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1. PURPOSE

1.1 The purpose of this procurement is to award a two (2) year contract starting 1st July 2016 to 30th June 2018 with an option to extend for a further one (1) (2+1), to a sole Supplier for the provision of an explosives testing service to the Home Office Centre for Applied Science and Technology (CAST).

2. BACKGROUND TO THE CONTRACTING AUTHORITY

- 2.1 CAST (the "Customer") is a unique team of scientists and engineers at the heart of the Home Office providing expert advice, innovation and frontline support. The Customer is the primary science and technology interface between Home Office ministers and policy makers, frontline delivery partners, and the suppliers of science and technology. Understanding the policy and operational context of Home Office business allows the Customer to operate where others cannot for reasons of impartiality, national security or market failure.
- 2.2 The Customer's expertise and activities are focused into capability areas that serve the range of Home Office interests in: contraband detection, crime prevention and community safety, cyber, forensics, identity assurance, protective security, public order and surveillance.

3. BACKGROUND TO REQUIREMENT/OVERVIEW OF REQUIREMENT

- 3.1 The Customer has a requirement for explosive safety data on the explosives it owns and uses. The Customer would like data on explosives sensitiveness to impact initiation, friction initiation, heat initiation, and spark initiation.
- 3.2 The Customer is currently undertaking a review of explosives safety, and their working practises in the area. An identified area of improvement is regarding safe handling and use of explosives that the Customer regularly use as part of project delivery.
- 3.3 The Customer has some pre-existing safety data on explosives of interest. However, the majority of the explosives that the Customer uses are of a non-military nature (owing to the work conducted), meaning the availability of the required data is limited. The Customer has recently commissioned a one-off set of tests on a limited number of explosives however the Customer has a requirement for additional explosives to be tested and this requirement is enduring.
- 3.4 To further inform risk assessments, and working practises, the Customer wishes to produce 'Explosive Hazard Data Sheets' for explosives that are regularly used. Currently work with explosives is restricted and as result of the current review, project work has either to be halted or significantly modified to meet delivery. By obtaining safety data on all explosives of interest, planned work with explosives can be sufficiently risk assessed, and can proceed with the relevant safety measures in place; this will allow the Customer's work to proceed as normal.

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4. **DEFINITIONS**

Expression or Acronym	Definition
EMTAP	UK Energetic Materials Testing Assessment and Policy
ISO	International Organization for Standardization; the body that develop and publish International Standards.
ECAC	European Civil Aviation Committee
DfT	The Department for Transport

5. SCOPE OF REQUIREMENT

- 5.1 In testing the response of explosives to stimuli, the Customer is interested in determining the sensitiveness of the explosive, that is to say the response of the explosive to an unplanned stimulus i.e. an accident scenario.
- 5.2 The sensitiveness measures the magnitude of a stimulus intended to mimic a typical accident, which is necessary to initiate an energetic material; this provides a measure of the potential hazard.
- 5.3 There are a series of tests which can be carried out to assess the response of explosive materials to a range of stimuli, with a view to assessing the likelihood of accidental initiation.
- 5.4 The Customer requires the Supplier to be capable of conducting the following tests:
 - 5.4.1 Rotter Test Impact Initiation
 - 5.4.1.1 A known weight is dropped from a measured height, onto a 0.03 cm3 sample of the explosive trapped between a brass cap and a metal anvil. An event is deemed to occur if > 1 cm3 of gas is produced following impact. If no event occurs then the sample is removed and a drop test at an increased height is performed again. Only one impact test is performed per sample. The percentage of ignitions at each drop height is determined, and a statistical plot to determine the 50% ignition height is performed. This value is compared with the 50% drop height for standard RDX, which is given a value, Figure of Insensitivity (F of I), of 80.
 - 5.4.1.2 The results of this test will feed primarily into the assessment of risk associated with ECAC trials; the placement of bags with

explosives into x-ray baggage scanners, and the potential for these to be dropped on exiting the system. This data will also be applicable to a review of future DfT trace trials.

