

Funding for Innovation: Cooperative Intelligent Transport Systems



Department
for Transport

Application Form

The level of information provided should be proportionate to the size and complexity of the scheme proposed. As a guide, we would suggest around 10 to 15 pages including annexes would be appropriate.

A separate application form should be completed for each scheme.

Applicant Information

Local authority name(s)*:

Lead Authority: Reading Borough Council

Supporting Authorities: Wokingham Borough Council: West Berkshire Council

Bid Manager Name and position:

Simon Beasley, Network Manager, Reading Borough Council

Contact telephone number: 0118 937 2228 **Email address:** simon.beasley@reading.gov.uk

Postal address: Reading Borough Council, Civic Offices, Bridge Street, Reading, RG1 2LU

When authorities submit a bid for funding to the Department for Transport, as part of the Government's commitment to greater openness in the public sector under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, they must also publish a version excluding any commercially sensitive information on their own website within two working days of submitting the final bid to the Department for Transport. The Department for Transport reserves the right to deem the business case as non-compliant if this is not adhered to.

Please specify the web link where this bid will be published:

www.reading.gov.uk

SECTION A - Scheme description and funding profile

A1. Scheme name: C-ITS for UTMC Network management

A2. Headline description:

Please enter a brief description of the proposed scheme (in no more than 100 words)

Cooperative systems will better enable network managers to properly balance the network for all modes, enabling improvements in overall network efficiency and the implementation of fairer policies to balance the use of capacity. Our proposal will look to improve roadworks information, parking information and network optimisation to the benefit of road users within the context of sustainable transport policies.

This scheme will deliver a new data engine linked to the UTMC system which will anticipate the data from the rollout of C-ITS units in cars and enhance the use of bus C-ITS. It will also demonstrate the potential of cycle C-ITS in intersection management.

A3. Geographical area:

Please provide a short description of area covered by the bid (in no more than 50 words)

The bid covers the Greater Reading area including all of the Reading Borough Council Administrative area (approx. 150,000 population) and the areas of the town of Reading which sit within West Berkshire District and Wokingham District (approx. 120,000 population). See map in Annex A.

OS Grid Reference: [SU714731]

Postcode: [RG1 2LU - Civic Centre postcode]

A4. Type of bid (please tick relevant box):

C-ITS: Connected Vehicle YES

C-ITS: Real Time Information YES

C-ITS: Smart Parking YES

C-ITS: Vulnerable Road Users YES

Other (please specify):

C-ITS: combined project integrating Connected vehicle, Real Time Information, Smart Parking and Vulnerable Road Users.

A5. Equality Analysis

Has any Equality Analysis been undertaken in line with the Equality Duty? **No**

A separate analysis has not been undertaken however as this scheme is utilising and enhancing existing tools constructed by RBC and all additional services as a result of this proposal will be available to all we do not anticipate any equality issues. However this will be kept under review, and in particular when considering challenge fund applications.

SECTION B – The Business Case

B1. The Scheme – Summary/History (Maximum 200 words)

At the core of the scheme is a new data engine that will link to the existing UTMC system and inform UTMC network management strategies. From our involvement in the CIMEC H2020 C-ITS project we would expect the roll out of in vehicle G5 units will mean the replacement of roadside journey time monitoring and in vehicle VMS messaging in around the next 5 years. Reading's extensive Bluetooth network and VMS network can act as a proxy for developing more intelligent C-ITS strategies and whilst this data is being used there is significant potential to use this in a more intelligent way. In addition we will implement cooperative roadwork technology which will give real time information on the actual start and end of road works which can be very different to the published roadworks. Reading has a strong sustainable transport strategy and the cooperative potential of the Bus AVL / RTPI system is not being fully utilized in UTMC and other projects will deliver cycle track and trace data (cooperative cycles). By combining all these data inputs we can better realise the potential capacity of the network in a balanced way.

B2. The Strategic Case (Maximum 350 words)

This section should set out the rationale for making the investment and evidence of the existing transport problems.

In particular please provide evidence on the relevant questions/issues in the accompanying Competition guidance.

