Innovation in Local Government
Oxfordshire’s approach

Llewelyn Morgan - Head of Innovation Oxfordshire County Council
And we may ask ourselves, “Well..... how did we get here?”

Oxford University, the most prolific University innovator in Europe, the City and County is a vibrant centre of innovation.

One of the fastest growing Places in the UK, though, brings its own challenges.

In 2015 OCC, City and Oxford’s Universities set up Smart Oxford with partners and initiated significant developments to address our societal challenges in key areas like:

• Transportation and Smart Cities
• Health and Wellness
• Environment

So it’s our regional innovation strategy to prioritise embedding innovations in the “Place” - a test-bed for innovation that can be shared with the broader world.
It started with learning from R&D Feasibility on mobility and embedding into OCC Policy; Science Transit Strategy

<table>
<thead>
<tr>
<th>Innovation in Transport</th>
<th>Intelligent mobility</th>
<th>Key infrastructure Improvement</th>
<th>Key route &amp; service enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating an ecosystem of innovation</td>
<td>Optimised movement of people irrespective of mode</td>
<td>Improve connections between key locations along the knowledge spine</td>
<td>Improve connections between key locations along the knowledge spine</td>
</tr>
<tr>
<td>Oxfordshire Living Laboratory</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multiple lead deliverers and project partners – consortium approach to project delivery and funding
Transport Impact In Oxford

Transport Responsible for 27% CO2 in UK
Est. 17% Oxford

45000+ Cars into Oxford in peak hrs

40% trips through traffic

2nd highest level of Cycling in UK

These challenges have led to a major policy direction

UK’s first ZEZ phase 1 starts later this year
Work Place Parking levy
Focused investment into Cycling, Walking and Public Transport Infrastructure
Why are Local Authorities essential

Multiple Timescales

- **Now/Minutes**: Emergency/Incident Management
- **Minutes/Hours**: Traffic Management
- **Hours/Days**: Asset Management
- **Months/Years**: Education Authority
- **Years/Decades**: Urban Planning
NEVFMA – AQ/RT Network Management project

**INPUT DATA**

Earthsense
- Zephyr AQ sensors on OCC fleet vehicles
- Zephyr AQ sensors on roadside infrastructure
- Data analysis and comparison vehicle vs roadside

Siemen
- SCOOT data and ITS expert
- Adapt road infrastructure to Zephyr sensors
- Cloud connected edge module to link MOVA to SCOOT
- Adapt loops to provide count data

**REAL-TIME TRAFFIC MANAGEMENT SYSTEM**

Data Manager
- Recurrent data feeds for monitoring and visualisation
  - Traffic patterns
  - Historical Data
  - Typical day OD matrices
  - Changes in supply, PT and signals

Air Quality Predictions
- Zephyr measurements
  - Traffic data
  - Simulated outputs
  - Air Quality prediction

Real time SCOOT simulation

Quality manager

Simulation Storer

**outputs**

OCC UTMC Centre

**MONITORING:** current traffic and air quality conditions for the whole network

**PREDICTIONS:** short-term predictions of traffic and air quality conditions for the whole network

**STRATEGIES:** comparison of different scenarios to improve traffic and air quality conditions

**OBTENTION OF BEST STRATEGY FOR EACH SITUATION IN REAL TIME**

**OUTPUTS**

OCC UTMC Centre

**Interactive VISUALISATION PLATFORM**

aimsun.live

- Interactive visualisation for traffic patterns
- Area of focus on the network

Air Quality Simulation

- Zephyr AQ sensors on OCC fleet vehicles
- Zephyr AQ sensors on roadside infrastructure
- Data analysis and comparison vehicle vs roadside

**BBC Oxford, OCC Twitter**

HE Traffic Management Centre
Summary of deployment

Traffic Model
- based on 2019/20 (pre COVID-19)
- Demand covers 24h 7 days a week
- 10 different day profile types, including a COVID-19 profile

ITS
- 179 continually monitored vehicle flow locations via 3 key providers
- Live VMS feed
- Geographical data for signal control

Air Quality
- Emission estimates available for CO₂ & NO₂
- NO₂ dispersion prediction and connectivity from EarthSense
- 18 freshly installed Zephyr AQ sensors

Real-time decision support:
- 4 future (+15, +30, +45, +60min)
- simulated and analytical predictions available
- 3 response plans can be simultaneously compared
LEO enables local energy trading

Adapted from the SSEN “Supporting a Smarter Electricity System — Our Transition to DSO” paper

LEO delivers a mature, quantified, and engaged supply of flexibility within a regional bound

LEO develops the interaction between marketplace operators

TRANSITION delivers the data exchange requirements and trading opportunities for a flexibility market.
Our Solution

Design thinking approach – solution agnostic

• Starting point:
  • natural
  • sustainable
  • off grid
  • cost effective
  • NOx and particulates

Beyond the obvious:

• sensors (AQ, humidity, soil...)
• power independent
• connected (LPWan)
• mobile

Moss...

36 out of 43 zones have illegal levels of air pollution

£54b pa UK economic cost (WHO)
Direct health & social care cost £5.3 billion by 2035
Moss Wall 1.0
12sqm for less than £3,000

- Self Contained Structure
- Moss Life Support System integrated including Ph Sensors, Precipitation, H2O Saturation to ensure Moss integrity
- Reusable pods for holding the organic material
- Seeded Roof for Filtration
- IOT Sensors for Solar and Battery Life
- 120L water tank with Grey water collection
- All parts can be reused and repurposed
- Wall can be ‘covered’ to create street art / using organic and repurposed materials
Moss Stop 1.0
Modular Bus Stop

- Replace Back Section
- Replace Roof Section
- No Structural Changes or ‘major works’
- Sedar Roof for Grey Water Collection
- Solar Powered / independent from Grid
- Wireless Phone Charging built into Seating Bench
- Water and Irrigation System in built in back wall
- IOT Sensors for maintenance / flush cycles / irrigation flow, 24/7 remotely
- Looking for initial Prototype Sites
Our Track Record

| £135 million+ Revenues | 60+ Projects | 100s Business & R&I engaged | 1 Local Authority |
Get in touch; we are here to support others delivering innovation in public services

Llewelyn Morgan - Head of Innovation Oxfordshire County Council
Email: Llewelyn.morgan@Oxfordshire.gov.uk
Twitter: @llewelynmorgan
Connect on LinkedIn