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Planning

Generation after next Materials - Centres of Excellence

Ministry of Defence

F16: Prior information notice for contracts in the field of defence and security

Notice identifier: 2021/S 000-026196

Procurement identifier (OCID): ocds-h6vhtk-02edc1

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Section I: Contracting authority/entity

I.1) Name, addresses and contact point(s)

Ministry of Defence

Porton Down,

Salisbury

SP4 0JQ

For the attention of

Ingram Kevin

Email(s)

kingram@dstl.gov.uk

Country

United Kingdom

Internet address(es)

General address of the contracting authority/entity

<https://www.gov.uk/government/organisations/defence-science-and-technology-laboratory>

Further information

Further information can be obtained from the above mentioned contact point(s)

I.2) Type of the contracting authority

Body governed by public law

I.3) Main activity

Defence

I.4) Contract award on behalf of other contracting authorities/entities

The contracting authority/entity is purchasing on behalf of other contracting authorities/entities:

No

Section II: Object

II.1) Title attributed to the contract by the contracting authority/entity:

Generation after next Materials - Centres of Excellence

II.2) Type of contract and location of works, place of delivery or of performance

Services

Service category No 14: Research and development services and evaluation tests

Main site or location of works, place of delivery or of performance

This will depend on the outcome of any future procurement exercise and will include Defence Science & Technology Laboratory (Dstl) sites.

NUTS code

- UK - United Kingdom
- UKK15 - Wiltshire CC

II.3) Information on framework agreement

The notice involves the establishment of a framework agreement: No

II.4) Short description of nature and scope of works or nature and quantity or value of supplies or services

The Dstl Advanced Materials Strategic Capability and the Materials for Strategic Advantage S&T Programme are exploring different ways of working to deliver future research. To supplement existing routes to market, Dstl is exploring working collaboratively with UK Centres of Excellence in different aspects of Advanced Materials.

II.5) Common procurement vocabulary (CPV)

- 73410000 - Military research and technology

Section VI: Complementary information

VI.2) Additional information

Please find attached a Prior Information document and questionnaire, which provides information about this potential future requirement. Dstl welcome responses back from the supplier market with regards to the questions which form part of the Prior Information document and questionnaire.

Dstl would also welcome any other thoughts or feedback in relation to the information contained within this document. Please read the attached document and submit your response to this to Ollie Kell at Dstl Commercial, email address okell@dstl.gov.uk. Please ensure that your response is submitted by 17:00 hours on 18th November 2021. Please be aware that Dstl is not seeking promotional or sales material in response to this Prior information document and questionnaire.

If you are having any problems accessing the Prior Information document and questionnaire, the content of this is detailed below.

Prior Information Notice Questionnaire - Generation after next Materials - Centres of Excellence

Purpose:

The purpose of this Prior Information Notice (PIN) questionnaire is to:

- Share information on Dstl's current thinking regarding future collaborative working with current and potential new Centres of Excellence, in relation to different aspects of Advanced Materials.
- Obtain views and feedback on this from the market, including responses to the questions detailed in this document.
- Provide the ability for the market to highlight areas of opportunity/innovation that Dstl are not currently aware of.
- Obtain information from the market in response to the Prior Information Notice Questionnaire.
- Use the feedback and information to inform and support the development of Dstl's future Business Case(s) and Procurement strategy.

This PIN questionnaire is not a request for a full proposal or bid nor should it be taken to

be a call for competition, it is purely to obtain information from early engagement with the market.

Background:

The Dstl Materials for Strategic Advantage Science and Technology (S&T) Programme is exploring different ways of working to deliver future research. To supplement existing routes to market, Dstl is exploring working collaboratively with UK Centres of Excellence on different aspects / topics of Advanced Materials. The Purpose of this PIN questionnaire is to assist Dstl in preparing a Business Case and Procurement Strategy for this future requirement.

