

# iTRAQ - Integrated Traffic Management and Air Quality Control using Space Services

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## DIGITS – DMU’s Interdisciplinary Group in Intelligent Transport Systems

### *Who we are:*

- 20 Members, 3 Professors, 2 Readers and growing
- PhD and Master students
- Significant research funding from a variety of sources, incl. EU and ESA
- Strong International reputation
- Researching and delivering cutting edge technologies for the transport sector

### *What we do:*

- Intelligent integrated traffic management and air quality control
- Mechanical behaviour of pavement and rail track materials
- Airport and harbour environment modelling and evaluation
- Geographical information systems and data mining
- Computational intelligence
- Embedded systems and ECU design
- Telematics

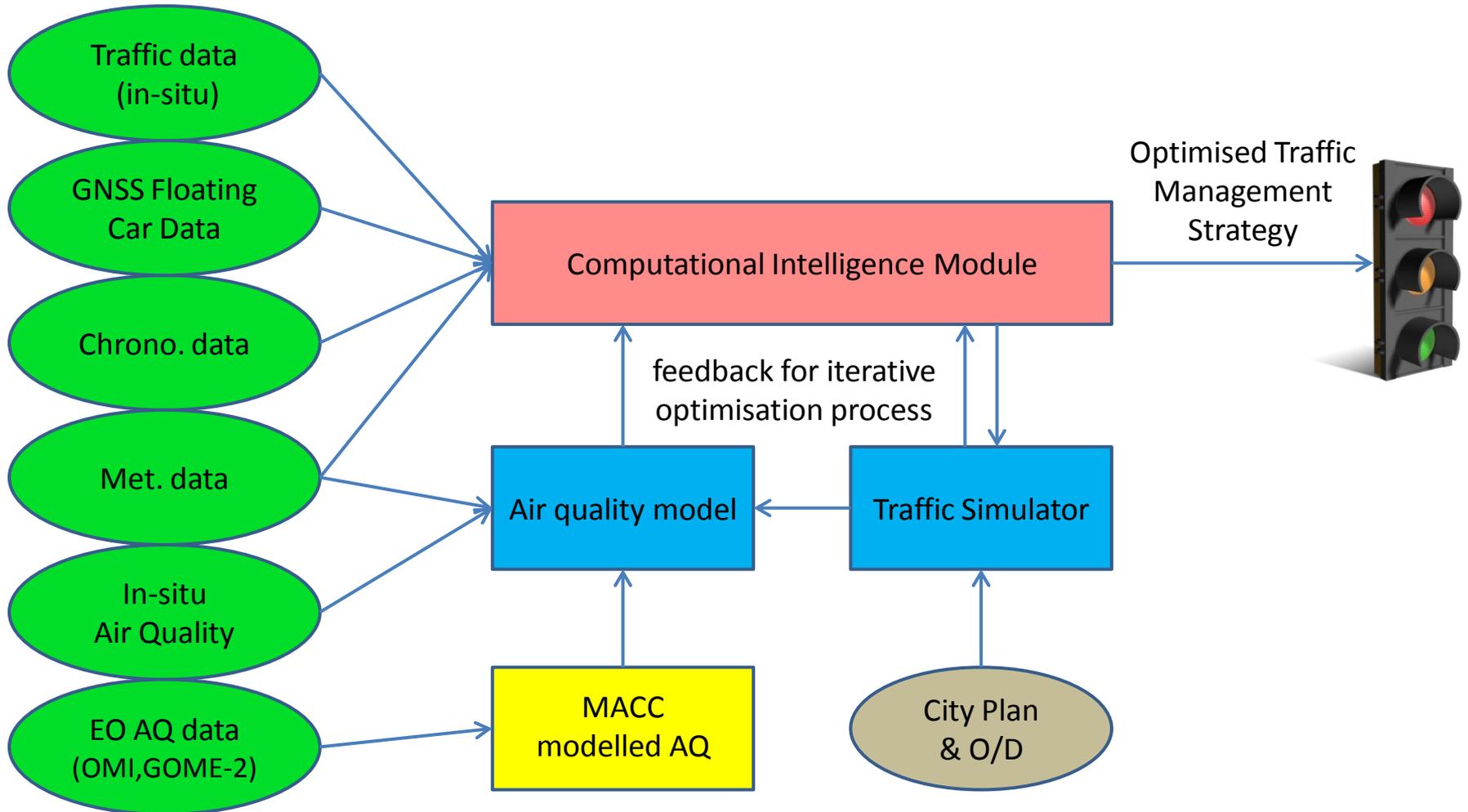


# Objective



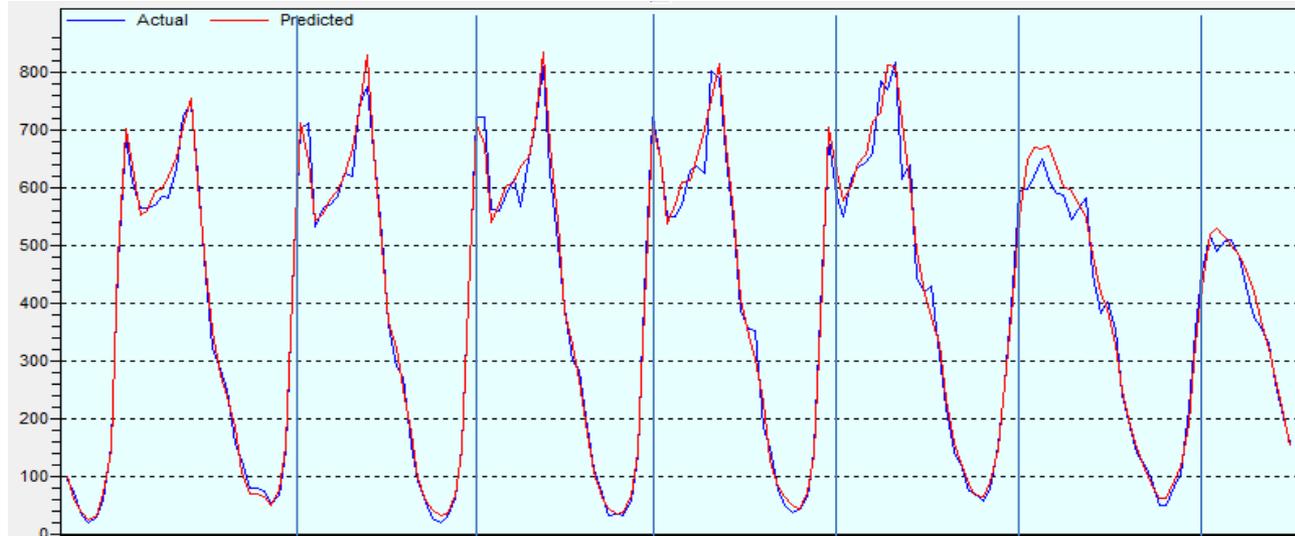
- Automatically optimise traffic
  - Automatically optimise air quality
- } Conflicting objectives
- Inform operators, users, public, ...
    - Accurate forecasts of local traffic flow and delay
    - Accurate forecasts of local pollution levels
    - Enhanced traffic flow ,delay, and air quality through using proposed strategies
  - Adapt to and deal with to ever-changing traffic and air pollution conditions

