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Our challenge is about Transport Network Management for New Mobility

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Oxfordshire County Council (“OCC”) is responsible for providing many key services and employs over 20,000 people to deliver these. Each year the OCC manages £700 million of public monies in the provision of these services on behalf of Oxfordshire’s 650,000 people. This includes transport planning and policy, roads, schools, social services, the fire service, libraries, the museums services, trading standards, land use and waste management.

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Oxfordshire is a mainly rural county made up of the medieval city of Oxford, market towns such as Banbury, Bicester and Witney and villages. Transport routes are mostly radial between the towns and Oxford. And we have a Knowledge Spine connecting Harwell & Didcot in the south to Oxford in the middle and Bicester in the northeast.

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We are part of England’s Economic Heartland that joins the local authorities between Oxfordshire and Cambridgeshire, where there is expected to be large growth in are jobs and housing. There are plans to reopen the old Varsity train line through the EEH corridor and to build an expressway.

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Oxfordshire is at the centre of the CAV R&D with autonomous vehicle trials happening in Oxford, Kidlington, Didcot and Culham. We are also in the middle of the motorsport valley.

Slide 6 CAV Projects

Read the slide.

We are the largest local authority CAV team other than TfL in the country and have 9 CAV projects funded by Innovate UK, SBRI and DfT. Some of these are Driven, lead by Oxbotica who have been testing their

CAV vehicles here in Oxfordshire in the secure campus environment of RACE in Culham and on the roads in Oxford and Kidlington.

OmniCAV is an AI Simulation that will enable autonomous vehicle software to be tested on a 32 Km Digital Twin route in Oxfordshire from the very urban Oxford city centre, dual carriageways, rural roads with few or no road markings, complex junctions like the Abingdon Road & Heyford Hill roundabouts and everything in between. It's a bit like a driving test for AVs to check if the software works as expected, it's the quality of kilometres driven not the quantity. This hopes to prove that AV's are not just for cities but for all.

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Here are a few of the companies working on autonomous vehicles here in Oxfordshire. Arrival van. Roborace car. Oxbotica with their cargo pod and DRIVEN project vehicle. Streetdrone's modified Renault Twizzy. But there are more, and some are in the room today. As well as Autonomous Vehicle's...

Slide 8 MAAS

OCC have committed to support new technology that delivers new mobility models and modes including CAVs which were specifically mentioned them in LPT4. This includes the largest Demand Responsive Transport service in the country, Pick Me Up, operating in east Oxford with 60,000 journeys in the first six months of operation. Not forgetting Dockless bikes which also operate in Oxford which are more user friendly than docked.

Along with walking, trains, planes and automobiles these are all part of Mobility As A Service and we need to enable end to end journey planning, booking & payment and for the routing of those journeys to be adaptable dependant on real time information about what is happening out there on the network.

Slide 9 - Drones

While drones are already used by our fire service to get a bird's eye view of incidents, and their potential use by us for managing our assets. We also must recognise their future use for delivering goods and people. We have a policy that does not allow drones to be flown over large crowds because of the risk. If drones start to be used for delivering goods this could create a very crowded low-level airspace above our population

centres. With that in mind how might drones be managed, corridors? There needs to be a Drone Traffic Control Centre, could that management tool be incorporated within a traffic network management system for new mobility if we don't just think of traffic as being on the highway.

Slide 10

Oxford plans to have the country's first Zero Emission Zone so there needs to be places where people can park & charge, but they also need to know if a charger is available at the end of their journey. Vehicles entering the Zero Emission Zone will have to be managed. This may be by time of day and the zone dynamic based on real time AQ sensors. To improve Air Quality we need to reduce congestion. Most signalised junctions operate at capacity during peak times using our existing methods of control such as SCOOT and MOVA, but could we squeeze more through using real time demand data and modelling. There also has to be a change in behaviour and that might only be through road pricing. Knowing the availability of a disabled bay is important maintain accessibility for all.

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We started implementing UTMC in 2008 and are now in our third Traffic Control room where we monitor the highway network from. BBC Radio Oxford broadcast their peak time travel news from the control room giving added insight but also enables us to get quality information to the public.

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Unplanned events on the highway network such as flooding or the fire at Oxford's Randolph Hotel shut some of our roads for days. Or having to send our Gritters out with their snow ploughs. Accidents and broken-down vehicles blocking lanes also must be managed.

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Planned events on the network that disrupt traffic are roadworks for schemes and utility companies, gulley emptying. Large events off the network like BBC Countryfile Live at Blenheim Palace increase the amount of traffic on our network.

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As an authority we have several different types of sensors out there on the network from journey time monitoring cameras to smart cycle detection. But there are more IOT projects that we want to support and ingest the data from like the citizen led Oxford Flood Network.

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A traditional way of informing the driver is by using Variable Message Signs but why can't we get that same message directly into the vehicle and can it be tailored to that specific journey?

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Currently data comes in from various other systems – Roadworks, UTC, 6 different parking providers, Journey Time cameras, road loops, Real time bus information, Gritters, Highways England and more.

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Roadworks Data flow Example

Blue indicates what we do already, and Orange are potentials for the future.

Slide 18

Real Time Parking Availability

Blue indicates what we do already, and Orange are potentials for the future.

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The Alliance for Parking Data Standards are working to create worldwide standards for managing the kerb space. There is a need to digitise Traffic Regulation Orders so that they are machine readable not just for managing the kerb space but speed limits, signs and much more will be required for CAVs.

Slide 20 – What we want

- Network management system
- Integrate with existing systems
- Accommodate new technologies

- Manage the movement of people and goods
- Be ready and de-risk CAVs and EVs
- Use IOT, crowd sourced and third-party data
- Provide analytics and create new KPIs
- Share Data easily
- Adaptable
- Portfolio approach

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- AV Operational Design Domains
- Rising Bollards
- Grid Capacity
- Street lighting
- Cycling and Walking
- Floating Vehicle Data
- Reliability of the Service
- Linking to Fix My Street
- Your ideas

Slide 22

The challenge can be found on the Innovate UK website, this is the link to this specific challenge. It is there now to view, it goes live on 4th March and closes at 12 noon on 17th April.

Slide 23

We will enable you to visit the traffic control centre during phase 1 and the first date for this is in the afternoon on the 18th March in Ron Groves House in Kidlington. Please contact cav@oxfordshire.gov.uk if you want to book a visit.

Slide 20 The team