

**Transport Systems Catapult**

**Invitation to Tender**

**Unmanned Aircraft System Traffic Management (UTM) Service Providers (UTMSPs)**

**October 2018**

Tender Reference: TSC\_2018-10-08

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# SECTION 1 - INTRODUCTION & BACKGROUND

## **Company background & information**

The Transport Systems Catapult is the UK’s technology and innovation centre for Intelligent Mobility, harnessing emerging technologies to improve the movement of people and goods around the world. We are here to support business growth, increase the UK’s share of the global Intelligent Mobility market, and attract investment – creating jobs and generating long-term economic growth.

We will help sell UK capability on the global stage, while also promoting the UK as a superb test bed for the transportation industry. With a clear emphasis on collaboration, we are bringing together diverse organisations across different modes of transport, breaking down barriers and providing a unique platform for meeting the world's most pressing transport challenges.

The Transport Systems Catapult is one of an elite network of not-for-profit technology and innovation centres established and overseen by the UK’s innovation agency, Innovate UK.

**Vision**

Our vision is to create an environment that will make the UK a world leader in transport systems innovation.

**Mission**

Our mission is to drive UK global leadership in Intelligent Mobility, promoting sustained economic growth and wellbeing through integrated, efficient and sustainable transport systems

**Our People**

We deliver our vision through our people by living our values: Care, Collaboration, Courage and Integrity

## **Approach**

This Invitation to Tender (ITT) is being issued as part of the procurement of Unmanned Aircraft System Traffic Management (UTM) Framework (referred to hereafter as the products and services) to be provided to Transport Systems Catapult (TSC)

The objective of this ITT is to provide sufficient information for Respondents to:

* Understand TSC requirements and proposed procurement approach
* Understand the scope and nature of the products and service that they will contract to provide
* Assess their ability in bidding to provide this service
* Provide agreement and/or feedback on proposed approach to the management and governance of this service
* Provide agreement and/or feedback on proposed contractual terms and commercial approach
* Develop and price a proposed solution based on current available information in the format specified

Respondents’ compliance with the requirements and submission in the required format will enable TSC to carry out a fair and thorough evaluation of the responses. Please see section 2 for details of the instructions. Failure to comply with these instructions will invalidate the Respondents submission.

The Respondents attention is drawn to the principles and terms set out in Appendix 1.

Each Respondent must perform its own appraisal of all information and data provided by TSC in this ITT. The products and service that form the basis of this document have been documented to the best of TSC’s knowledge and are not warranted.

You are deemed to fully understand the procurement process TSC is required to follow under relevant (European and UK) legislation, particularly in relation to the Public Contract Regulations (PCR 2015).

1. **Section 2 – TENDER PROCESS AND INSTRUCTIONS**
   1. **Summary Contract Details**

|  |  |
| --- | --- |
| Contract description | Each UTMSP will Provide consultancy and know how to support the development of a UTM architecture and the corresponding messaging and data-exchange mechanisms, and work towards delivering a simulation of a multi-UTMSP operating environment. The appointed PARTY WILl:develop baseline UAS models capable of integrating into the UTM architecture.deliver iterations of its system test-harness that is reflective of the existing use-cases and scenarios.provide a visualisation tool (an existing system used) to show the data-exchange of manned air traffic systems with unmanned air traffic.Provide a means of deploying the relevant systems in the simulation with respect to each of the defined use-cases.work With stakeholders to produce technical documentation, presentations & Reports. |
| Contract period | 5 months |
| contact point | procurement@ts.catapult.org.uk |
| closing date | 12:00 HRS GMT Monday 15th October 2018 |

* 1. **Definitions**

|  |  |
| --- | --- |
| Closing date | The closing date for the submission of tenders. |
| Contract | The contract will be entered into by TSC and the successful respondent. |
| contract period | The duration of the contract. |
| most economicallyadvantageous | The tender which TSC has evaluated as demonstrating the best value for money, considering both price and quality of service. |
| services | The services and/or product to be supplied by the supplier under the contract |
| Supplier(s) | The respondent(s) selected will enter into a contract with TSC |
| Tender | The proposal submitted by a potential supplier. |

## **Introduction**

## This ITT refers explicitly to the supply of goods and services to support TSC in the delivery of a project for the DfT.