The PIN questionnaire is seeking feedback and advice from the market to help understand the value add and potential cost of the approach; this is not a request for proposals or tenders at this stage. Any information provided will be treated as a public disclosure which will provide Dstl with the right to free and unrestricted use of it. If you have any concerns with regards to this, please do contact us so that we can discuss this with you.

The aims of working collaboratively with Centres of Excellence include:

- Accelerating the development of advanced materials for generation-after-next (GAN) defence capabilities
- Engaging with and linking to other entities in the ecosystem to support work and transition for onward development and exploitation
- Contributing to stewardship of S&T capability (Suitable Qualified and Experienced Personnel (SQEP) and facilities)
- Strengthening and achieving resilient access to expertise and expert advice for the UK.

Owing to budgets and scope, it is envisaged that key topics of interest, and therefore collaboration with individual Centres of Excellence, will be cycled every ~5 years. Dstl encourages and welcomes responses to this Prior Information Notice questionnaire from Centres of Excellence that are either established or are in the detailed planning stages to achieve an initial operating capability (IOC) before 2025.

We are considering currently two main purposes of working collaboratively with Centres of Excellence that we would welcome your thoughts and feedback on, these being:–

1. Establishing a technology focus in priority areas for defence materials research, primarily to support S&T project delivery through a portfolio of funded projects, including access to specialist facilities.

2. Support to the development of SQEP, including the ability to access more wide-ranging materials facilities.

Current thinking is that collaborative working with ~3 individual Centres of Excellence at any one time would be viable. However, Dstl is interested in obtaining feedback to different models and ways of working; therefore there is a section in the Questionnaire to highlight opportunities that Dstl may not have considered but which could be useful collaborative working opportunities to help deliver the accelerated development of defence materials technology.

Advanced Materials Technology-focused Centres of Excellence:

The aim of working collaboratively with Technology-focused Centres of Excellence is to access leading capabilities (expertise and equipment) to deliver Science and Technology projects with Dstl. Although the exact mix of projects will be dependent on the technology area and customer priorities, it is envisaged that a Centre will be able to support projects across the TRL range 1-6 as the aim of working collaboratively will be to both discover new approaches and accelerate the most promising Materials technology over a 4-5 year timescale. It is envisaged that the primary focus of work will be in TRL ranges 1-4, with only the most promising developments (e.g. 1-2) to be accelerated to TRL6 (with cognisance of manufacturing needs and digital-ready considerations).

Centres of Excellence will be leaders in the research and development of the associated materials technology. They will have (or as a Centre of Excellence have access to) state of the art facilities associated with the specific area and a track record of delivery, including through collaboration with industry and academia. Centres of Excellence will be able to put in place appropriate agreements and mechanisms to respect and exploit Intellectual Property and to work collaboratively by design. It is anticipated that Centres of Excellence may need to evolve over time (e.g. new partners to help accelerate technology developments subject to Dstl's approval); therefore Centres of Excellence should have the ability and agility to do this.

The Advanced Materials Strategic Capability in Dstl does not run its own laboratories. Therefore, we are also exploring opportunities to develop mutually agreeable ways of working that may help our staff maintain their technical skill sets as part of collaborative working with Centres of Excellence.

The Advanced Materials technical areas of interest, which we would welcome your view and feedback on, including any wider scope/opportunity are (order does not reflect a priority):

1. Materials for Extreme Environments:

Interrogation and design of the processing – structure – properties – performance

relationships in advanced materials (structural and functional) through:

- (a) modelling and simulation;
- (b) state-of-the-art materials characterisation and testing facilities;
- (c) processing facilities across TRL-relevant scales (from laboratory to industrially relevant);
- (d) component prototyping (depending on TRL goal);
- (e) digital tools to support materials assurance.

