over a period of **up to 12 weeks**:

- **Workstream 1:** User-centric Journey mapping and associated pain points:
 - We would like a **Solution Provider** to work with our operational users to help map out the user journey(s) for which biological and/or chemical tracking could be applied within our scenario. This should identify associated pain-points (e.g. where there are tensions for which solutions do not exist).
- **Workstream 2:** Horizon Scanning and identification of new or existing solutions:
 - We would like the same **Solution Provider** to work with our teams to identify potential solutions to address the pain-points identified during the user-journey mapping.
 - This could be through a combination of engaging with industry, academia and government to identify a range of existing, new or emerging solutions across the TRL scale.
 - Nb - work may already have been undertaken within government, industry and academia to investigate solutions to these pain-points, so this workstream could, for example, also include a series of workshops with a range of stakeholders to help draw this out for inclusion within the Horizon Scan.
 - This could, for example, be in addition to literature reviews and market surveys.

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- **Workstream 3:** This Workstream will complement the other two by producing a report comprising a technical deep dive into existing academic and industrial research & development.
- We envisage this will provide insights into the art of the possible and ultimately provide recommendations highlighting key areas of work needed to produce future proof of concept(s).

UK Solution Provider Proposals – ‘our ask’

We are seeking a single **Solution Provider** to lead **Workstreams 1 and 2**, delivering an MVP by the end of **12** weeks.

We are seeking a separate **Solution Provider** to lead **Workstream 3**, again delivering an MVP by the end of **12** weeks.

We are open to interest from all aspects of the supply chain with particular interest from **SME, RTO** and **Academic Solution Providers**.

There is no limit on the number of workstreams a Solution Provider can submit therefore proposals for Workstream 3 can be made in addition to Workstreams 1 & 2. If making multiple submissions please make it clear which workstream you are responding against.

Community Partners are welcome to participate in both coordination and delivery of the Workstreams to support the Solution Partners – please contact us to discuss this approach if you are considering a multi-partner approach.

Commercial Consideration:

We are happy to be guided by Solution Providers proposals regarding the number and duration of these sprints within the **maximum** 12 week period.

Next Steps

Confidentiality: All proposals will be subject to commercial confidentiality and official sensitive clearance. Please do not submit any materials above this classification.

Clarification Questions: Clarification questions can be submitted to cocreation@hmgcc.gov.uk, or via IUK KTN Hazel.biggs@ktn-uk.org, no later than **Friday 22 July 2022**.

Questions and Responses: All inquiries will be collated, and responses sent to all interested parties by close of business on **Friday 29th July 2022** – please ensure the coordinating **Community Partner** is included in the circulation.

Deadline: The deadline for proposals to be submitted is close of business on **August 5th 2022**. Please include the title of the Challenge ‘**NSTix Chemical Biological Breadcrumb Trail**’ in your email.

Format: Final responses for this challenge are to be provided in MS Office (Word, PowerPoint, Excel) or PDF format to the following email address: cocreation@hmgcc.gov.uk with cc to Innovate UK KTN Hazel.biggs@ktn-uk.org who introduced the Challenge.

Alternative Formats: If you wish to discuss other forms of response such as a video presentation or live demonstration please contact us via the **Clarification** process to discuss your approach.

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Feedback: All applicants will be provided with written feedback via the Community Partner once both technical and commercial assessments have been concluded. We will endeavour to provide feedback within **2** weeks of the competition deadline.

Commercial Engagement:

The NSTIx Op-Tech Co-creation Centre will select and directly engage Solution Providers for this Challenge on the technical and commercial merit of the proposal received.

Pricing: Solution Providers are invited to submit Fixed Price or Time and Materials (T&M) proposals for the 12 week engagement. If submitting T&M, please indicate the approximate run-rate across the sprint-profile.

Commercial Considerations – Regardless of the Commercial Route Selected the following terms apply:

#	Category	Consideration
1	IP	Intellectual Property (IP) will be managed in accordance with DEFCON 705.
2	NDA	It is the responsibility of the Community Partner to propagate and adhere to the agreed Non-Disclosure Agreements (NDAs).
3	IT Systems	The Community Partner and/or Solution Provider IT system will be used as the collaboration platform for developing solutions to this challenge (including for example MS Teams, SharePoint, plus any required development and test environments). Systems must be capable of holding documents marked at OFFICIAL SENSITIVE.
4	Data	All data will be managed in accordance with UK Data Protection legislation. This includes commercial & project documentation, and any data utilised in developing, testing and implementing the solution for this challenge.
5	Data	Data utilised in developing, testing and implementing the solution must reside on UK-based systems.
6	Scope	Solution providers for this challenge may be from the UK or 5EYES geographies. Other geographies will be considered on a case-by-case basis.
7	Clearance	All work will be classified at no higher than OFFICIAL SENSITIVE. It is desirable for resources working on the project from Community Member organisations to have BPSS or SC (or equivalent) clearance, however this is not essential at this stage. Community Partners are asked to please state the clearance levels of their proposed Project Team within their submitted proposals.

About NSTIx Co-creation

The National Security Technology and Innovation Exchange (NSTIx) is a government-led science, technology and innovation (ST&I) partnership that enables coherent and agile delivery of innovative national security outcomes through a co-ordinated and systematic approach to research and capability development. We are a key contributor to delivering the UK’s ambition to be a ‘Science and Technology Superpower’, including in new and emerging technologies.

NSTIx engages with UK government organisations that require national security ST&I to identify and communicate crosscutting areas for collaboration and Co-creation . We aim to drive coherence and efficiencies across the national security ST&I ecosystem. We also feed national security ST&I expertise into the wider government ST&I ecosystem, informing decisions on UK strategic advantage through ST&I. We promote engagement with providers and end users of ST&I, including with industry and

academia, to enable better outcomes for all parties. We identify enablers and seek to break down common barriers to ST&I across this landscape.

NSTix has established a government-led network of themed Co-creation Spaces (CCS). The CCSs combine the respective power of specialist public and private sector partners in research, capability development and end user requirements. This supports the development of effective, user-driven technology at pace in areas that are critical to national security.

Co-creation Spaces bring together key public and private sector parties to foster open and collaborative development of high impact, user-driven technology solutions around a cross-cutting theme critical to national security, at a pace and scale that could not otherwise be achieved.

Each Co-creation Space will engage on a preferred commercial framework as NSTix does not directly task or fund the Co-creation Spaces or the projects within them. NSTix does provide the partnerships and enablers under which Co-creation can thrive.

In return, Co-creation Spaces provide NSTix with a practical outlet for our core work, allowing us to develop crosscutting capabilities, test concepts and develop best practice in Co-creation that will be fed back into the Co-creation Spaces and to wider partners.

You can find out further information about NSTix on our [gov.uk webpage](#).