

Funding for Innovation: Connected Vehicle Data



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: Lead Authority: Cambridgeshire County Council
Includes Cambridgeshire County Council and Peterborough City Council

Bid Manager Name and position: Mike Atkins – Highways Asset Manager

Name and position of officer with day to day responsibility for delivering the proposed scheme.

Contact telephone number: 01223 715560

Email address: mike.atkins@cambridgeshire.gov.uk

Postal address: Cambridgeshire County Council
Place and Economy
Vantage House
Vantage Park
Washingley Road
Huntingdon, PE29 6SR

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:

Cambridgeshire County Council

<https://www.cambridgeshire.gov.uk/transport-funding-bids-and-studies/transport-funding-bids/>

Peterborough City Council

<https://www.peterborough.gov.uk/residents/transport-and-streets/highway-asset-management/>

SECTION A - Scheme description and funding profile

A1. Scheme name: Mobile Phone based Asset Management

A2. Headline description:

Please enter a brief description of the proposed scheme (in no more than 250 words)

£76k funding for innovation is requested towards a £96k one-year programme, for completion within 2018-19, to assess and report on an innovative 'Computer Vision' solution being proposed by Vaisala which would enable the automated digital visual recording and processing of road conditions across Cambridgeshire and Peterborough, using standard android mobile phone technology.

The trial would also include the recording of road condition information using mobile phone accelerometer data and correlation with existing highway condition information, such as Scanner and Coarse Visual Inspection data, displaying a network 'heat map' to identify potential hazards and areas of deterioration.

A focus of the trials will be across the fen roads to monitor the rate of deterioration in these roads, particularly those recently improved as part of the successful Challenge Fund Drought Damage award to the Cambridgeshire and Peterborough authorities during 2017/18.

A3. Geographical area:

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

The area concerned is shown on the map provided, Appendix A, being mainly north & east Cambridgeshire, and eastern Peterborough. It covers the fen area of these authorities, where soil conditions contain substantial quantities of peat and other water susceptible sub-strata.

OS Grid Reference: not applicable

Postcode: not applicable

Please append a map showing the location (and route) of the proposed scheme, existing transport infrastructure and other points of particular interest to the bid e.g. development sites, areas of existing employment, constraints etc.

Appendix A: Map of Geographic Area showing particular roads of interest

A5. Equality Analysis

Has any Equality Analysis been undertaken in line with the Equality Duty?

Yes – Attached Appendix B

SECTION B – The Business Case

B1. The Scheme – Summary/History (Maximum 300 words)

Please outline what the scheme is trying to achieve – .indicate what data you expect to collect and your technological approach, what applications you will deliver from the connected data etc.

This should also provide a clear statement on data privacy and security.

We would use existing readily available android mobile phone technology with a bespoke app to digitally record the aspects of the highway asset and provide dynamic and continuous updates on the road condition, ride quality, and changes to these.

The “Computer Vision” automated road condition monitoring-technology utilizes a smart phone’s inbuilt camera, accelerometer and GPS devices to collect survey data and ride quality information to produce a “heat-map” based user interface to identify areas of the network deteriorating, for example due to subsidence caused by erosion of fen soil at specific locations. The system will also be able to identify bumps and other potential hazards and detail those on the map based user interface.

The project would involve connecting a number of highways department vehicles with the Computer Vision technology to collect data and feed it into the system for analysis. The project includes the evaluation of the data against existing road condition survey data produced by previous SCANNER and CVI/DVI surveys. This evaluation will enable the Computer Vision machine learning capabilities to improve the analysis of road condition based on the data collected by the in-vehicle hardware.

The project would:

- Test and develop the capabilities of the app regarding the recording of road condition
- Developing the “learning” potential of the app via correlation of data (be it visual and/or accelerometer) with existing pavement condition data
- Explore capabilities / applicability of the app regarding pavement condition projection, via trend analysis. Monitoring of the changing condition of roads founded on fen soil types would provide synergies with the authorities’ successful Challenge Fund bid for innovative maintenance treatments for these roads

The project would adhere to current legislation and no personal information will be transmitted or used within the project. Any personal data inadvertently collected will be immediately deleted.

