
POLIS
CITIES AND REGIONS FOR TRANSPORT INNOVATION
ANNUAL CONFERENCE 2021
Innovation in Transport for Sustainable Cities and Regions
1-2 DECEMBER 2021 GOTHENBURG, SWEDEN

2021 Annual Polis Conference

NEVFMA: Combining real-time air quality and traffic data in Oxfordshire

Carles Illera – Regional Head of Professional Services UK

NEVFMA - Network emissions/ vehicle flow management adjustment

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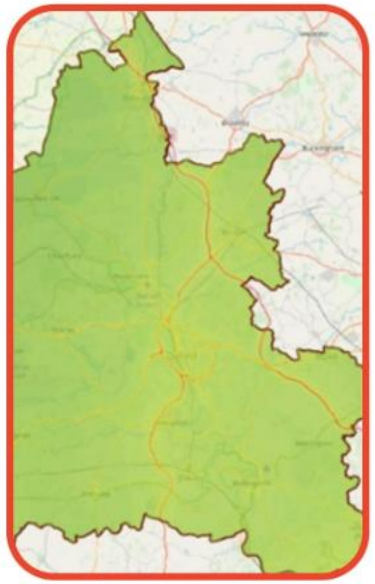
EARTHSENSE

SIEMENS

OXFORDSHIRE COUNTY COUNCIL

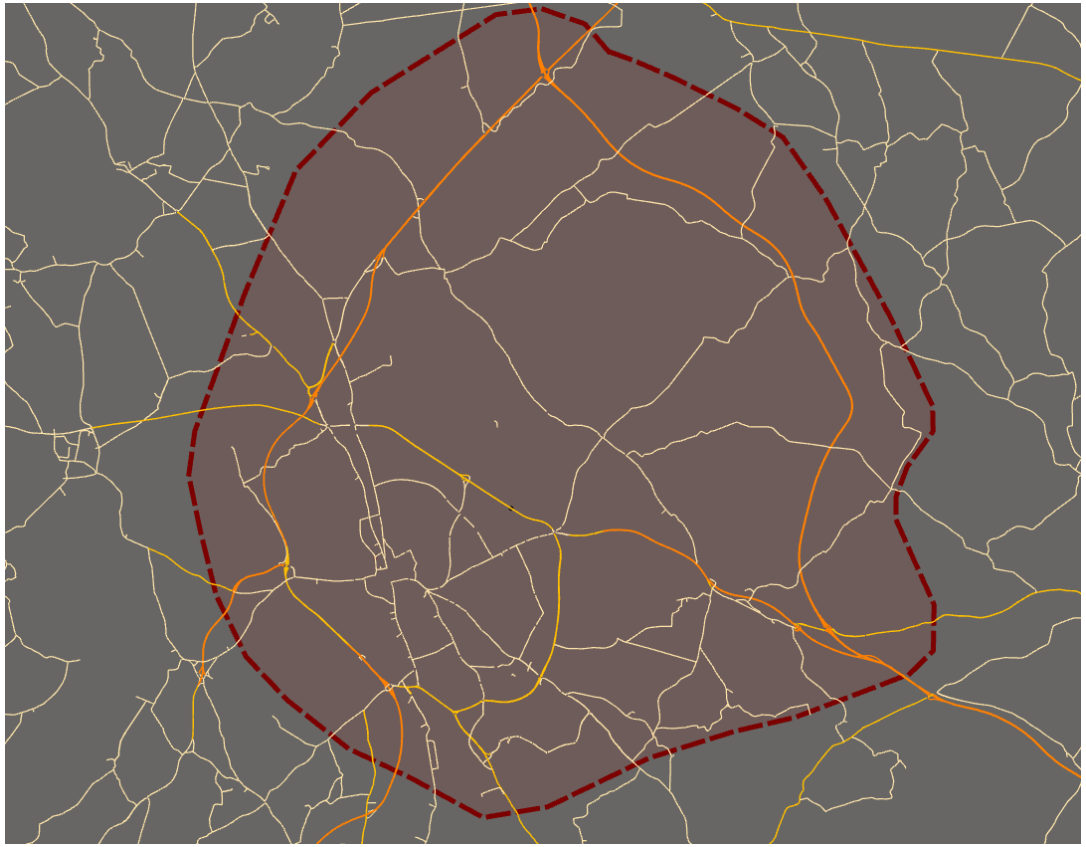


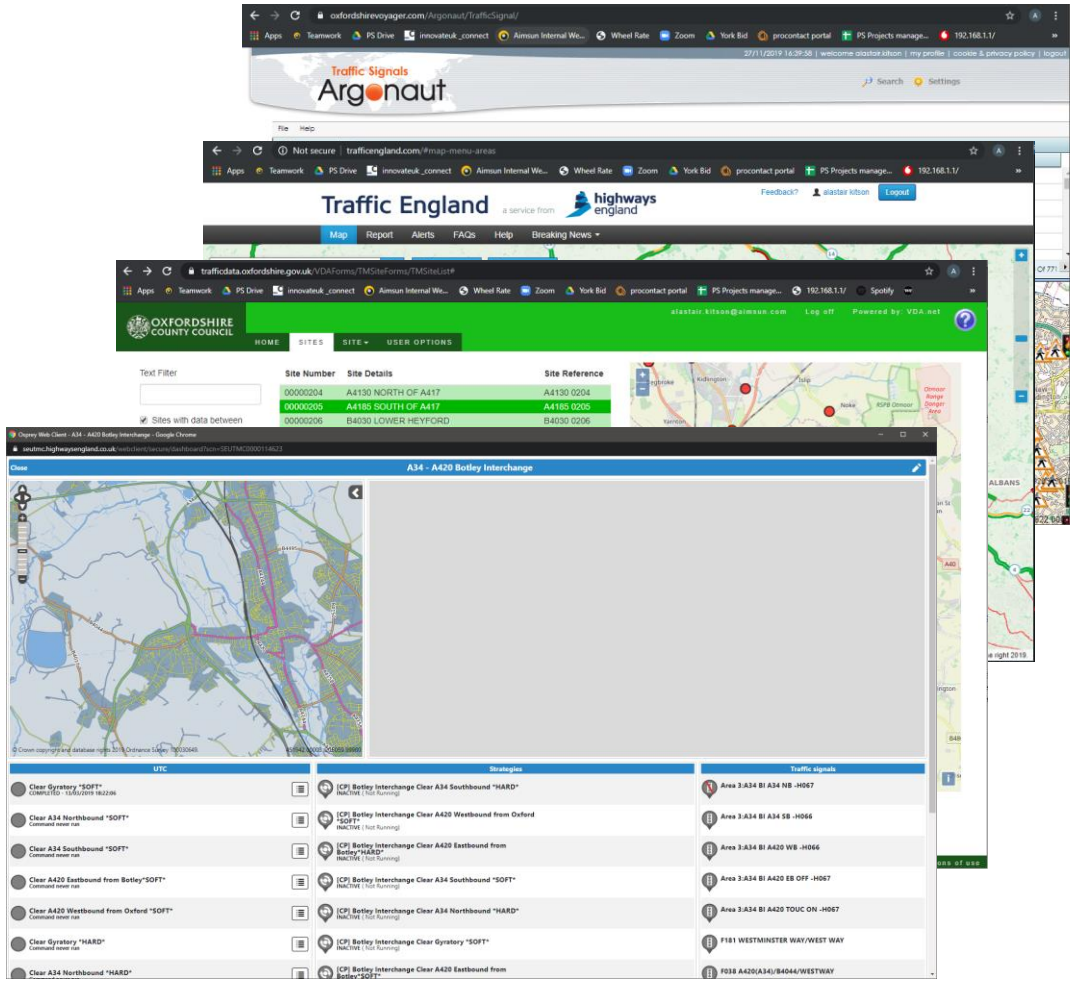
Aimsun Live

- Monitor
- Predict
- Decision Support

Monitor

Network and Data





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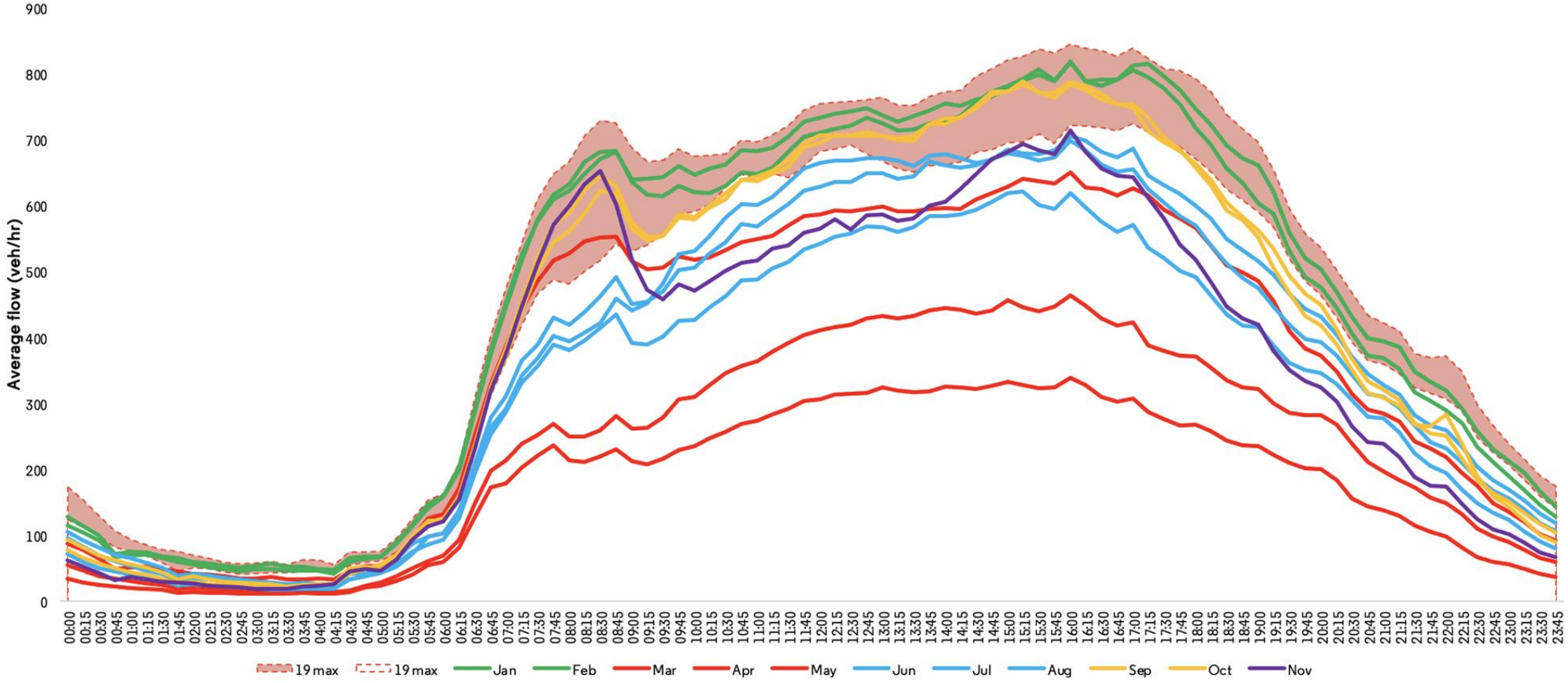
Monitor

Predict

Traffic Patterns and Profiles



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Monitor

Predict

Decision Support

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
Utilising existing Data sources

Air Quality

Emission estimates available for CO2 & NO2
NO_2 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

