



Report To: Greater Cambridge City Deal Executive Board

13 July 2016

Lead Officer: Noelle Godfrey, Cambridgeshire County Council

Smart Cambridge: Smart City Management Platform Progress Report

Purpose

1. The purpose of this report is to provide a progress update to the Board on the Smart City Management Platform, which forms part of the Smart Cambridge project.

Recommendations

2. The Executive Board is asked to note:
 - (a) the progress to date;
 - (b) the forward plan for the delivery of the first phase.

Background

3. In November 2015 the City Deal Executive board gave in principal agreement to the development of a “smart city management platform” as part of the Smart Cambridge work stream.

In March 2016 the board gave approval to a £300k investment proposal for the Smart City Platform and asked for a progress update to be presented to the July board meeting.

Description and update

4. The aim of the Smart City Platform is to collect, process and make-available data to help improve transport and reduce congestion in Greater Cambridge.

There is a vast amount of data that either already exists, or which could be collected. The problem is that, at the moment, it is neither joined-up nor readily-available for the public or professionals to use. So the Smart City Platform will solve this problem by:

- (a) collecting transport and transport-related data from many existing and new sources

For example, as part of the first phase:

- The team is working with the bus operators to capture the data from the GPS sensors that they already have on their buses, which gives “real-time” information about exactly where buses are. This data is currently only available to each bus company itself, but the Smart City platform will enable it to be made widely-available and used as described below.

- The team is using the new network of about 30 Bluetooth sensors on key roads throughout the City, which count real-time traffic volumes, and which will be made widely-available and used as described below.
- The team has established a pilot network 20 Air Quality sensors throughout the City, to provide a better view of the air quality impact of traffic congestion across Greater Cambridge and used as described below.

As part of the second phase, the team will pursue:

- Collecting data on the real-time occupancy levels of:
 - car parks
 - blue badge spaces
 - loading bays
 - coach parking spaces
- and further data could include:
 - the use of sensors to determine how full individual buses are
 - temperature and other weather-related sensors to enable micro-weather forecasting for cyclists within the City.

(b) combining and processing this data

This is a big technology challenge. The ability to combine and process very large amounts of data in a manner that will provide useful outputs is reliant on leading-edge “Smart City” technology and concepts which are not yet in general use in the management of transport networks.

The Smart Cambridge Project Team is working in close collaboration with the University of Cambridge as well as with Smart City teams from other cities across the UK including Peterborough, Milton Keynes, Oxford and London, to develop these innovative solutions.

Although various mitigations have been put in place, including the use of leading specialists from several departments at the University of Cambridge, the Smart City Platform is based on leading edge concepts and technology that has not yet been fully proven; therefore the project outputs and timeline are of necessity aspirational and as such are not guaranteed.

(c) making this data readily-available to the public, planners and other IT developers.

The key output will be many “data feeds”. These will be able to be used not just by the City Deal and partner Councils, but will be made available to third parties.

The list of possible uses of the data is very long, and will be refined in due course. Not all of it will be developed or introduced by the Smart City team itself: indeed, one of the points is that other City Deal or Council departments, or third parties, will be able to use the data. The list includes:

- Smart Cambridge will launch a free public mobile phone App in 2017. This will enable all residents, commuters and visitors to see the real-time location of buses, how busy the roads and real time train information. By giving more accurate information to the travelling public about whether public transport is running to schedule and how busy the roads are, the public will have a “real-time” view about the best travel options to take, and will gain greater confidence in the transport system. The App will have the capability of including information that mainstream journey-planners such as Google and Apple don’t have. It is likely that the app will require several phases of refinement, but we plan for the first version of the App to be available for the public to test by April 2017.

- The data will be made available (on appropriate terms) to third-party users who will be encouraged to build Apps of their own.
 - More real-time traffic data indicators can be installed: for example, as car drivers approach the Park & Rides, they can be warned about bad traffic or full City centre car-parks, inducing them to use the Park & Ride and a bus instead.
 - The City Deal and partner Councils will get more and more accurate data about traffic flows round Cambridge and South Cambridgeshire, and their transport planning departments will be able to use that to better plan future transport-related initiatives.
 - The air quality data will enable better environmental planning.
5. The primary outputs from this project are summarised below, and more detail is included in Appendix Two which includes the slides for the presentation to the Board in conjunction with this report from Dr Ian Lewis from the University of Cambridge. The technology components include:
- (a) *in relation to 4(a) above:* An “Internet of Things (IoT) capable” network and a sensor deployment plan and test-bed.
 - (b) *in relation to 4(b) above:* A data hub which collates process and makes available a number of disparate transports related data sets.
 - (c) *in relation to 4(c) above:* A series of test-bed applications and examples, including the trial travel-related mobile phone App referred to above.
6. Work to date has proceeded well. The project stream will be delivered in two overlapping phases. The first is already underway and will be complete by April 2017; the second will start in January 2017 and complete by April 2018. The project plan, together with outline timescales for Phase One is included at Appendix One.
7. The core team is taking advice and assistance from external parties:
- The Smart Cambridge Advisory Board has been helping to steer the work and give technical guidance. The Advisory Board has to date met twice, with its last meeting on 10th Dec 2015. Given its technical and working nature, minutes are not published.
 - Cambridge University will provide resource and expertise to assist develop and host elements of the Platform, and a Memorandum of Understanding (MOU) will be agreed to formalise the approach. The Universities input will be a combination of both free and chargeable resource.

