



Department
for Transport

Transport Technology Research Innovation Grant (T-TRIG) December 2017 Grant Specifications

Moving Britain Ahead



December 2017

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Department for Transport
Great Minster House
33 Horseferry Road
London SW1P 4DR
Telephone 0300 330 3000
Website <https://www.gov.uk/government/organisations/department-for-transport>
General enquiries: <https://forms.dft.gov.uk>



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1. Introduction

- 1.1 The Transport Technology Research Innovation Grant (T-TRIG) is a scheme that enables the Department for Transport (DfT) to fully fund early-stage research projects in support of innovative ideas or concepts that facilitate a better transport system.
- 1.2 This document provides details of the scope of the competition(s) within the T-TRIG scheme. Applicants are advised to consider these specifications along with the guidance document to ensure the application questions are addressed appropriately.
- 1.3 The number and scope of the T-TRIG competitions varies with each round to remain in line with the Department's needs. Generally, it is formed of an open call and one or two targeted calls in specific areas.
- 1.4 The December 2017 T-TRIG scheme will comprise of three separate competitions. Each competition has been allocated its own budget. There will be:-
- 1.5 An **Open call** for a range of novel and innovative ideas focused on transport (budget up to £840k);
- 1.6 A targeted '**Improving the performance of the road network using Big Data and Machine Learning**' call (budget up to £200k).
- 1.7 A targeted '**Maritime Air Quality or Automation and Technology**' call (budget up to £100k).
- 1.8 All competitions will use the same application form and assessment criteria.
- 1.9 All applications must be innovative and focussed on science, engineering or technology to solve a transport challenge.
- 1.10 Each individual application can only be submitted to one of the above competitions.
- 1.11 If applying to more than one call, applicants will need to demonstrate an ability to deliver the projects.
- 1.12 Applicants should consider and incorporate accessibility within their project specifications.

2. Open Call Competition

Scope – Open Call

- 2.1 The purpose of the open call competition is to seek innovative ideas that have the potential to address a UK transport challenge.
- 2.2 It should be noted that although the open call competition is available to all transport challenges, applicants should align their proposals with [DfT's priorities](#) and the [Industrial Strategy Grand Challenges](#).
- 2.3 Projects must clearly articulate what challenge or unmet need that is being addressed. The solution to this challenge must be innovative and focussed on science, engineering or technology or the use of the technology.
- 2.4 Projects should be at the early stage of research, looking to prove a concept or develop a feasibility study.
- 2.5 The research should describe what solution is being proposed and clearly highlight the innovative aspects.
- 2.6 The solution could well be a completely novel idea or approach. However, approaches or innovations from other areas, applied in a novel way to transport will also be of interest.
- 2.7 A fully competent team should be able to deliver the aims and objectives of the study. A credible project plan and risk assessment should be presented. Risk mitigation measures should be suitably identified.
- 2.8 If the project delivers the outputs expected, there should be a consideration of the broader impact of the work and how additional funding to take the product to the next level will be achieved.
- 2.9 Applicants should consider and incorporate accessibility within their project specifications.

Budget

- 2.10 Applicants can apply for a project grant of up to £30,000.
- 2.11 The budget available for the open call is approximately £840,000. We are looking around 20-25 projects; however, this will depend on the quality of applications.
- 2.12 Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids.

3. Improving the Performance of the UK's Road Network using Big Data and Machine Learning

Overview

- 3.1 This specification is for applicants who wish to apply for the targeted competition on improving the performance of the road network using Bid Data and Machine Learning (ML).
- 3.2 This competition will fund research into developing new solutions and approaches which use Big Data and ML to improve road performance on the strategic road network and in urban areas, which will provide tangible and impactful benefits.
- 3.3 Applicants should consider and incorporate accessibility within their project specifications.

Background

- 3.4 Open Data and ML are currently transforming our world, changing how we interact with our day-to-day environments and revolutionising the delivery of day-to-day services, such as healthcare, media and finance.
- 3.5 These technologies have the potential to transform how transport operates, by providing near-time analysis of data, utilising information across multiple source of data, which will increase the efficiency of the road network, improve journeys and deliver environmental benefits.
- 3.6 The UK's strategic road network and urban areas face a common challenge of accommodating technology and information, and there is a huge potential to generate innovative solutions for these areas, to deliver more joined-up and seamless multi-modal solutions which will make better use of travellers' time.
- 3.7 Effective use of Big Data and ML has the potential of improving the performance of the road network through provision of new innovative solutions.
- 3.8 In 2016 T-TRIG undertook a targeted call on Big Data. This call seeks to further build on this area by focussing on a specific area. Applicants to previous T-TRIG rounds are welcome to apply, but need to clearly demonstrate the innovative nature of their proposal.
- 3.9 This targeted T-TRIG call seeks to support the creation of new innovative solutions in this area, ensuring that the UK is able to capitalise on this new technology, enabling the transformation of the transport system through the better use of data.