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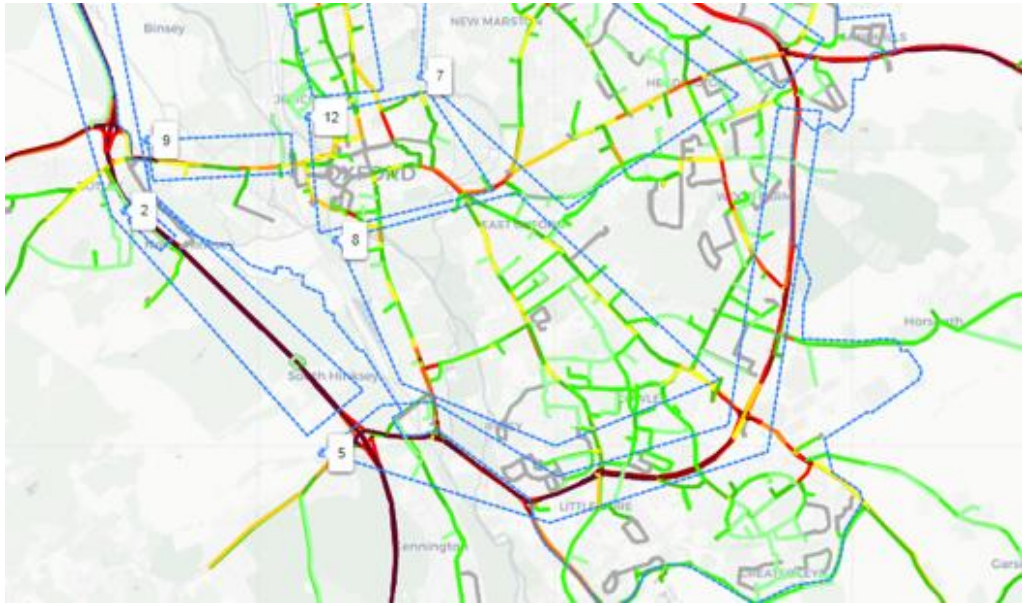
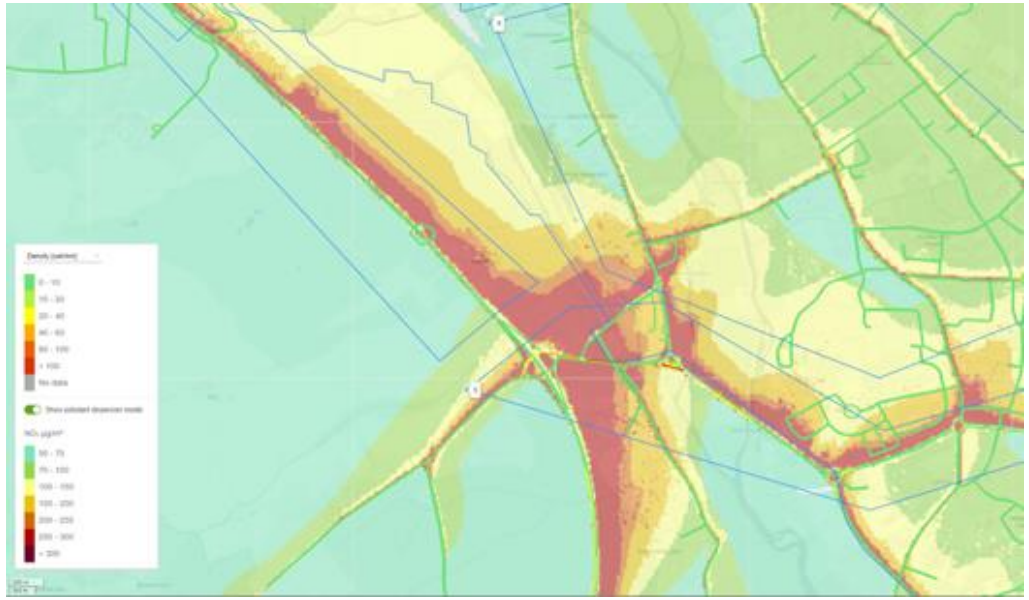


Global KPIs

KPI	Evaluation	Value
Congestion Indicator	Simulated Prediction	16.960

Time Based KPIs

KPI	Evaluation	Value at 15	Value at 30	Value at 45	Value at 60
Global Fluidity	Simulated Prediction	22.560	24.250	28.950	27.570
Region 1: Oxford AQMA (Mean NO_x µg/m³)	Simulated Prediction	58.000	56.000	53.000	51.000
Region 12: New zero emission zone (Mean NO_x µg/m³)	Simulated Prediction	58.000	55.000	54.000	52.000
Region 13: A34 Highways England AOI (Mean NO_x µg/m³)	Simulated Prediction	75.000	76.000	71.000	72.000
Region 2: A34 south of Botley AQMA (Mean NO_x µg/m³)	Simulated Prediction	65.000	65.000	61.000	61.000
Region 3: A34 Eastern Bypass (Mean NO_x µg/m³)	Simulated Prediction	65.000	64.000	61.000	60.000
Region 4: A40 Northern Bypass (Mean NO_x µg/m³)	Simulated Prediction	62.000	60.000	56.000	54.000
Region 5: A4142 Southern Bypass (Mean NO_x µg/m³)	Simulated Prediction	65.000	63.000	61.000	59.000
Region 6: A4144, A4165, (northern city centre) (Mean NO_x µg/m³)	Simulated Prediction	58.000	55.000	53.000	51.000
Region 7: Headington Road, Marsdon Road (eastern city centre) (Mean NO_x µg/m³)	Simulated Prediction	57.000	54.000	52.000	50.000
Region 8: Abingdon Road, Iffley Road (southern city centre) AQMA (Mean NO_x µg/m³)	Simulated Prediction	57.000	55.000	53.000	50.000
Region 9: Botley Road, (eastern city centre) AQMA (Mean NO_x µg/m³)	Simulated Prediction	59.000	57.000	55.000	53.000



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Use cases

- Kennington Bridge – full road closure
- A34 Botley Road – exceedance of air quality threshold

Kennington Bridge – Full Closure

- Bridge replacement – construction mitigation

A423 Kennington Bridge works

Information page for the replacement of Kennington Bridge on the A423

Following several detailed inspections of a bridge that forms part of the A423 at Kennington (Southern Bypass) we have identified the need to replace the structure. This is based upon the initial poor design of the structure and the effects of weathering on the bearings that support it.