Supporting evidence may be provided in annexes – if clearly referenced in the strategic case. This may be used to assist in judging the strength of your strategic case arguments but is unlikely to be reviewed in detail or assessed in its own right. So you should not rely on material included only in annexes being assessed. [[see Annex B](#)]

What are the current problems to be addressed by your scheme? (Describe any transport, environmental, social problems or opportunities which will be addressed by the scheme.

- 1) Addressing the need to allow for economic growth whilst meeting the demands for the movement of people in a congested network.
- 2) Ensure that Reading is maximising its existing data, including Bluetooth journey time monitoring, parking bay monitoring (funded through SIMON EU project) including

aspirations to extend to loading bay monitoring etc to optimise the overall road network.

- 3) Providing a better balance of priority to buses in key areas where they suffer significant delay.
- 4) Better understand the impact of roadworks on the network which often does not correspond to the published impact.
- 5) Effectively capitalise on innovation around the 'Things Network' developed by the Reading community. This is also linked to point 1.
- 6) Capitalising on current projects promoting cycling including EMPOWER and the C-ITS data that will arise to ensure that junction operation is effectively optimised.

What options have been considered and why C-ITS may provide the best solution?

Cooperative systems are seen as one of the potential disruptive technologies for transport and there is significant momentum from industry which local authorities may have difficulty keeping up with. Hence a key challenge for a local authority is making C-ITS work for all and ensure that we are able to capitalise on the potential benefits of C-ITS.

What are the expected benefits / outcomes?

- 1) Reduced vehicle delays through the new UTMC compliant data engine and monitoring of start and end of roadworks using the 'things network'.
- 2) Improved bus progression and services to bus passengers with reduced operating costs for Reading Buses.
- 3) C-ITS for cyclists – mobile phone based track and trace information volunteered by cyclists and enhanced services including, signal timings (countdown to green), pinchpoints, accident hotspots, cycle lane shut etc.
- 4) Stimulation of the local developer market for C-ITS solutions through increased open data provision and challenge fund support.

Please provide information on the geographical areas that will benefit from your scheme. You should indicate those areas that will directly benefit, areas that will indirectly benefit and those areas that will be impacted adversely.

The data engine will provide benefits across the Reading network and bus benefits will be delivered at key interchanges. Evaluation of a full multimodal network optimisation incorporating cycle and pedestrian data will be focused on the London Road SCOOT corridor.

What is the impact of the scheme?

A development tool which will deliver up to 10% delay savings to drivers and public transport and series of ancillary services and trials.

B3. The Financial Case – Project Costs

Before preparing a scheme proposal for submission, bid promoters should ensure they understand the financial implications of developing the scheme (including any implications for future resource spend and ongoing costs relating to maintaining and operating the asset), and

the need to secure and underwrite any necessary funding outside the Department for Transport's maximum contribution.

Please complete the following tables. **Figures should be entered in £000s** (i.e. £10,000 = 10).

Table A: Funding profile (Nominal terms)

£000s	2016-17	2017-18	Total
<i>DfT Funding Sought</i>	<i>70,000</i>	<i>180,000</i>	<i>250,000</i>
<i>LA Contribution</i>	<i>37,500</i>	<i>20,000</i>	<i>57,500</i>
<i>Other Third Party Funding</i>	<i>10,000</i>	<i>20,000</i>	<i>30,000</i>

Notes:

- (1) Department for Transport funding must not go beyond 2017-18 financial year.
- (2) A local contribution of 5% (local authority and/or third party) of the project costs is required.

B4. The Financial Case - Local Contribution / Third Party Funding

Please provide information on the following points (where applicable):

- a) The non-DfT contribution may include funding from organisations other than the scheme promoter. Please provide details of all non-DfT funding contributions to the scheme costs. This should include evidence to show how any third party contributions are being secured, the level of commitment and when they will become available.