# Overview

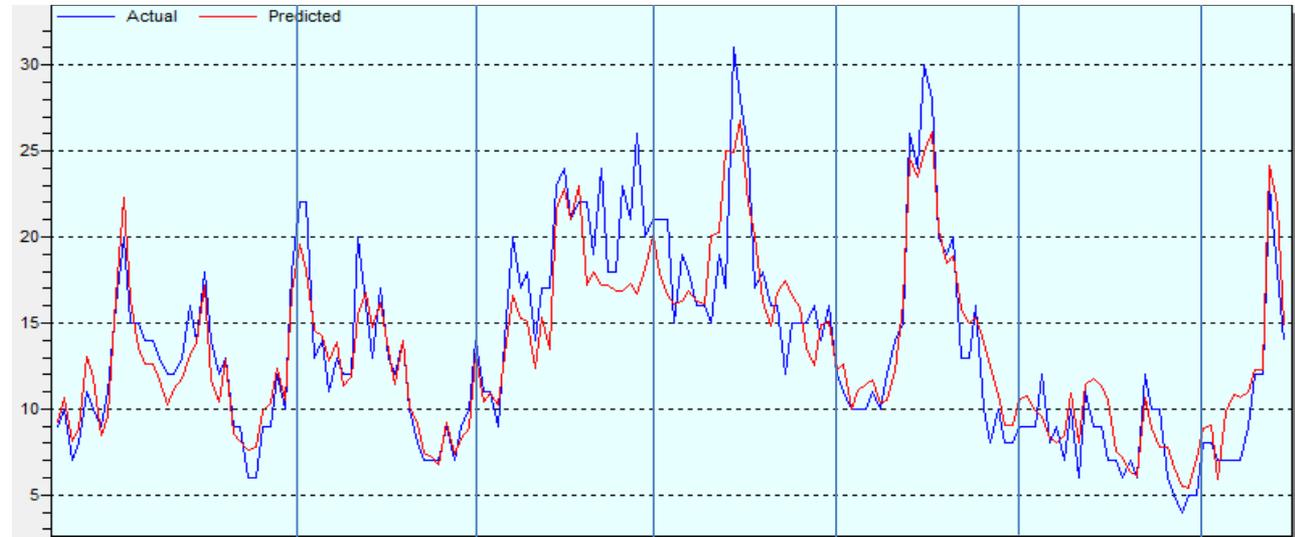


# Actual Forecast Results

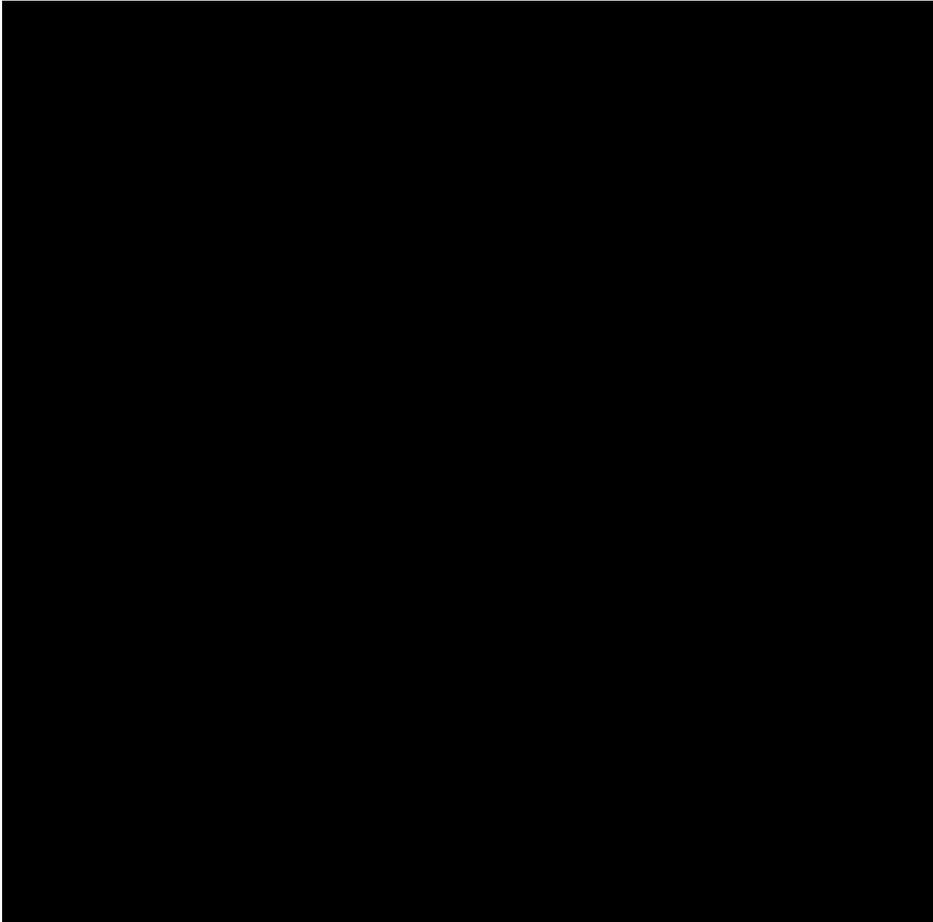
Traffic Flow (veh/hr)