## There is a need to explore a future UTM architecture that enables multiple UTM stakeholders to participate in the distribution of information and intelligent control of airspace. Today, numerous UTM services are developing independently of any framework – potentially resulting in uncoordinated low-level air traffic. The focus is on the creation of a UTM framework for UTM service providers (UTMSPs) to operate within. It aims to investigate how and what information may be exchanged between different UTMSPs and the required data sources such that airspace coordination can be attained to achieve the critical safety requirements.

## The key aims of the new contract for the appointed party will be to support the development of a UTM architecture and the corresponding messaging and data-exchange mechanisms, and work towards delivering a simulation of a multi-UTMSP operating environment. This will include several UTMSPs collaborating to:

## Baseline UAS models capable of integrating into the UTM architecture.

## Delivery of iterations of its system test-harness that is reflective of the existing use-cases and scenarios.

## Provide a visualisation tool (an existing system used) to show the data-exchange of manned air traffic systems with unmanned air traffic.

## Provide a means of deploying the relevant systems in the simulation with respect to each of the defined use-cases.

## Furthermore, each UTMSP will also work with other subcontracted parties, will support the TSC and the Satellite Applications Catapult in the UTM architecture development and formalisation, integration requirements, development of roles and responsibilities, and development of data-exchange methodologies, structures and protocols, to successfully ensure system integration and enable the visualisation of the simulation activities.

## Following the simulation of use-cases and Scenarios, it will be necessary to record the results and technical developments that will be documented in a final report.

## Their work will interface with other subcontracted parties that are being tendered who will focus on:

## UTM Framework and

## Air Navigation Service Provider (ANSP) requirements, inputs and outputs

## It is expected that the applicants will be able to demonstrate:

* An existing UTMSP platform.
* Experience of working on collaborative research and development (CR&D) projects that include the operation of UAS and development of UTM.

## Experience and knowledge of the UK airspace and its management.

## Further information is to be found in Appendix 2 – Specification.

## Two other ITT’s related to this ITT are also being published on Contract Finder and respondents may wish to refer to them to obtain a broader overview of the work or respond to if they feel they have the relevant knowledge and experience. They are:

## Tender Reference: TSC\_2018\_09\_01

## Tender Reference: TSC\_2018\_09\_02

## **Tender Submission**

## All documents submitted as part of your tender must be written in English and sent to Transport Systems Catapult.

## An electronic copy of the Respondents proposal should be submitted to the individual(s) named below:

## Helen Wallis

## Procurement & Contracts Manager

## procurement@ts.catapult.org.uk

Responses will not be opened until the closing time and date for receipt of tenders. Please do not leave your tender submission until the final deadline as tenders received late will not be considered.

* 1. **Respondent enquiries and clarification**

The Respondents will be able to raise clarification questions. All questions concerning the tender must be made in writing via email and must reference the tender page number and section number. Questions should be concisely stated and be numbered in sequential order.

Questions must be submitted by e-mail and addressed to Helen Wallis at [procurement@ts.catapult.org.uk](mailto:procurement@ts.catapult.org.uk) Questions will be responded to within two days of receipt, by circulation of anonymised responses to all Respondents.

**Any approaches to other members of staff, direct or otherwise in direct relation to this tender will result in exclusion from this process.**

## **Respondent responses**

Respondents are invited to respond to this ITT by submitting a detailed bid that addresses all the requirements set out in this document.

Each response should be submitted in the name of the Respondent who will be entering into any resultant contract with TSC. The bid must apply from the closing date for ITT bid submission and be valid for a period of twelve months. TSC may require the Respondent to extend the validity of its bid at any time prior to the contract award.