The non DfT contribution, £87,500 which represents approximately 26% of the total £337,500 project value will come from the following sources:

- 1) Reading Buses (letter in Annex C) – Reading have committed to delivering a tech hub on their premises to encourage 3 or 4 start-ups to work with Reading buses to develop disruptive technologies for the bus industry. If this project is funded then the project will work alongside the tech hub to gain the maximum benefit of innovation which is expected to focus around more cooperative services between customers and the buses and services which enhance operational efficiency which will better integrate into the overall network management.
- 2) Reading buses are investing £10,000 into a review of the network operation to improve the efficiency of the bus network using the AVL system to better integrate with Reading Borough Council's UTMC and journey time monitoring systems which will be integrated into this project should it be funded to develop an added value solution.
- 3) RBC Revenue Funding – RBC's budget for developing the UTMC strategy development will be focused on delivering this scheme for the duration of the project. The value of this is £20,000
- 4) SIMON – £17,500 of funding for disabled bay parking studs
- 5) EMPOWER EU project –EMPOWER is funding the development and promotion of the track and trace functionality within the BetterPoints app which will be an input to this project. The value of this development is around £20k over the period to April 2017.

- b) Where the contribution is from external sources, please provide a letter confirming the

body's commitment to contribute to the cost of the scheme. The Department for Transport is unlikely to fund any scheme where significant financial contributions from other sources have not been secured or appear to be at risk.

Have you appended a letter(s) to support this case? Yes
[Reading Buses letter of support attached]

c) Please list any other funding applications you have made for this scheme or variants thereof and the outcome of these applications, including any reasons for rejection.

There has not been a specific application for this proposal although some of the concepts come from the unsuccessful £10m Internet of Things bid to Innovate UK last year where Reading were scored 2nd on the written stage but were ultimately unsuccessful with Manchester being awarded the funding.

B5. The Financial Case – Affordability and Financial Risk (maximum 300 words)

This section should provide a narrative setting out how you will mitigate any financial risks associated with the scheme.

Please provide evidence on the following points (where applicable):

a) What risk allowance has been applied to the project cost?

The project cost includes a 20% allowance for risk. In addition there are elements of the project which can be scaled to manage cost.

b) How will cost overruns be dealt with?

Should cost over runs occur then:

- 1) Spend against deliverables will be managed and monitored and therefore the risk of overspend will be understood before the overrun occurs.
- 2) The consequence of overspending will then be evaluated to understand the options. I.e., is there added value coming with the overspend, can the scope of the deliverable be reduced without having a fundamental impact on the scheme delivery, or is there potential to value engineer without reducing scope.
- 3) If the overspend is unavoidable or desirable because it is adding value then two options will then be reviewed:

- a. Reducing / scaling back other areas of the project to fund the overspend
- b. Look to other funding sources to meet the overspend without impacting on the rest of the project.

c) What are the main risks to project delivery timescales and what impact this will have on cost?

- 1) Procurement
- 2) 3rd Party Delivery risks
- 3) Innovation risks

These risks are discussed in Annex F. For cost we would expect:

- 1) No significant impact as we do not expect any procurement delays to be so excessive that there would be unrealistic time pressures on the suppliers that would warrant an uplift in bid costs.
- 2) Procurement will minimize the risk of 3rd party costs associated with project delay to price

provided plus any agreed contingency amounts. Some elements of delivery will be more flexible and an Agile approach will be implemented to manage these. Any delays will be monitored at the time and response to potential cost overruns addressed as in (b) above.

- 3) Innovation risks – as a development of existing technology these should be minimized. The main risks sit with the data engine and if elements are proving difficult to get to work then we would apply the approach in b above.

B6. The Economic Case – Value for Money

If available, promoters may provide an estimate of the Benefit Cost Ratio (BCR) of the scheme (particularly for schemes costing more than £100,000)

Where a BCR is provided please provide separate reporting in the form of an Annex to the bid to enable scrutiny of the data and assumptions used in deriving that BCR.

Where a BCR is not available/appropriate other values of value for money should be demonstrated. These should be commensurate with the value of the scheme – examples are set out in paragraph 20 of the Guidance.