Implications

8. In the writing of this report, taking into account financial, legal, staffing, risk management, equality and diversity, climate change, community safety and any other key issues, the following implications have been considered:

Financial and other resources

9. The allocated budget for the Smart City Platform project is £300k over 2016/17 and 2017/18.

Legal

10. As set out in paragraph 7 above, a Memorandum of Understanding is being drawn up to set out the collaborative partnership, including roles and responsibilities, between the University of Cambridge and Cambridgeshire County Council, Cambridge City Council and South Cambridgeshire District Council with respect to the Smart Cambridge project.

Risk Management

11. Risk and Issue Registers are in place for the project and managed through the Smart Cambridge Programme Board.

Climate Change and Environmental

12. Potential air quality benefits are set out in paragraph 8 above.

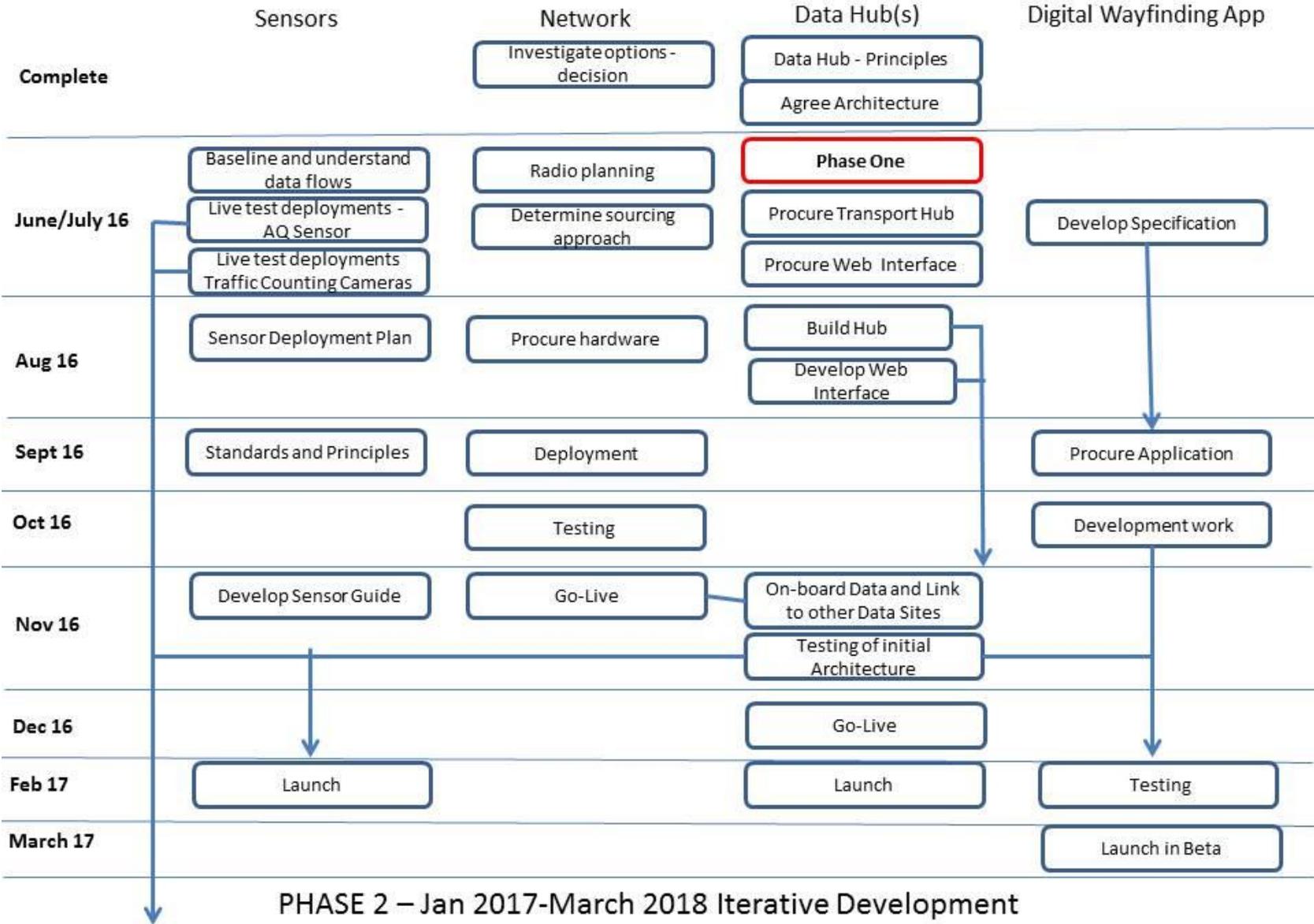
Background Papers

Further information about the Smart City Platform, including membership of the Smart City Advisory Group can be found in the Smart Cambridge Guide at:

<http://www.connectingcambridgeshire.co.uk/wp-content/uploads/2016/03/Smart-Cambridge-guide.pdf>

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Cambridge City Management Platform – First Phase



Dr Ian Lewis

Director, Infrastructure and Investment, University of Cambridge

**Presentation to
The Joint Assembly
and Executive Board
July 2016**

Development of the Smart Cambridge Platform



Development of the Smart Cambridge Platform

1. The City Deal has a primary emphasis on deriving economic benefit from improved local travel in the region.
2. A successful case was made that a proportion of the City Deal investment should target a 'smart programme' that will
 - a. Inform travellers about their travel choices
 - b. Support intelligent planning of the transport infrastructure
 - c. Provide the framework within which the digitally connected city will evolve
3. The approach taken seeks to take advantage of the unique strengths of the region, with collaborative working between the local authorities, suppliers and the University.
4. The evolving platform created with the support of the University is technically state-of-the-art with significant elements already in place. It is designed to grow as additional requirements emerge.
5. We have worked with other cities in planning our approach and aspire to a leadership position, while ensuring the practical developments target priority requirements in our region.