Dstl is interested in hearing from Centres of Excellence with existing or planned future expertise and facilities associated with any of the following extreme environments:

- o Extremes of temperature, e.g. temperatures greater than 1000 °C, including in oxidising environments
- o Polar to tropical operations and associated environmental challenges
- o Vibration and fatigue
- o Impact and shock
- o Radiation
- o Vacuum (e.g. outgassing)
- o Water depth
- o Erosion and accretion, e.g. sand, dust, ice
- o Although not necessarily considered an 'extreme' environment, Dstl is also interested in understanding the implications of typical service life

in a defence environment context on the performance of materials

2. Materials for the congested electromagnetic environment:

Discovery; modelling, simulation and design; materials and component fabrication and prototyping; materials and component characterisation and testing; collaborative research and innovation

- o Metamaterials

- o Functional, smart and animate materials

- o Enabling advances in antenna functionality and integration into platforms, the soldier and infrastructure for communications, sensing and

other electromagnetic activities

3. Accelerated Materials Discovery:

The rapid design and assessment of new or improved materials and associated manufacturing processes for generation after next defence capabilities in air, land, maritime, space or weapons domains. Improvement may not be just related to performance but could be to reduce the reliance on scarce or very expensive materials and elements and should include environmentally responsible approaches to the development of new materials for defence applications.

Accelerated materials discovery will employ the tools of:

- (a) modelling and simulation at different length and temporal scales and supporting characterisation at those scales;

- (b) high throughput and potentially accelerated materials characterisation and testing;

- (c) sub-scale but relevant processing methods;

- (d) digital tools to support prototype design studies. Structural, functional and multi-functional materials are all in scope, including, but not limited

to, ceramics, metals, polymers, composites, adhesives and coatings. Properties of interest will depend on the application and could include, but not be limited to, mechanical (for relevant loading types and strain rates), acoustic, physical, thermal, optical, electrical, magnetic, environmental (e.g. corrosion).

Note on Engineering Biology:

As an emerging technology, engineering biology has the potential to transform many sectors and address major global grand challenges including materials-relevant issues such as decarbonisation, remediation, and recycling, as well as allowing production of novel precursors and facilitating control of microstructure. As such, we would also be interested to see how links between potential Centres of Excellence and local engineering biology expertise could be exploited, although we are not currently looking for feedback on Centres of Excellence for Engineering Biology as a separate entity.

Miscellaneous:

Dstl is also interested in receiving responses that propose different approaches to harness the expertise of the UK in an efficient manner, or in those that represent existing Centres of Excellence in Advanced Materials technology areas that are not listed but could be of importance to Defence and Security Applications.

Prior information Notice Questionnaire

Please complete the below questionnaire and provide information, which Dstl may seek to clarify and discuss further to support our understanding and inform the future development of the Business Case and Procurement Strategy.

Organisation name

POC name and contact details

Materials Area i.e. 'Extreme Environments', 'Contested Electromagnetic', 'Accelerated Discovery', , 'Miscellaneous'

Centre of Excellence established or in planning? If in planning, please highlight potential IOC year if known

Describe briefly the areas covered by the Centre and its key drivers (for example technology scope, TRL scope, application area foci etc.):

Describe briefly the ethos and construct (including Legal construct) of the Centre (for example partners, partnering mechanism, approach to facilities & skills, legal owner etc.):

Describe briefly the opportunity for Dstl to work collaboratively with the Centre (for example, how do you see a potential collaboration working, how could the Centre aid in delivery of S&T and development of Dstl and external SQEP)

If you are able to provide indicative cost information, without undertaking significant effort , please provide examples here (for example, these could be based on the indicative numbers of projects and TRL levels provided (e.g. 1 year projects at TRL 1-2, cost of PhDs, 3 year projects to TRL4 etc), access fees already in place with the Centre, equivalent collaborative working with other entities etc.).

Describe briefly the added value potential through collaborative working with the Centre (for example, what benefits might Dstl see through collaborative working).

What are your thoughts on the Centres of Excellence approach, is this feasible? Do you have thoughts which you would like to share on a potential different approach or approaches which could apply? If you would like to make us aware of opportunities for different ways of working, please share this information with us.

Please provide any other comments or advice which you believe will inform or support the development of Dstl's future Business Case(s) and Procurement strategy.