A BCR has not been developed for the scheme however there are expected to be significant value for money benefits as summarised below:

- a. The overall scheme cost is £320,000. This will enable network operational efficiency improvements across all 80 signal junctions in Reading for traffic and will be transferable to neighbouring authorities. The scheme will also enable bus service efficiency improvements where intelligent operational approaches are required to ensure real benefits are delivered. We expect around 15 junctions in the network can be better operated to significantly benefit buses. These benefits are through use of the enhanced data engine in combination with the existing UTM and bus AVL systems. The work undertaken for the LSTF bid identified that a 10% reduction in delays across the network would equate to a discounted benefit of around £112m and whilst we do not expect this level of benefit from this modest bid we would expect a good return even if we only achieve a 1% or 2% reduction in congestion. Reading Buses have estimated the benefits of improved network management on maintaining headways at around a 3% increase in patronage, or around 0.6m passengers per annum and if around a 5% reduction in delays could be achieved on the demonstrator corridor then they could remove a bus from the schedule (£120k per annum saving) and this will further increase with the enhanced services.
- b. An accurate understanding of the start and end of roadworks will enable better information to be shared with drivers, the bus operator and other road users reducing unnecessary diversions. The benefit is difficult to predict however the supporting study will compare published to actual roadworks to estimate the benefits.
- c. The current situation is that whilst Reading is using innovation to promote multimodal transport, for example the EMPOWER project using ICT to promote cycling; it does not have the resource to make optimum of all its data for wider transport benefits. There is a significant opportunity to use data analysis and algorithms to better translate a range of datasets including Bluetooth journey time, bus AVL, cycle tracking, pedestrian densities etc into usable information for network management

and enhanced cooperative services to users.

- d. The demonstration of C-ITS optimisation for all modes in the focused study area will be a pilot demonstration as, whilst we would anticipate to secure around 300 engaged cyclists across Reading (based on EMPOWER) and we would seek to secure more, this will only represent a sample of the total cyclists in Reading. With around 20% of Reading residents cycling at least once a month the benefit of improved services for cycling will be widespread.

B7. The Commercial Case (maximum 300 words)

This section should set out the procurement strategy that will be used to select a contractor and, importantly for this fund, set out the timescales involved in the procurement process to show that delivery can proceed quickly.

What is the preferred procurement route for the scheme? For example, if it is proposed to use existing framework agreements or contracts, the contract must be appropriate in terms of scale and scope.

*It is the promoting authority's responsibility to decide whether or not their scheme proposal is lawful; and the extent of any new legal powers that need to be sought. Scheme promoters should ensure that any project complies with the Public Contracts Regulations as well as European Union State Aid rules, and should be prepared to provide the Department for Transport with confirmation of this, if required.

An assurance that a strategy is in place that is legally compliant is likely to achieve the best value for money outcomes is required from your Section 151 Officer below.

The challenge of procuring services in tight timescales is well understood by RBC. To enable the delivery timescales to be met the procurement of the services required will be through five main procurement approaches. Procurement timescale has been allowed for in the attached gantt chart (Annex D)

- 1) **Existing frameworks and contracts:** Existing frameworks and contracts will be used where applicable including the UTMCI support contract, consultancy support contracts and others. These have been checked for scale and scope and fully accommodate the relevant works for this project.
- 2) **Low value procurement:** for example, addition of new data feeds to the open data service will be sub £10k and can most expediently be delivered by the original open data service supplier.
- 3) **Challenge (Grant) funds:** Having already run challenge funds the procurement and legal approaches are all agreed and we have a template for this competition based process which will be accommodated within the procurement timescales set out in the attached Gantt Chart.
- 4) **Framework / tender:** We will need to procure the main data engine which will represent the largest spend within the budget through either a framework or a tender and timescales have been allowed for this based on previous procurements. From previous success in using the G-Cloud Government framework we anticipate that this will be the preferred way forward for procurement as it will enable the flexibility for innovation and an agile approach to delivery.
- 5) **Competitive Quotes:** we will procure 10 'Things Network' devices for roadworks to link

to existing things network communications in Reading for the trial. The value of this procurement sits within RBC's level for procuring through a quote process.

B8. Management Case - Delivery (maximum 300 words)

Deliverability is one of the essential criteria for this Competition and as such any bid should set out if any statutory procedure are needed before it can be delivered.