6. As it becomes better known that the Cambridge region is making progress in this area, we are attracting increasing engagement from other participants in the sector who will contribute, particularly the commercial developers of travel platforms but also local employers with an interest in informing their employees.



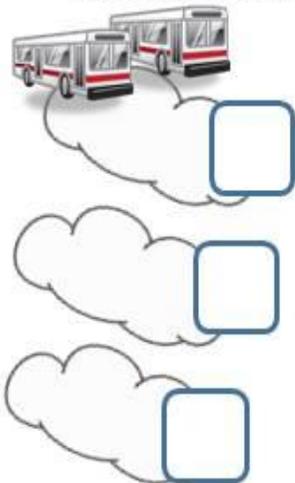
Overview of the Smart Cambridge architecture

The 'sensor network' is the essential underpinning of any real-time information system. Currently it includes position transmitters on our region's buses, blue tooth sensors on the road network and Air Quality sensors. It is important that our platform can incorporate new information as it becomes available. This list is expected to grow overtime.

Data collected is made available for analysis. This means for example, that we can measure the pre- and post-journey times for transport initiatives. Already we have better data than most cities.

The 'real-time' platform is the core of the digital infrastructure. It is what enables data (e.g. the positions of buses) to be collected and disseminated in a reliable way.

The architecture is enabling the provision of a range of travel applications to be available to the public, sourced from local organisations including the University, and commercially.



Planning 'back door'



Real-time Data System and Digital Archive

Portfolio of Travel Applications

Public 'front door'



Federated Sensor Networks

How our approach is intending to meet the goals

1. Informing travellers about their travel choices

A portfolio of 'apps' for use by the public will emerge. These will be provided by the Smart Cambridge platform itself, by collaborative contributors in the region including the University, and by commercial providers.



2. Supporting intelligent planning of the transport infrastructure

The Smart Cambridge Platform is already collecting the data necessary for a detailed practical analysis of the impact of transport schemes. The richness of the information will grow with time. The University will also exploit this data in for research analysis which may benefit the region.



3. Provide the framework within which the digitally connected city will evolve

There is ongoing discussion regarding other 'sensor' data that will inevitably become available in the region, from air pollution data to cycling and footfall sensors and other traffic data. The platform is designed from the outset to accommodate additional 'sources' as they become available.