3.10 This competition is being run with support from the Transport Systems Catapult and others who potentially have access to large data sets.

Scope of Competition

3.11 This targeted call is to stimulate ideas generation and test initial concepts around how ML and Big Data, when combined with **existing** data sets, can demonstrate and provide improvements to the UK's strategic road network and urban roads.

3.12 The call will fund around 4-6 projects, for up to 40k each, which will develop an innovative approaches to this challenge which provide best value for money.

3.13 To inform this the Department will fund genuinely innovative projects designed to support the development of a prototype, proof of concept, or feasibility study. Examples of proposals which are in scope for this project include:

- Improve the provision of services to road users by integrating different data sets. For example, the combination of vehicle, mobile phone and traffic data to improve traffic flow and system operation.
- Improving integration of urban systems with the strategic road network.
- Improve traffic management systems by integrating live data using ML.
- To better deal with planned and unplanned disruption to the road network – which could include the coordination of disruptive events between local highway authorities and Highways England.

3.14 Projects supported through this T-TRIG application must deliver a robust assessment of the transport benefits that their proposals can bring. Successful bids will need to demonstrate clearly the following:

- What transport challenges the innovation is aiming to solve.
- Evidence of state-of-the-art innovation being carried out in practice.
- That the team has the skills and expertise to deliver the project plan.
- The project will deliver tangible transport and/or commercial opportunities for the UK.

3.15 The Department seeks genuinely innovative solutions and would welcome bids from 'non-transport' organisations or consortia that can see a role for their technologies, tools and approaches in delivering benefits in this space.

3.16 The following areas will be out of scope for this call:

- Simulation and micro-simulation of transport systems.
- While not excluded, the development of smartphone apps is not a primary interest for this competition and should not be a primary output of proposed projects.
- The focus should be to maximise in-vehicle information and not the deployment of telematics/Variable Message Signs.

Available Data Sets

3.17 There are a significant number of open data sets which applicants could use. Examples of these include:

- Transport for London Open Data:
<https://tfl.gov.uk/info-for/open-data-users/our-open-data>
- WebTris Traffic Flow data is openly available for 15 minute intervals. One minute interval data is available through a registration process, subject to approval.
<http://webtris.highwaysengland.co.uk/api/swagger/ui/index>
- Highways England data on traffic flow and journey time from 2009-2015:
<https://data.gov.uk/dataset/dft-eng-srn-routes-journey-times>

3.18 For successful applicants, the Transport Systems Catapult in partnership with Department for Transport will grant controlled access to data held by the Transport Systems Catapult. Due to licensing restrictions, this data shall only be made available to SMEs and University or Research Institutions. The information held by the Transport Systems Catapult is as follows:

- Detailed **mapping grids** with road direction markers, speed limits and **vehicle flow** allowing us to build robust models of towns or regions at a granular level.
- **Mobile Network** data for the UK in aggregated anonymised form. Data can be separated into **vehicle and train journeys**.
- **National roadworks** data covering the UK gives us the ability to observe the effects and impact on journey routes that roadworks in a specific area may have.
- **Traffic movement patterns** with journey times and roadworks highlighted gives insight into effects of roadworks on journey times.
- **Haulage journeys** from detailed telematics fleet providers, **differentiation between HGV and LCV** is visible and will give overview of freight transit patterns together with port of entry and exit.

3.19 Successful applications to this call of T-TRIG will be expected to use either other open data sets or the information listed above.

Budget

3.20 The indicative budget for this call is up to £200,000 in total to fund 4-6 projects, with the maximum amount of funding allocated to an individual project £40k. Applicants may only submit one application. The final number of projects funded will depend on the quality of applications, value-for-money, and the policy needs of DfT.

3.21 Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids, especially innovation, impact, and value for money of the proposal.

4. Maritime Autonomy, Technology and Solutions to Reduce Shipping Emissions

Background

- 4.1 The Maritime Sector is likely to undergo significant changes in the near future as technology revolutionises the way the sector operates and environmental concerns create new and more stringent requirements for the maritime industry.
- 4.2 **In the context of innovation, autonomy** is seen as a possible solution for maritime transport to meet future competitiveness, safety and sustainability challenges. Automation and related technological development will affect both shipping and maritime infrastructure in ports and at sea, in the UK and overseas.
- 4.3 From an environmental point of view, it is fundamental to understand how the deployment of innovative technology and the application of operational changes will have a significant beneficial impact in the reduction of shipping emissions and the improvement of Air Quality in the UK.
- 4.4 Applicants should consider and incorporate accessibility within their project specifications.