RBC are well versed in delivering innovation projects and this expertise has been used in putting together a realistic project plan. By building on a core of existing services we have been able to propose a project which does not carry large project risk as it represents a step forward rather than an overly ambitious tech led solution for the timescale. RBC recognises that internal resourcing will represent a challenge and therefore have allowed for consultancy support to help meet the main delivery timescales.

In putting the bid together outline discussions have been had with key existing and potential suppliers to ensure that delivery timescales are realistic and appointment of new suppliers will be based on the ability to deliver within the necessary time scales.

There is inevitably less certainty over 3rd party delivery where services are provide through the challenge fund, however we will fund a number of low cost initiatives with the expectation that not all will succeed. These will add value to the project but are not core to the delivery of the scheme. Core elements will all be delivered by contracted suppliers.

- a) An outline project plan (typically in Gantt chart form) with milestones should be included as an annex, covering the period from submission of the bid to scheme completion. The definition of the key milestones should be clear and explained. The critical path should be identifiable and any contingency periods, key dependencies (internal or external) should be explained.

Has a project plan been appended to your bid? **Yes** **(See Annex D)**

- b) A statement of intent to deliver the scheme within this programme from a senior political representative and/or senior local authority official.

(See section D below)

B9. Management Case – Governance (maximum 300 words)

Please name who is responsible for delivering the scheme, the roles (Project Manager, SRO etc.) and set out the responsibilities of those involved and how key decisions are/will be made. An organogram may be useful here. This may be attached as an Annex.

Simon Beasley (network manager at Reading Borough Council) will have overall responsibility for the delivery of the project. Simon is experienced in delivering research and innovation projects with both UK and European funding and is an expert in UTMC being the chair of the UTMC development group. Simon will be supported by Lyndon George, who is responsible for the UTMC system and the systems being used in this project including the Bluetooth journey time monitoring system, VMS and disabled bay parking occupancy studs. Lyndon will ensure the necessary technical integration is delivered by the suppliers. Simon will be supported by Marian Marsh, a transport planner, who is leading the EMPOWER project and is experienced in end user engagement and who will be responsible for the overseeing of the trials. Emma Baker, RBC's cycling officer, will advise on the cycle elements of the scheme. RBC's partnership consultant, Peter Brett Associates will work closely with Lyndon and Marian to support the development of the technical specifications and the monitoring and reporting of the demonstrations.

Simon will also liaise with the neighbouring authorities on the project. James Clements is the procurement officer allocated to the transport team who will ensure that all procurement is fully compliant with the Council's procedures and the Legal team will provide advice where necessary.

An organogram is attached in Annex E

B10. Management Case - Risk Management

Risk management is an important control for all projects but this should be commensurate with cost. For projects where the costs exceed £100,000, a risk register covering the top 5 (maximum) specific risks to this scheme should be attached as an annex.

The risk register covering the following top 5 risks is attached in Annex F and includes:

- i. Delays in procurement
- ii. Cost of services is greater than expected
- iii. Delivery timescales are greater than expected
- iv. Innovation Risks – technology does not meet functional expectations
- v. Challenge fund fails to deliver 3rd party services
- vi.

Please ensure that in the risk register cost that you have not included any risks associated with ongoing operational costs and have used the P50 value.

Has a risk register been appended to your bid? **Yes** (Annex F)

SECTION C – Monitoring, Evaluation and Benefits Realisation

C1. Benefits Realisation (maximum 250 words)

The Competition is seeking to build up the business case for the relevant technologies and use cases. Please provide details on the profile of benefits, and of baseline benefits and benefit ownership and explain how your will lead to the outputs/ outcomes. This could be achieved by logic maps, text descriptions, etc.

This should be proportionate to the cost of the proposed scheme.