- 5.4.2 Mallet Friction Test Friction Initiation
 - 5.4.2.1 A sample of explosive on a specified surface is struck at a glancing blow with a specified mallet. The number of initiations in 10 trials is recorded. To improve reproducibility a system comprising a pendulum mallet falling through a specified arc, with the explosive sample held between two friction surfaces, and a load applied to the top surface (which can be varied by adding weights) is also used. The results of this test are reported as percentage ignitions at a specified load.
 - 5.4.2.2 These results have a similar application to the Rotter test outlined above; with applications to running baggage on conveyor belts, and concealment of explosives on individuals.
- 5.4.3 Temperature of Ignition Test Heat Initiation
 - 5.4.3.1 Sensitivity to heat is tested with a 0.2 g sample of explosive within a specified test tube, placed in a metal block that is heated in an oven at a rate of 5 °C per minute; in this test, the rate of heating is crucial. The temperature at which an even occurs is measured via a thermocouple in the explosive. The test is repeated a further three times, and the lowest temperature at which ignition occurs is recorded.
 - 5.4.3.2 The primary application of these results would be in the effect that external illumination from active standoff systems has on heating explosives, and in a similar vein, the effect that Raman techniques may also pose. Similarly, whether the concealment of explosives on an individual, and the build-up of static, pose any issues.
- 5.4.4 Electric Spark Test Spark Initiation
 - 5.4.4.1 This test assesses the likely response to an electric spark/static hazard initiation. In this test explosive samples are subjected to a variable energy discharge from a capacitor; the starting energy is set to 4.5 J. If any event occurs in fifty shots, the discharge energy is then reduced to 0.45 J, and the test is repeated. This is repeated for ever decreasing energies, and if it is found that an event does occur at < 0.045 J, then the explosive is classified as spark sensitive. In a similar vein, if no event occurs in fifty shots at the highest energy level of 4.5 J, then the material is classified as insensitive to spark discharge.
 - 5.4.4.2 Spark test data is near applicable across the board, but is most pressing in the measurement of explosive samples with CAST

equipment in laboratories and safe handling of explosive samples in general.

- 5.4.5 Gap Test Shock Initiation
 - 5.4.5.1 This test measures the response of an explosive to shock wave stimulus. The shock wave from a donor charge passes through a variable barrier of cardboard shims and the barrier limit at which the acceptor does not sustain detonation as registered on the witness plate, is recorded.

6. THE REQUIREMENT

- 6.1 The Customer maintains a stock of explosives for testing purposes. The stock of explosives is added to and over time the existing stock is retained so may require retesting. The Customer therefore requires these tests to be offered at a fixed price on a call-off basis (service) as opposed to a one-off activity.
- 6.2 The Customer shall supply suitable samples for testing purposes. The samples shall be collected by the Supplier from the Customer's storage facility in Harwich, Essex. The Customer will require the name of the delivery driver(s) 3 days in advance and will need to carry photographic identity as proof of identity.
- 6.3 The tests outlined in Section 5.4 are required as a minimum. If the Supplier wishes to utilise any other test methods or recommends any additional testing for specific types of explosive the Supplier shall supply details of these with the associated costs in their Tender response although these will not be included in the price evaluation.
- 6.4 The Customer will submit the detail of the explosive(s) to be tested in advance and the Supplier shall respond with a written proposal for the testing regime specific to each explosive.
- 6.5 The results of the testing shall be written up into Hazard Test Certificate for each explosive tested, outlining the results of each test, in additional to any comments/observations noted for each test.
- 6.6 The results of the data testing will be sent back to the customer electronically by email, or DVD which is to be posted securely using a courier.
- 6.7 EMTAP testing shall include the tests outlined in Section 5.4 and the Hazard Test Certificate shall comprise of all EMTAP data, chemical stability, designation, ingredients, incompatibilities, fire extinguishing agents, recommended method of destruction, packaging and storage. The certificate shall also contain a date at which a review and/or re-tests are recommended if the explosive is to be retained.

7. KEY MILESTONES

7.1 Not Applicable.

8. CUSTOMER'S RESPONSIBILITIES

8.1 The Customer shall:

- 8.1.1 Ensure the required (as stipulated by the Supplier) quantity of explosive is prepared and packaged for transport.
- 8.1.2 Provide any existing data or information on the explosives which may be relevant to the testing.
- 8.1.3 Provide the Supplier with the details of the explosive sample to undergo testing in advance.