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.

What are the current problems to be addressed by your proposal?

At present highway condition data is recorded using expensive, specialist equipment, or visually, meaning it is only collected at infrequent intervals. Highway condition data on some parts of the network may currently only be collected on a 4 yearly cycle. The condition of traffic signs and other street furniture is not recorded automatically.

What options have been considered and why does your approach to road condition provide the best solution?

The proposal is to monitor the highway asset using readily available low-cost equipment (android phones), and the data processed automatically. This data will be evaluated against existing condition data from Scanner and Coarse Visual Inspection surveys, which will be used to inform the Computer Vision artificial intelligence capabilities to improve the analysis of data. Refer to Appendix H for a brief description from Vaisala.

What are the expected benefits / outcomes?

- Use of readily available equipment and the automatic processing of data will enable the deterioration of the asset to be monitored on a significantly increased basis
- Network 'heat map' showing of areas of deterioration, and the ability to identify bumps and other potential hazards
- Real time monitoring of the asset, as it becomes rolled out further. For example; has a sign suddenly disappeared? Is there a missing / stolen gully cover.

What is the impact of the scheme?

The scheme, if rolled out, would improve the condition data available to asset managers, which would lead to an improvement in the condition of the network to the users' benefit. Ultimately the scheme could be used to automatically monitor the safety index of a road and update the index based on improvements / changes to the asset.

How will you transform the data into intelligence?

By automatically processing of the data collected through machine learning and by improving the artificial intelligence capabilities of the Computer Vision system.

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	2018-19	Total
<i>DfT Funding Sought</i>	76	76
<i>LA Contribution</i>	10	10
<i>Other Third Party Funding</i>	10	10
<i>Total Project Funding</i>	96	96

Notes:

- (1) Department for Transport funding must not go beyond 2018-19 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.*

This bid confirms that Cambridgeshire and Peterborough will allocate additional funding to the value of £10,000, equivalent to a contribution of over 10%, reflecting the importance that the authorities place on the management of their respective road networks

- 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 – Appendix G. This shows a Vaisala contribution to the project of £10,000. This is recognition from Vaisala that they will receive some valuable development for this system and have agreed to offer a discount for the proposed investment. This contribution is equivalent to a contribution of over 10%

This brings the total non DfT contribution to £20,000, or over 20% of the overall cost.

- 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.*

None

B5. The Financial Case – Affordability and Financial Risk (maximum 200 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?

A 10% risk allowance has been applied. Both Authorities have a robust understanding of historic and future costs based on past experience and existing term contracts. A low element of risk has therefore been applied to this proposal to reflect external price fluctuations.

- b) How will cost overruns be dealt with?

Both authorities are confident that the study works can be delivered in financial year 2018/19 within the funding levels provided. Any cost over-runs will be the responsibility of the two authorities.

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

- Price fluctuation
- Dispute with the software developer
- Technology not working
- Mobile phone signal availability/reliability
- Speed of development of the app

A 10% allowance has been calculated to allow for these risks

B6. The Economic Case – Value for Money (maximum 200 words)

Bidders are requested to provide qualitative description of the data that will be collected from the project and how these could provide potential benefits going forward.

The asset data will be automatically recorded and faults identified, and by comparing with real time with baseline data will enable

- The rate of deterioration of the asset to be monitored, enabling just in time maintenance
- The Identification of “missing” assets, for example a missing or new street sign or gully

This should also capture any examples which generate revenue from the data collected and an indication on the number of users that benefits

The study will validate or otherwise the collection of Asset data using digital video and accelerometer data captured using readily available mobile phone technology. The key benefits are:

- Easy and cost effective to roll out the technology, initially to Highway Inspectors but then to the general workforce and beyond, enabling the asset to be monitored more effectively in real time
- Potential saving in inspection costs

If the trial is successful and the software rolled out nationwide then effectively all users of the asset benefit, through:

- Reducing the road safety risks caused by missing street signs, street gulleys etc
- Early detection and remedy of faults (such as pot holes, missing or dirty street signs)
- Potential saving in Highway Claims, e.g. due to potholes otherwise causing vehicle damage

B7. The Commercial Case (maximum 200 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.