* 1. **Post-Submission Clarifications**

During the evaluation period, the Transport Systems Catapult reserves the right to seek further information from the respondents to assist in its consideration of the tenders; this may take the form of post-submission clarification meetings or written clarifications.

* 1. **Award Criteria Summary**

|  |  |  |
| --- | --- | --- |
| **CRITERIA** | **WEIGHTING** | **DEMONSTRATED BY** |
| **Price** | **40%** | Price submitted by respondent where the lowest cost respondent shall receive 40% and all other scores shall be allocated according to their difference from the lowest price, using the formula.  40% x [lowest price of all tendered value.] |
| **Quality** | **60%** | Each criterion will be marked using a scale of 0-5 (as referenced in section 4:2) |

* 1. **Quality Criteria**

Tender responses for quality criteria will be evaluated according to the table set out below.

Respondents must enter their response to the below evaluation criteria in Appendix 3.

| **CRITERIA** | **SCORING (%)** |
| --- | --- |
| Initiation – demonstrate how project team is set up and how it would work with TSC and other subcontractors | 5 |
| Technical Knowledge - Demonstrates a clear understanding of the UK UAS UTM landscape, the barriers and key issues | 15 |
| Relevant CR&D Experience - Demonstrates experience of working in CR&D projects in UAS/UTM arena | 10 |
| UTMSPs – Demonstrates existing platform and capability or potential to interface to other UTMSPs | 40 |
| Staff - Demonstrates knowledge and capability of team and ability to deliver in timeframe. | 10 |
| Terms and Conditions - Acceptance of terms and conditions (without major amendment) to allow expedition of contract award | 20 |

* 1. **Presentation**

Respondents may be invited to make a presentation to introduce their company and present their tender response.

TSC will provide guidance where it considers it appropriate to do so to each Respondent ahead of this presentation as to any specific queries or issues to be covered in respect of that specific Respondents proposal.

Specific dates, times and locations for presentations will be advised later in the selection process and if possible notified at least a week in advance. For now, Respondents should assume a one-hour slot, with formal presentations for around thirty minutes followed by questions and answers.

For each Respondent the senior manager that would be responsible for the contract is required to attend the presentations.

| **ACTIVITY** | **DATE** |
| --- | --- |
| **ITT Issue -** ITT issued to respondents | Monday 8th October 2018 |
| **Respondents Proposals** - TSC to receive responses to ITT | Monday 15th October |
| **Evaluation of Proposals -** Review, score and evaluate proposals, including a credit check of potential suppliers. | Week Commencing 15th October 2018 |
| **Shortlist respondents & inform all respondents of results of selection process i.e.: successful and unsuccessful** | Week Commencing 15th October 2018 |
| **Respondent Presentations -** Respondent presentations of proposals (if required) | Week Commencing 15th October 2018 |
| **Management and / or Internal Board Approval** | Week Commencing 22nd October 2018 |
| **Contract Awarded** | Week Commencing 22nd October 2018 |
| **Contract Commences** (with respondent fully accountable for ongoing service) | Week Commencing 29th October 2018 |

* 1. **Legal Information**

The contractual terms are set out in Appendix 1. The duration of the contract is five (5) months.

Respondents may propose minor amendments to the contractual terms attached.

If respondents wish to seek clarification in relation to any provision of the contractual terms, they should do so by asking a clarification question and submitting that question accordingly. Respondents should note that responses to clarification questions may be provided to all respondents.

1. **SECTION 3 - CANCELLATION PROCESS**
   1. **Right to Cancel**

TSC reserves the right to terminate the tender process. This ITT does not represent a commitment to enter into any contract.

* 1. **Right not to award a contract**

TSC reserves the right to reject all tenders if none, in its opinion, adequately satisfies the requirements, or if TSC’s circumstances change. In such circumstances, TSC may subsequently issue a further ITT.