We expect the following key benefits to be identified:

- 1) Evaluation of the added benefit of journey time monitoring in optimising networks through UTMC strategies – our work on CIMEC is showing that there is not an immediately clear reason why local authorities should invest in C-ITS to communicate with vehicles in the short to medium term. If C-ITS base stations can provide cost effective journey time systems and there is a clear benefit of these systems shown through this project then this could provide the business case for C-ITS base station investment.
- 2) Evaluation of the added value of investing in more accurate roadworks monitoring and information sharing.
- 3) Evaluation of the value of more advanced VMS information strategies based on Reading's comprehensive network of VMS. C-ITS will enable this information to be presented directly to the vehicle and in a greater number of locations and is expected to replace VMS and Reading's comprehensive VMS coverage will enable a large scale proxy for this.
- 4) A greater understanding of the potential of C-ITS for cyclists to become a more integrated part of network management, and gaining feedback from cyclists on how this will affect the way they travel.
- 5) A more advanced integrated bus priority use case within a more holistic network management strategy.
- 6) The role of innovative ideas and engaging with the local business community around the 'Things Network' to improve cooperative products and services to improve network management and traveller services.

C2. Monitoring and Evaluation (maximum 250 words)

Evaluation is an essential part of scheme development and should be considered and built into the planning of a scheme from the earliest stages. Periodic monitoring and evaluating the outcomes and impacts of schemes, in addition to evaluation findings towards the end, is also important to show if a scheme has been successful.

Where possible, bidders should describe has any baseline info (or other counterfactual) they will use for the evaluation.

Please set out how you plan to measure and report on the benefits identified in Section C1,

alongside any other outcomes and impacts of the scheme. Scheme promoters are expected to contribute to platforms for sharing and disseminating the lessons learned, as directed by the Department for Transport.

Monitoring and evaluation will be undertaken in the following ways:

- 1) **Numerical Analysis** – Reading have a comprehensive network of traffic count and Bluetooth detectors to understand current transport conditions. In addition we have historic bus journey time data which will provide an effective basis for evaluation. We will evaluate the impacts of different UTMC strategies developed with the data engine to understand impact and benefits. Alongside this, evaluation of the resultant signal timings will be undertaken to understand impact on delays to vulnerable road users. Track and Trace cycle data will also be used to evaluate cycle journey times through the network.
- 2) **User surveys and focus groups** – A cohort of cyclists will be engaged through the project based on existing project recruitment. Questionnaires / focus groups. This will focus on the cooperative services delivered in the project and other potential cooperative services which could be developed in the future.
- 3) **Operator surveys**- Network management staff and Reading buses will provide formal feed back on the lesson's learnt from the project.

A final report will be produced summarising the data and RBC staff will attend any relevant feedback meetings and present at necessary events.

SECTION D: Declarations

D1. Senior Responsible Owner Declaration

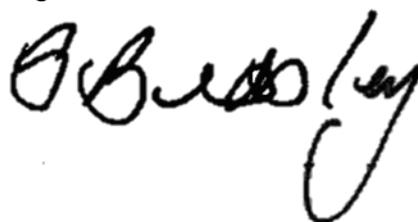
As Senior Responsible Owner for [*scheme name*] I hereby submit this request for approval to DfT on behalf of [*name of authority*] and confirm that I have the necessary authority to do so.

I confirm that [*name of authority*] will have all the necessary powers in place to ensure the planned timescales in the application can be realised.

Name:

Simon Beasley

Signed:



Position:

Network Manager, Reading Borough Council

D2. Section 151 Officer Declaration

As Section 151 Officer for [*Reading Borough Council*] I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that [*Reading Borough Council*]

- has allocated sufficient budget to deliver this scheme on the basis of its proposed funding contribution
- will allocate sufficient staff and other necessary resources to deliver this scheme on time and on budget
- accepts responsibility for meeting any costs over and above the DfT contribution requested, including potential cost overruns and the underwriting of any funding contributions expected from third parties
- accepts responsibility for meeting any ongoing revenue requirements in relation to the scheme
- accepts that no further increase in DfT funding will be considered beyond the maximum contribution requested
- has the necessary governance / assurance arrangements in place
- has identified a procurement strategy that is legally compliant and is likely to achieve the best value for money outcome
- will ensure that a robust and effective stakeholder and communications plan is put in place.

Name:

Alan Cross

Signed:



Submission of bids:

The deadline for bid submission is **5pm, 30 September 2016**.

An electronic copy only of the bid including any supporting material should be submitted to:
TRAFFIC.COMP@dft.gsi.gov.uk