The preferred Contractor Vaisala will be secured by either Peterborough or Cambridgeshire through their existing framework contract with Skanska. The appointment by either of these authorities is within scope through their existing contracts with Skanska. Negotiations and agreement have already been reached with Vaisala who will be an integral part of the project.

*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.

B8. Management Case - Delivery (maximum 200 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.

No statutory procedures are required in order to deliver the bid within the 2018/19 financial year.

The mobile device technology required to deliver this project is readily available and the project is able to start promptly, with only a two week mobilisation period required. The outline project plan indicates a 9 month delivery programme, with capacity for float.

- 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. Attached Appendix C

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

Support for this scheme has been granted by the Combined Authority, see Appendix D, and a letter confirming our joint approach from Peterborough City Council, see Appendix I.

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.

This project is being delivered jointly by Peterborough and Cambridgeshire, with support through our shared delivery partner Skanska. Detailed Governance responsibilities are identified on the attached Appendix E.

B10. Management Case - Risk Management

Risk management is an important control for all projects but this should be commensurate with cost. A risk register covering the top 5 (maximum) specific risks to this scheme should be attached as an annex.

Has a risk register been appended to your bid? Yes No

Attached Appendix 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.

We also request that your bid clearly articulates how you are expecting to use the data collected and the expected benefits for both road users and road operators. Please also outline how you could measure the expected benefits from the application of the harvested data.

The benefits will be measured by comparing the new automatically collected data with existing, more traditional but costly highway condition survey data for accuracy. We would also measure and monitor:

- How accurate is the data collected?
- How easy is the data to collect and evaluate?
- Can the system be easily rolled out to wider usage?
- An up to date asset inventory enables Asset deterioration to be monitored, which would enable just-in-time maintenance
- Missing assets to be identified enables an unsafe asset to be quickly fixed and improve overall inventory data
- Ultimately, an improvement to the performance of the asset to the benefit of the user

C2. Monitoring and Evaluation (maximum 150 words)

The Department intends to evaluate the competition and bidders are requested to support our evaluation activities through the provision of information. For example, we may ask you to complete a survey or take part in an interview. In particular we will be interested to gather your views on; the delivery process (e.g. have you delivered your proposal to cost and schedule and whether you have encountered any barriers to delivery); the technology implemented (e.g. did it work as intended); the data collection process (e.g. do you have confidence in the data collected?); and how the data has been used/how are you planning to use it?

We will produce a monitoring and evaluation plan; which will identify and quantify any benefits realised

- How the data is being used to support existing highway condition data
- Whether the system can be rolled out for wider use and realise greater benefits
- Can the system be ultimately used to automatically index the safety of a route
- The continuous update of inventory data through machine learning

SECTION D: Declarations

D1. Senior Responsible Owner Declaration

As Senior Responsible Owner for Mobile Phone based Asset Management I hereby submit this request for approval to DfT on behalf of Cambridgeshire County Council and confirm that I have the necessary authority to do so.

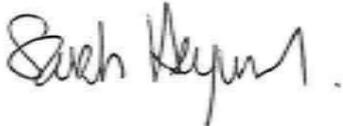
I confirm that Cambridgeshire County Council will have all the necessary powers in place to ensure the planned timescales in the application can be realised.

Name: Richard Lumley	Signed: 
Position: Assistant Director – Highways	

D2. Section 151 Officer Declaration

As Section 151 Officer for Cambridgeshire County Council I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that Cambridgeshire County 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: Sarah Heywood	Signed: 
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Submission of bids:

The deadline for bid submission is **23.59 on 16 February 2018**.

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