We are working closely with our colleagues at the Environment Agency to ensure that the new structure incorporates the Oxfordshire Flood Alleviation Scheme. By working in close partnership, we aim to deliver a far more cost-effective solution for both parties.

Construction works are **not likely to start until 2023** due to the complexities of the surrounding utility constraints.

Work will be coordinated in a manner that minimises the impact on the network as far as is reasonably practicable.

This is an exciting opportunity for Oxfordshire as we can look at this key gateway to Oxford and try to increase traffic flow in the area for all modes of transport.

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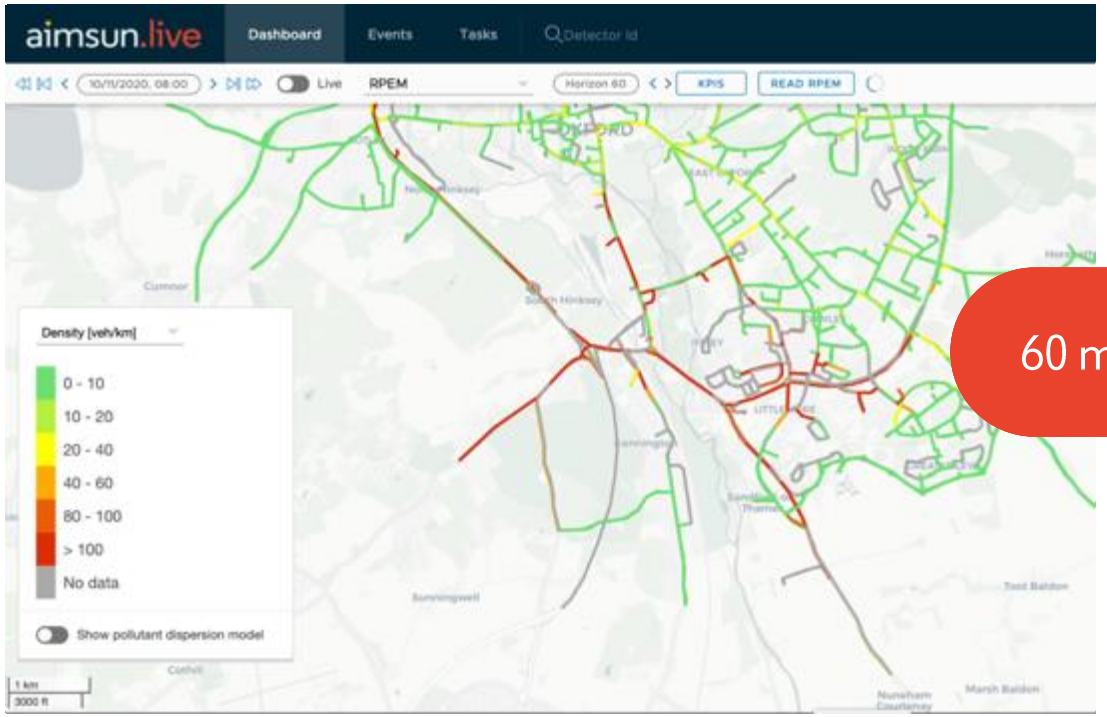
Kennington Bridge – Full Closure