* 1. **Costs**

**Respondents shall bear all costs associated with the preparation and submission of their tender and TSC shall not be responsible or liable for any costs or expenses regardless of the outcome of the procurement process.**

* 1. **Confidentiality**

All communications issued by TSC to respondents must be treated as strictly confidential. Respondents shall not release details of such communications other than on an “In Confidence” basis to those who have a legitimate need to know or whom they need to consult for the purpose of preparing their tender. Under no circumstances may Respondents release any information concerning such communications for publication in the press or on radio, television, screen or any other medium. The content of the tender and the details of the evaluation of the proposals will remain confidential to Transport Systems Catapult and its advisors who will comply with all relevant legislation. Should Respondents wish that any information supplied by them as part of this process not be disclosed because of its commercial sensitivity or confidentiality or otherwise, they must, when providing this information, clearly identify the specific informationthey do not wish to be disclosed and clearly specify the reasons for its sensitivity.

Please note that it is not sufficient to include a statement of confidentiality encompassing all the information provided in the response.

1. **SECTION 4 – TENDER EVALUTION PROCESS**
   1. **Tender Evaluation Process**

The evaluation process will follow the below stages:

Stage 1: Receipt and Opening

Stage 2: Compliance Check

Each tender will be checked for compliance with the requirements of the ITT. Tenders which are not substantially complete, or which are non-compliant with the ITT may be excluded from further participation in the evaluation process or, at the Catapult’s discretion, respondent s may be asked to provide clarification. In the case of the latter, a failure by the respondent to provide a satisfactory response within the deadline specified in the request for clarification may result in disqualification from the evaluation process.Transport Systems Catapult reserves the right to evaluate tenders before declaring them non-compliant.

Stage 3: Evaluation of Tender Responses

Price and quality evaluation will be carried out in accordance with the published evaluation criteria.

Stage 4: Score Review

Review of quality and price scores

Stage 5: Final Evaluation Report and Recommendation

A final evaluation report will be completed, recommending award.

* 1. **Marking Scheme**

|  |  |
| --- | --- |
| **0-5** | **USING A 0-5 MARKING SCHEME** |
| 0 | Unacceptable Response – No information provided, or response does not address the requirements. |
| 1 | Poor Response- The response contains material omissions and/or is supported by limited evidence/examples. Major concerns that the respondent has the potential to deliver/that they have failed to meet a reasonable standard. |
| 2 | Fair Response – The response contains some omissions and/or is not well supported by evidence/examples. Some concerns about the respondent ’s ability to deliver/that they have failed to meet a reasonable standard. |
| 3 | Good Response – There is adequate detail/supporting examples giving a reasonable level of confidence in the respondent ’s experience and ability. The respondent appears to have the potential to deliver as required/has met a reasonable standard and there are only minor concerns about the respondent ’s experience. |
| 4 | Very Good Response – The level of detail/supporting examples gives a high level of confidence in the respondent ’s experience and ability. The respondent clearly has the potential to deliver and/or has clearly met an acceptable standard. |
| 5 | Excellent Response – A comprehensive well evidenced submission, clearly demonstrating expertise and knowledge incorporating value added benefits/social value attributes and other points of innovation. The response is deemed to offer little or no risk and fully captures the understanding of the steps involved to deliver the aspects of the question posed, giving a very high level of confidence in the respondent ’s experience and ability. |

**Appendix 1: TERMS AND CONDITIONS**

This contract will be on Transport Systems Catapult’s standard terms and conditions.

Please find attached as a separate document.

# Appendix 2: SPECIFICATION

Introduction

There is a significant market opportunity within the UK (and globally) for the deployment of drone related services. This is evidenced by numerous market reports, and at a practical level, by a small, but rapidly growing drone-related business sector. There is industry-wide consensus that the technology will be impactful, disrupting the remote sensing, infrastructure inspection, surveillance, emergency response, and transport and logistics sectors over the next decade.