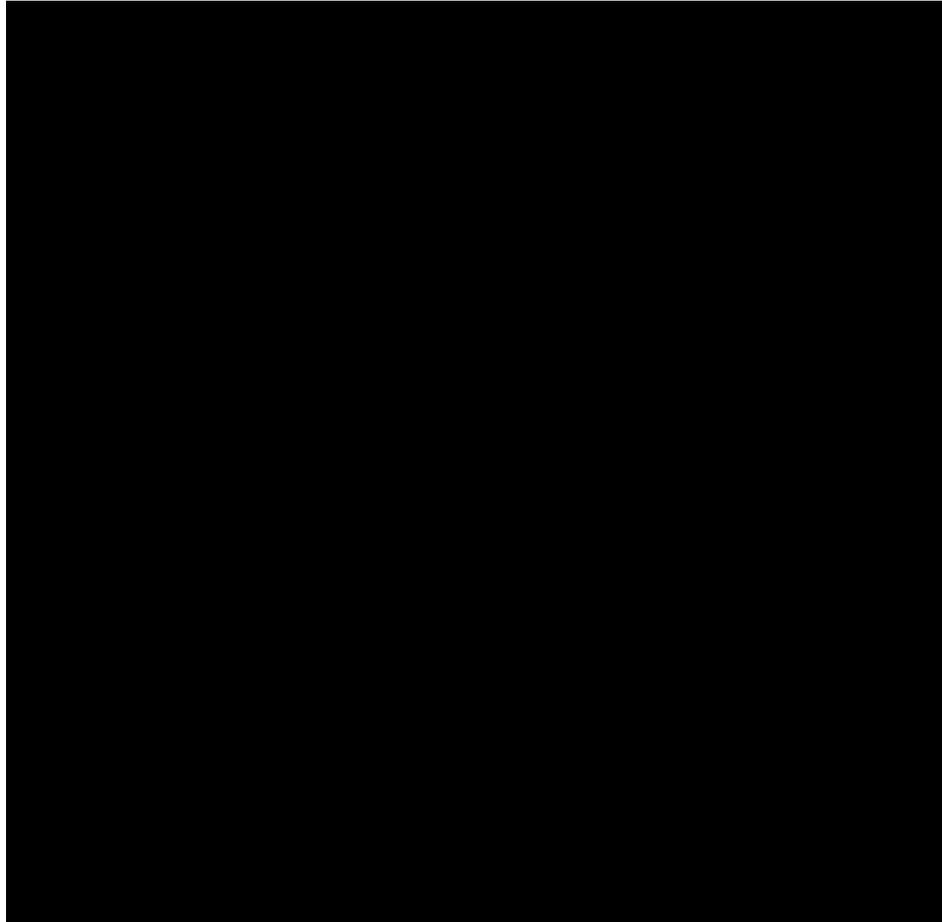
Air Quality NO2 ( $\mu\text{g}/\text{m}^3$ )