- Bridge replacement – construction mitigation

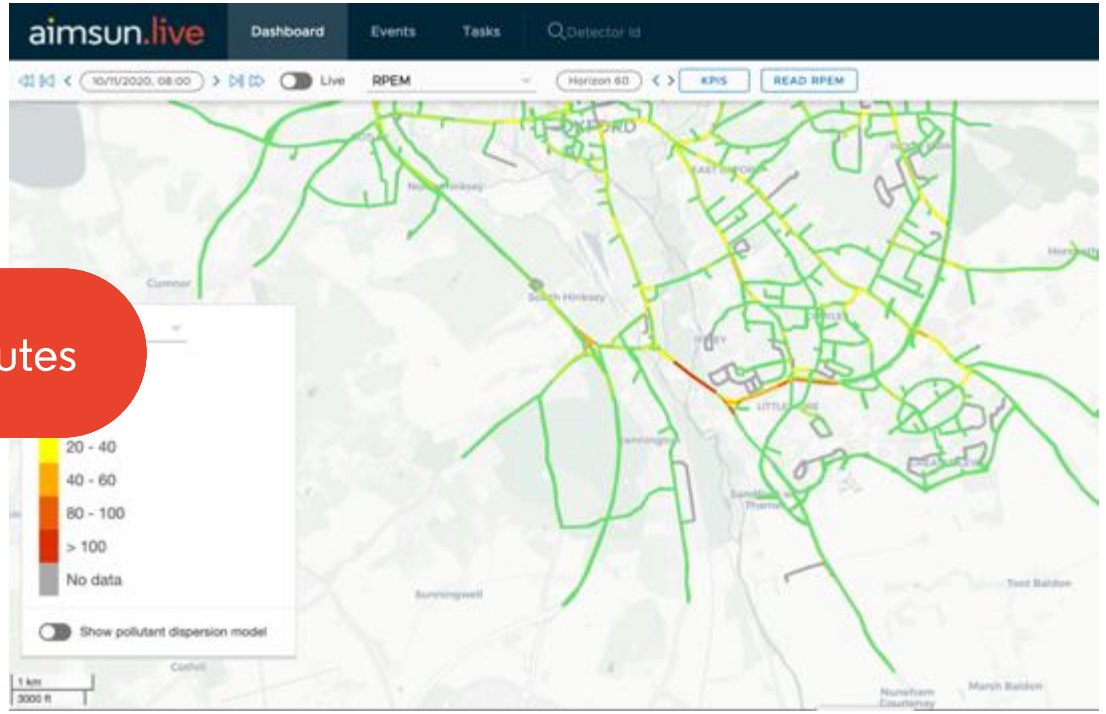
Bridge Closed Do Nothing



Do Nothing with traffic management system

60 minutes

Keep One Lane Open Contraflow Strategy



Invoke Traffic Management Plans

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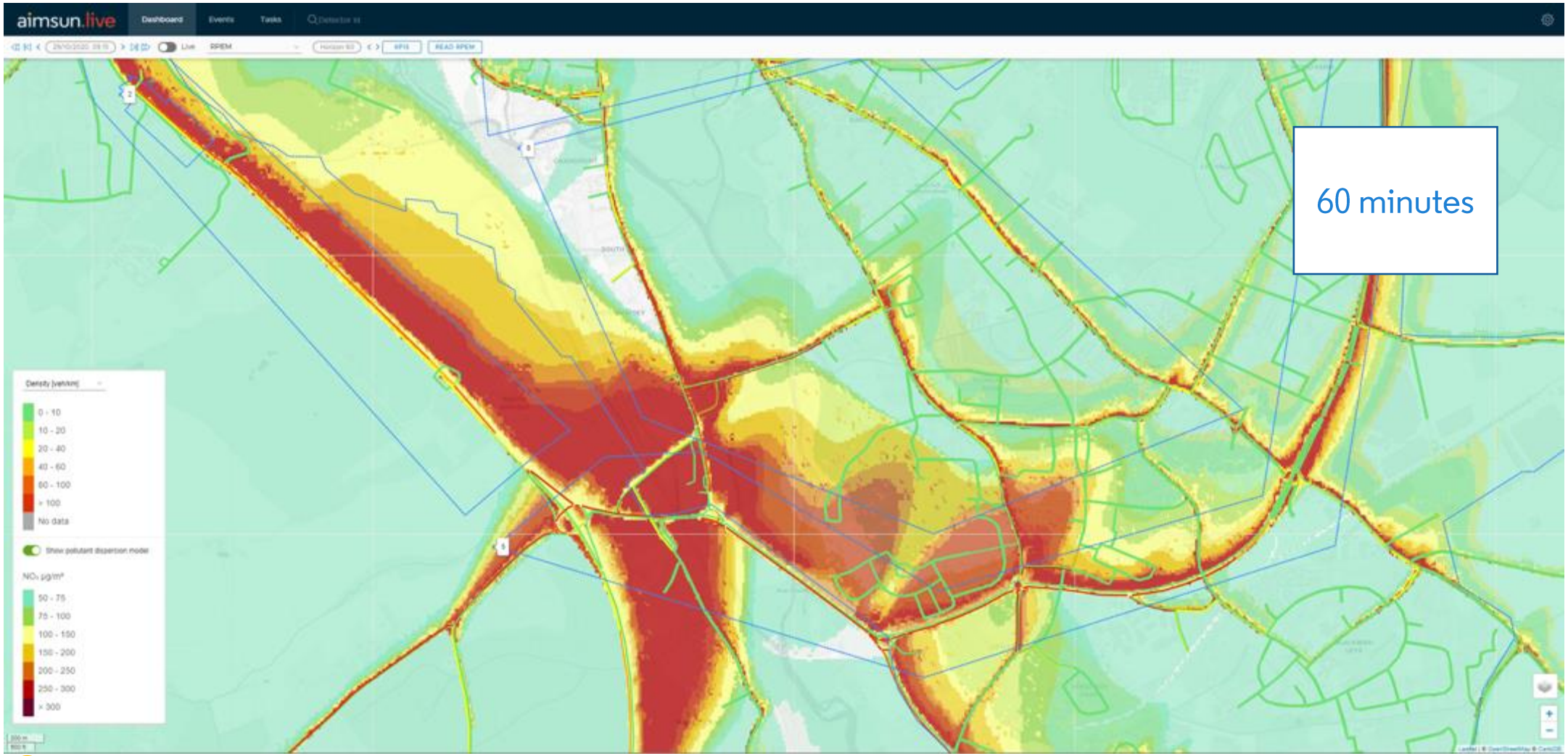
Kennington Bridge – Full Closure