To enable the UK to maintain a pre-eminent position in this space, there is a need for a focused initiative to generate a safe operating environment with reduced barriers-to-entry. Should the UK not succeed in achieving this ambition, then it is likely that the UK will be forced to adopt systems developed overseas. The result of such an occurrence is highly likely to restrict the opportunity for innovative service development in the drone-related arena by UK companies. 

There is a need to explore a future UTM architecture that enables multiple UTM stakeholders to participate in the distribution of information and intelligent control of airspace. Today, numerous UTM services are developing independently of any framework – potentially resulting in uncoordinated low-level air traffic. This programme aims to investigate how and what information may be exchanged between different UTM service providers and the required data sources such that airspace coordination can be attained to achieve the critical safety requirements.

This subcontract will support the TSC in a five (5) month, industry-coordinated project to develop the requirements and validation methods of a coordinated and comprehensive Unmanned Traffic Management (UTM) system architecture. The proposed approach builds on and supports the work already generated by the TSC, Satellite Applications Catapult, and industry. The programme will bring together ongoing strands of relevant research and aligns with the DfT’s UTM development work stream. 

A core principle will be to develop an architecture which enables competition between multiple UTM component suppliers and service operators and embeds data sharing within the UTM platform.

Developments in large-scale UTM simulation will generate new operating guidelines and procedures that can then be applied to the pathfinder’s live trials and inform the development of standards.

This UTM Development Programme will:

* Develop and model the foundation software modules for the UTM simulation.
* Provide system integration of the software modules.
* Deliver system trials.
* Provide system demonstration and the final report.

Scope of Work

The  UTM service providers will engage in this project to support the development of a UTM architecture and the corresponding messaging and data-exchange mechanisms, and work towards delivering a simulation of a multi-UTMSP operating environment. This section breaks down the scope between the Architecture and Wider UTM development, and Modelling and Simulation components of the project.

Architecture

UTM Architecture Developments and Formalisation

The UTMSP will support consortium discussions and development for:

* Formalised system architecture
* Integration requirements
* Roles and responsibilities

Data-exchange methodologies, structures and protocols

The UTM service providers will support the consortium to describe data-exchange methods behind the architecture. This includes defining messaging protocols and the corresponding data formats between modules. For simplicity, preliminary templates for data-exchange structures/formats might include the following:

* XML
* YAML
* JSON

Examples of communication systems might include the following:

* MAVLINK
* TCP/IP
* UDP

Benchmark Metrics

The UTM service providers will support the consortium to develop (and refine) benchmark metrics around which the simulations of architectures applied to the use-cases are assessed. Metrics are currently expected to be based on the expected attributes of the open-access UTM architecture:

* Safety
* Security
* Scalability
* Transparency
* Flexibility

Modelling and Simulation

UAS Models

The UTM service providers will develop baseline UAS models capable of integrating into the UTM architecture. This will establish the necessary system-level requirements for UAS to be incorporated into the wider UTM system. Furthermore, this will involve assessing what potential communication sub-systems will need to be used, as well as any collision avoidance requirements for specific applications (i.e. urban or congested UAS operations).

UAS and Operator Registries

UAS and operator registries are expected to be key outputs of the upcoming DfT drone bill because they will play an important role in managing and monitoring airspace use, in a similar manner to the registries held by the DVLA for cars and their drivers. Registration data may include operator competence recognition, authentication and authorisation data, flight history logging, and vehicle operating capabilities. Therefore, UTMSPs will support the consortium to formulate these registries and recognise how this information will be used and will be important aspects of the project team. It will also be important to understand how individual operators and businesses will input and access this information.

Other Services

Inclusion of other services e.g. separation and obstacles, flight planning and approvals, will be agreed at the start of the project.

Use-cases and Scenarios

There is a need for the consortium to agree on the use-cases and scenarios of interest to this research programme. The contracted UTM service providers will support the development of the use-cases and scenario generations, including the operational requirements central to the use-cases.