# Traffic Flow Prediction Results

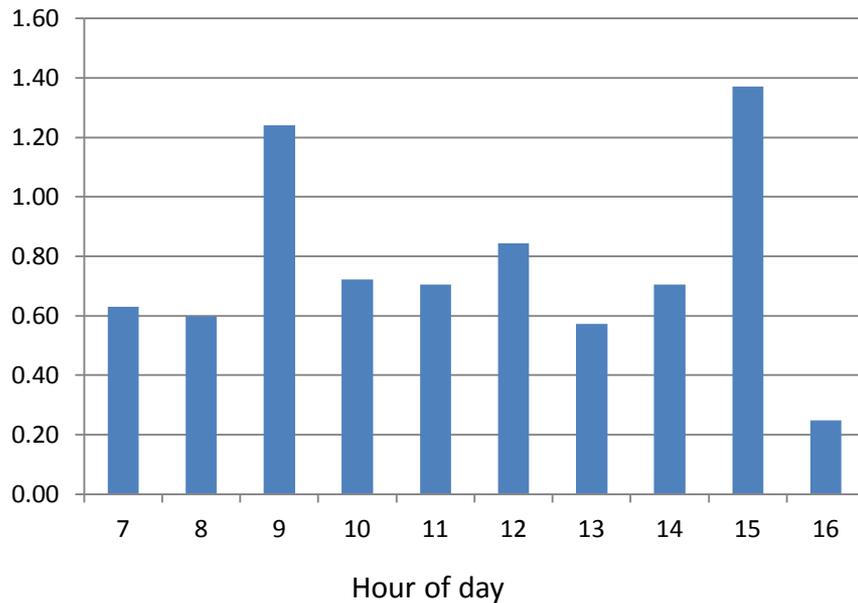


Forecasted

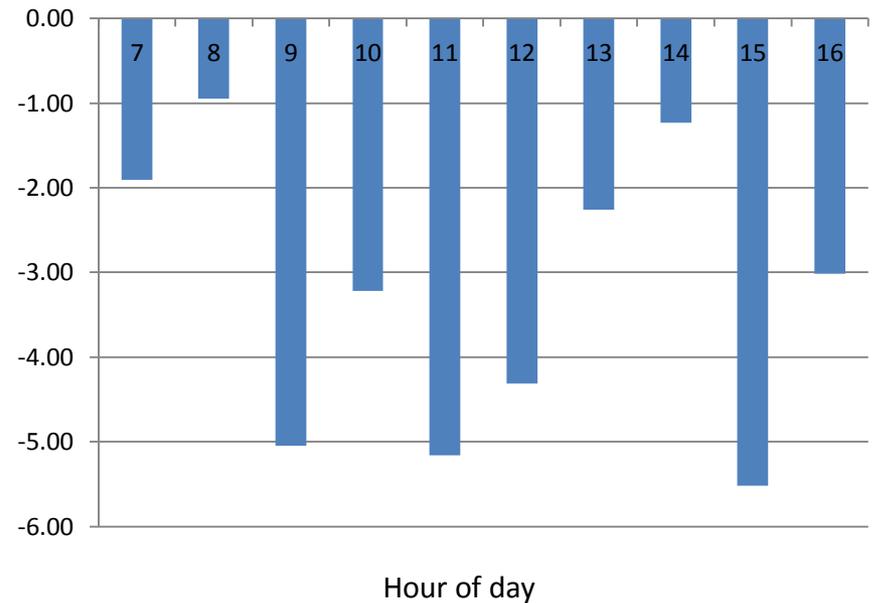


Measured

## Flow %



## Delay %



- ✓ Strong increase in traffic flow
- ✓ Substantial decrease in delay
- ✓ While simultaneously managing air quality

# Conclusions

- I. A system capable of integrated decision-making on both air quality and traffic is operationally feasible.
- II. The system demonstrated:
  - an increase in traffic flow 89% of the time (average increase of 0.6%)
  - a reduction of delay every time (average reduction of over 3%)
  - (using only two neighbouring junctions)
- III. iTRAQ provides the user with a variety of additional information, such as:
  - forecasts of traffic conditions and pollution levels
  - to react and make more informed decisions before traffic congestion or pollution levels can build up.
- IV. The iTRAQ system can inform and support operator decision-making, or in a fully-tested system, have autonomous control over light timing.