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Kennington Bridge – Full Closure

Emissions vs Zephyr vs MappAir (during Cal)

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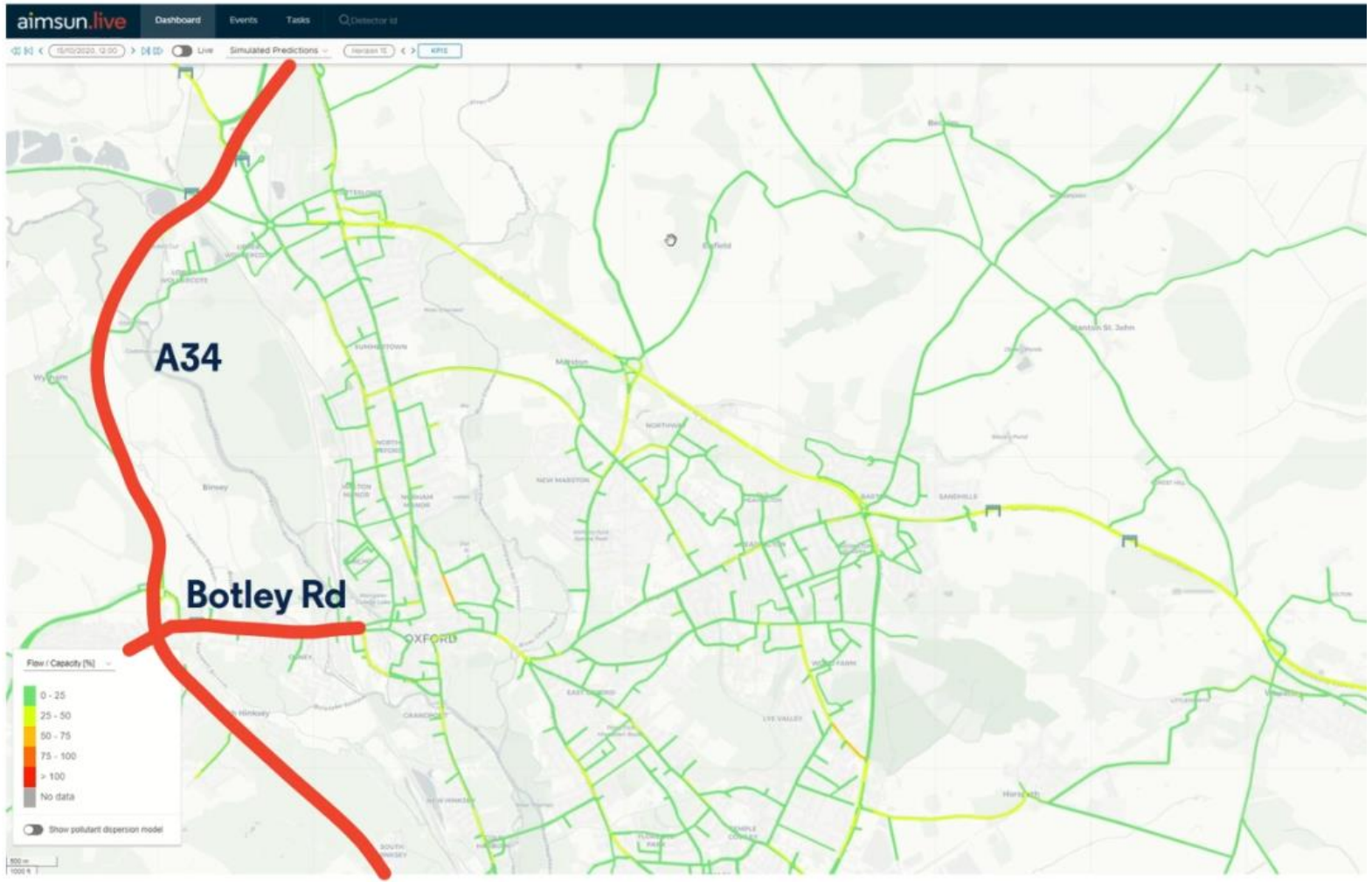
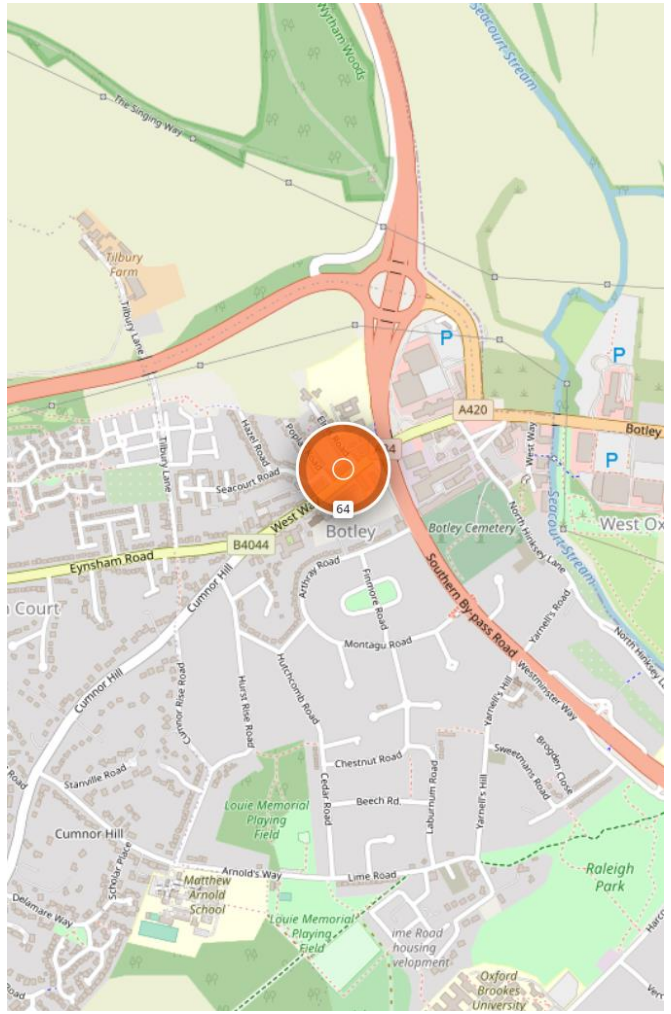
Botley Road – Exceedance of Air Quality