Test Harness

Each UTM service provider will deliver iterations of its system test-harness that is reflective of the existing use-cases and scenarios. This will enable other consortium partners to independently test their systems and accelerate development of the respective modules.

Visualisation Tool

Each UTMSP will provide a visualisation tool (an existing system used) to show the data-exchange of manned air traffic systems with unmanned air traffic.

Simulation of Use-cases

Each UTMSP will provide a means of deploying the relevant systems in the simulation with respect to each of the defined use-cases. A number of control mechanisms are expected to be required such as the implementation of dynamic geofencing, re-routing procedures, and collision avoidance.

Report Writing

The UTMSP will support the consortium in developing the final report, and any additional documentation necessary, in support of the research programme.

Activities/Tasks/Deliverables

*Table 1: Project’s Tasks and Deliverables*

| **#** | **Tasks and Deliverables** | **Notes** | **Due** |
| --- | --- | --- | --- |
| 1 | Support architecture discussions; Formalise UTM architecture report | TSC and Satellite Applications Catapult will release an architecture report for input and review.  Report will include architecture descriptions, and corresponding communications methodologies. The report will also include module ownership descriptions. | November 2018 |
| 2 | Deliver and present the developed UAS models and scenarios | From stakeholder engagements with the TSC, support the consortium to deliver and present the developed UAS models and scenarios. | December 2018 |
| 3 | Carry out system integration and testing activities | Work with the consortium to define test harness requirements (based on defined architecture and framework) for simulation activities. | January 2019 |
| 4 | Carry out demonstration activities | Support the consortium throughout the demonstration phase of the project, specifically, the development of communications performance metrics, communication requirements, evaluation of the performance of communication systems used, capturing lessons learned, and making recommendations based on lessons learned. | February 2019 |
| 5 | Support final report development | Support TSC with a write-up of the final report (potentially as a whitepaper) – to be submitted to the DfT and circulated within the wider UTM community | March 2019 |
| 6 | Support communication and dissemination activities | Support TSC to present findings and whitepaper to the IAG, Pathfinders and wider drone community. | March 2019 |

Estimated Effort and Costing

The proposed end date of the project is 29th March 2019. The respondent needs to be able to demonstrate that they have:

* the correctly qualified and experienced staff
* availability of those staff
* ability to commence work 29th October 2018

The value boundaries for this contract are shown on Contracts Finder.

# Appendix 3: RESPONSE TO QUALITY EVALUATION CRITERIA

Respondents must use the template below for their response to quality evaluation criteria. Responses in any other format will not be accepted.

|  |  |
| --- | --- |
| Criterion | Initialisation  Please outline how you would structure the project implementation team and establish robust working relationships with Transport Systems Catapult’s key contacts. Please include a Organisation Chart, outlining all key roles and basic profiles. |
| Response  (500 words max excluding Org Chart and Profiles) |  |
| Criterion | Technical Knowledge  Please outline your understanding of the UK UAS UTM landscape, the barriers and key issues. |
| Response  (1,500words max) |  |
| Criterion | Relevant CR&D Experience  Please explain your experience of working in CR&D projects in UAS/UTM and simulation arena |
| Response  (1,500 words max) |  |
| Criterion | UTMSP  Please explain your existing platform and capability or potential to interface to other UTMSPs and ability to visualise it in a simulated environment |
| Response  (1,500 words max) |  |
| Criterion | Staff  Please outline i.e. via CVs the knowledge and capability of team and ability to deliver in timeframe, including a Gantt chart. |
| Response  (2000 words max) |  |
| Criterion | Acceptance of Terms and Conditions  Please confirm acceptance of terms and conditions (without major amendment) to allow expedition of contract award |
| Response  (50 words max) |  |

# Appendix 4: PRICING SCHEDULE

Please see attached pricing schedule to be completed as part of the respondent’s response.



The value boundaries for this contract are shown on Contracts Finder.