Your completed Prior Information Notice Questionnaire should be returned to Oliver Kell at Dstl Commercial to the following email address okell@dstl.gov.uk by 17:00 hours on 18th November 2021.

Questions and Answers:

1. Is a response required to this PIN questionnaire in order to be selected for any future Procurement activity?

A. No - this stage is for the purpose of obtaining information to support Dstl's understanding of what could be available from the market and to support business case and procurement strategy planning. This is not a call for competition. Should a future procurement result from the PIN advert this will be run in a fair and open competition in accordance with the appropriate Procurement Legislation.

2. Does the Questionnaire response have to cover the scope of all Centres of Excellence areas of interest?

A. No - we are interested in responses that cover the scope of any individual Centre of Excellence in order to understand the breadth of current opportunities.

3. Our Centre cannot cover all the TRLs listed - is it still of interest?

A. We are looking to work collaboratively with leading experts - the Centre should be able to cover the majority of TRLs but could have access to established collaborative networks to deliver certain aspects (e.g. academic Centres collaborating externally with industry to cover high TRLs, industrial Centres of Excellence collaborating externally with academia to cover low TRLs).

It is also recognised that TRLs may need to differ between Centres of Excellence; we welcome feedback on the appropriate scope and level of ambition associated with each technical area of interest.

4. Our organisation is focused on programme / project management capable of managing engagements with Centres of Excellence - is this of interest?

A. Not at this stage; this PIN questionnaire is focused on feedback directly from organisations with existing Centres of Excellence or those maturing in planning.

5. What is meant by TRL levels?

TRLs can be considered as described in the Table below, with TRLs 1-6 being the primary interest associated with this PIN advert:

MOD TECHNOLOGY READINESS LEVELS AND THEIR DEFINITIONS

9 Actual Technology System qualified through reliability and maintainability demonstration in service. Application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation and reliability trials. Examples include using the system under operational mission conditions.

8 Actual technology system completed and qualified through test and demonstration. Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of Demonstration. Examples include test and evaluation of the system in its intended weapon system to determine if it meets design specifications, including those relating to supportability.

7 Technology system prototype demonstration in an operational environment Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment, such as in an aircraft or vehicle. Information to allow supportability assessments is obtained. Examples include testing the prototype in a test bed aircraft.

6 Technology system/subsystem model or prototype demonstration in a relevant environment. Representative model or prototype system, which is well beyond the representation tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in simulated operational environment.

5 Technology component and/or basic sub-system validation in relevant environment. Fidelity of sub-system representation increases significantly. The basic technological components are integrated with realistic supporting elements so that the technology can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.

4 Technology component and/or basic technology sub-system validation in laboratory environment. Basic technology components are integrated. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in a laboratory.

3 Analytical and experimental critical function and/or characteristic proof-of-concept. Analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology are undertaken. Examples include components that are not yet integrated or representative.

2 Technology concept and/or application formulated. Invention begins. Once basic principles are observed, practical applications can be postulated. The application is speculative and there is no proof or detailed analysis to support the assumptions. Examples are still limited to paper studies

1 Basic principles observed and reported. Lowest level of technology readiness. Scientific research begins to be evaluated for military applications. Examples might include paper studies of a technology's basic properties.

6. Why are you using TRLs not Manufacturing Readiness Levels (MRLs)?

A. Defence S&T contracting is based on Technology Readiness Levels. We recognise MRLs are a useful tool to mature materials development. For the purposes of this PIN advert, we would anticipate MRL 4 as being the closest equivalent to TRL 6. MRL 4 states 'Required investments, such as manufacturing technology development identified. Processes to ensure manufacturability, producibility and quality are in place and are sufficient to produce technology demonstrators. Manufacturing risks identified for prototype build. Manufacturing cost drivers identified. Producibility assessments of design concepts have been completed. Key design performance parameters identified. Special needs identified for tooling, facilities, material handling and skills.' Only the most promising and highest priority technologies would be accelerated to this level, with the majority of work focused at a maximum of MRL 3.