9. **REPORTING**

The Supplier shall provide a report for each explosive sample following the testing. The report shall contain as a minimum the information outlined in Section 6.5.

10. VOLUMES

10.1 The Customer expects to require testing on a maximum of thirty (30) explosives during the contract period. The Customer cannot commit to a minimum number although it is anticipated to be in the region of twenty (20).

11. CONTINUOUS IMPROVEMENT

11.1 Not Applicable.

12. SUSTAINABILITY

12.1 Not Applicable.

13. QUALITY

13.1 The Supplier shall have ISO9001:2008 certification.

14. PRICE

- 14.1 The supplier shall provide a fixed price for each of the five (5) tests outlined in Section 5.4 and a fixed price for sample transportation and reporting. These prices shall be itemised individually but for evaluation purposes the total cost for the testing of a single explosive sample shall be considered.
- 14.2 Prices are to be submitted via the Appendix E excluding VAT.

15. STAFF AND CUSTOMER SERVICE

- 15.1 The Customer requires the Potential Provider to provide a sufficient level of resource throughout the duration of the Contract in order to consistently deliver a quality service to all Parties.
- 15.2 Potential Provider's and their sub-contractors' staff (if applicable) shall have the relevant qualifications and experience to deliver the Contract.

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15.3 The Potential Provider shall ensure that staff understand the Customer's vision and objectives and will provide excellent customer service to the Customer throughout the duration of the Contract.

16. SERVICE LEVELS AND PERFORMANCE

16.1 The Customer will measure the quality of the Supplier's delivery by:

16.1.1

KPI/SLA	Service Area	KPI/SLA description	Target
#1	Testing Proposal	Customer to receive testing proposal within 10 working days of receipt of explosive sample details	80%
#2	Transport	Sample(s) to be collected within 10 working days of agreement of testing proposal	80%
#3	Testing	Testing to be completed within 30 working days of receipt of sample(s)	80%
#4	Reporting	Reporting to be completed within 10 working days of testing completion	80%

- 16.2 Where the Customer identifies poor performance against the agreed KPI's, the Supplier shall be required to attend a performance review meeting. The performance review meeting shall be at an agreed time no later than 10 working days from the date of notification at the Customer's premises.
- 16.3 The Supplier shall be required to provide a full incident report, no later than 10 working days from the date of request by the customer, which describes the issues and identifies the causes. The Supplier shall also be required to prepare a full and robust 'Service Improvement Action Plan' which sets out its proposals to remedy the service failure. The Service Improvement Plan, shall be subject to amendment following the performance review meeting and agreed by both parties prior to implementation.
- 16.4 The Customer agrees to work with the Supplier to resolve service failure issues. However, it will remain the Suppliers sole responsibility to resolve any service failure issues.
- 16.5 Where the Supplier fails to provide a Service Improvement Plan or fails to deliver the agreed Service Improvement Plan to the required standard, the Customer reserves the right to seek early termination of the contract in accordance with the procedures set out in Appendix C Terms and Conditions

17. SECURITY REQUIREMENTS

- 17.1 The supplier shall not disclose any details with regard to Customer's requirements or the reports without written consent.
- 17.2 The Customer shall advise the Supplier of any specific information security requirements with regard to the reporting at the time of the testing request.
- 17.3 The supplier and/or subcontractors will be required to be Security Cleared (SC).

18. INTELLECTUAL PROPERTY RIGHTS (IPR)

18.1 The Customer shall own all rights and permissions to any data collected.

19. PAYMENT

- 19.1 The supplier shall invoice upon completion of testing and reporting for each sample.
- 19.2 Payment can only be made following receipt of compliant reports and return (if appropriate) of the samples.
- 19.3 Before payment can be considered, each invoice must include a detailed elemental breakdown of work completed and the associated costs.

20. ADDITIONAL INFORMATION

20.1 None.

21. LOCATION

21.1 The Customer requires the testing to be conducted at the Supplier's premises. The Customer stores their explosives at site in Harwich, Essex.