Overview

- 4.5 If applying to this targeted call competition, applicants are advised to consider this specification along with the guidance document to ensure the application questions are addressed.
- 4.6 This specification details the scope of the competition for Innovation in Maritime Autonomy and Technology, and the use of Technology to reduce Shipping Emissions and those aspects which are out of scope.
- 4.7 This competition is a standalone call for innovative solutions to demonstrate potential applications for autonomous technology or for proof of concept of new ideas in this field, and the scope of the deployment of green technology to reduce shipping emissions in the context of improving air quality.
- 4.8 Project applications should describe how the proposed solution will be applied in the Maritime Environment, and the benefits that this will have to Maritime Operations. This could include safety, reduced cost, improved efficiency, reduced emissions and wider environmental benefits, enhanced situational awareness etc.

Scope – Maritime Autonomy and Technology

- 4.9 The Department is running a competition which could fund projects to either develop an initial prototype, a proof of concept or a feasibility study that demonstrates the project's potential applications to maritime operations.
- 4.10 We are seeking projects that demonstrate the innovative use of autonomy or technological solutions to deliver benefit to maritime shipping and infrastructure both in the port and at sea, in the UK and overseas.
- 4.11 We will consider any science or technology that could enhance any component of a ship, port infrastructure or supporting operations. For example this could include: enhanced human factors; better use of data or enhanced systems integration. The anticipated benefits of the proposals could be safety (e.g. taking humans out of dangerous situations), efficiency (e.g. automating or reducing time spent on certain operations) or provision of enhanced situational awareness for seafarers. This is not intended to be a limiting set of criteria, and any innovative use of technology in Maritime will be considered.
- 4.12 Examples of ways in which maritime operations could be supported include:
- Enhancing situational awareness using technology or other uses of technology to improve safety.
 - Improving safety of operations in congested waterways.
 - Providing decision support or full autonomy in aspects of maritime operations.
 - Alternative approaches to port activity and the interaction between the port and the vessel (for example, berthing technology).
 - Changing the design of a vessel to improve efficiency, make the vessel better suited to the use of autonomy etc.
- 4.13 Capability demonstrations of currently marketed or existing maritime technology products are out of scope for this work. Projects must have an innovative aspect, although this does include products being used in innovative ways, outside of their original intended use.
- 4.14 This list is not exclusive. The Department is interested in any proposals that might offer significant improvements to systems, timings, processes or technology for maritime operations. Ideas which offer only incremental updates to existing capability will not be considered.
- 4.15 Organisations are invited to submit applications on this basis.

Scope – Maritime Air Quality

- 4.16 The Department is running a competition which will fund around three projects to either develop an initial prototype, the trial of an identified technological solution or backing of an already committed project that needs further support and/or data monitoring to inform the policy direction.
- 4.17 We are seeking projects that demonstrate the application of technical solutions to vessels and/or port infrastructure that of benefit to clean shipping.
- 4.18 The major impediment to deploying technology on the domestic fleet is the high barrier to entry caused by ship owners being unwilling to run trials. However, several

ports have shown an interest in running trials of biofuels, hybrids, shoreside power and other alternatives.

4.19 As most ports have vessels under their direct control (tugs, pilot boats, workboats) there is an option to identify a technology/solution that needs trialling and then use the funds to trial it – the port providing the vessel, the technology firm providing the equipment/fuel system and the Government providing the cash to make it work and provide a structured report back on the outcome.

4.20 Example of ways in which these trials/research efforts could be supported include:

- Provision of cold ironing/plug in facilities for small boats/workboats/marinas (most plug in already, but not for main engines) – either a study into practicality and compatibility of power systems, or a trial with an operator of EV charging.
- Use of biofuel on a UK river – looking at how the fuel market operates on a river – at the moment there is little understanding of this and it's a major impediment to rolling out bio in locations like the Thames due to contamination/comingling.
- Deployment of Continuous Emissions Monitoring Systems (CEMS) and Portable Emissions Monitoring Systems (PEMS).
- Deployment of a fixed CEMS on a bridge or in a high pollution area to monitor the impact of vessels.
- Use of battery/hybrid systems on very short domestic voyages – primarily for ferries on short fixed runs.

4.21 This list is not exclusive. The Department would be interested in any proposals that might offer significant improvements in technologies that reduce shipping emissions or create a pathway towards the progressive application of these technologies.

4.22 Out of scope applications for this funding are the improvement and/or extensions of existing infrastructure or calls for support of a well-established technology that has already been successfully tested and applied in the maritime context.

4.23 Organisations are invited to submit applications on this basis.

Budget

4.24 The available budget for this call (including autonomy and air quality) is around £100,000. We are looking to fund 3-6 projects; however, this will depend on quality of applications and the extent of the funding required to support the project.