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Botley Road A34 AQMA

Key results during project (Oct/Nov evaluation period)

Air quality exceeded legal thresholds on 57% of evaluated days

Traffic management strategies designed in Aimsun Next mitigated against air quality on 65% of the days evaluated

Of which an improvement or benefit of 5% was recorded

Further evaluation just conducted with normalised traffic conditions and benefits have increased slightly.

Interestingly, whilst in Oct/November the maximum benefit was 20% (on more than once occasion) now 40% was seen as the maximum benefit…!

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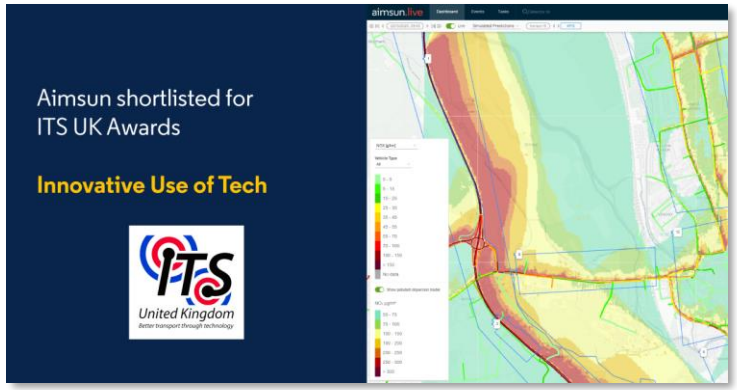
Project summary

Project Summary

- Recognised for its innovation….
- Typical days are not typical - Real-time monitoring, prediction and decision support systems can be deployed with benefits - even during unpredictable times
- System learns and adjusts the longer it is deployed
- Modelling isn't just for offline planning but has now a credible role in traffic operation
- Digitisation use of existing assets can go a lot further than their primary purpose
- What can we realise together?



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Thank you!

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