# ITS Applications Guide

**PDS »**

Infrastructure systems

# Introduction

PDS have been delivering and supporting Traffic Control and Monitoring systems since 1988. Working across both the UK and Irelands transport industries, deploying innovative Intelligent Transport Systems and technologies from the control room to the roadside.
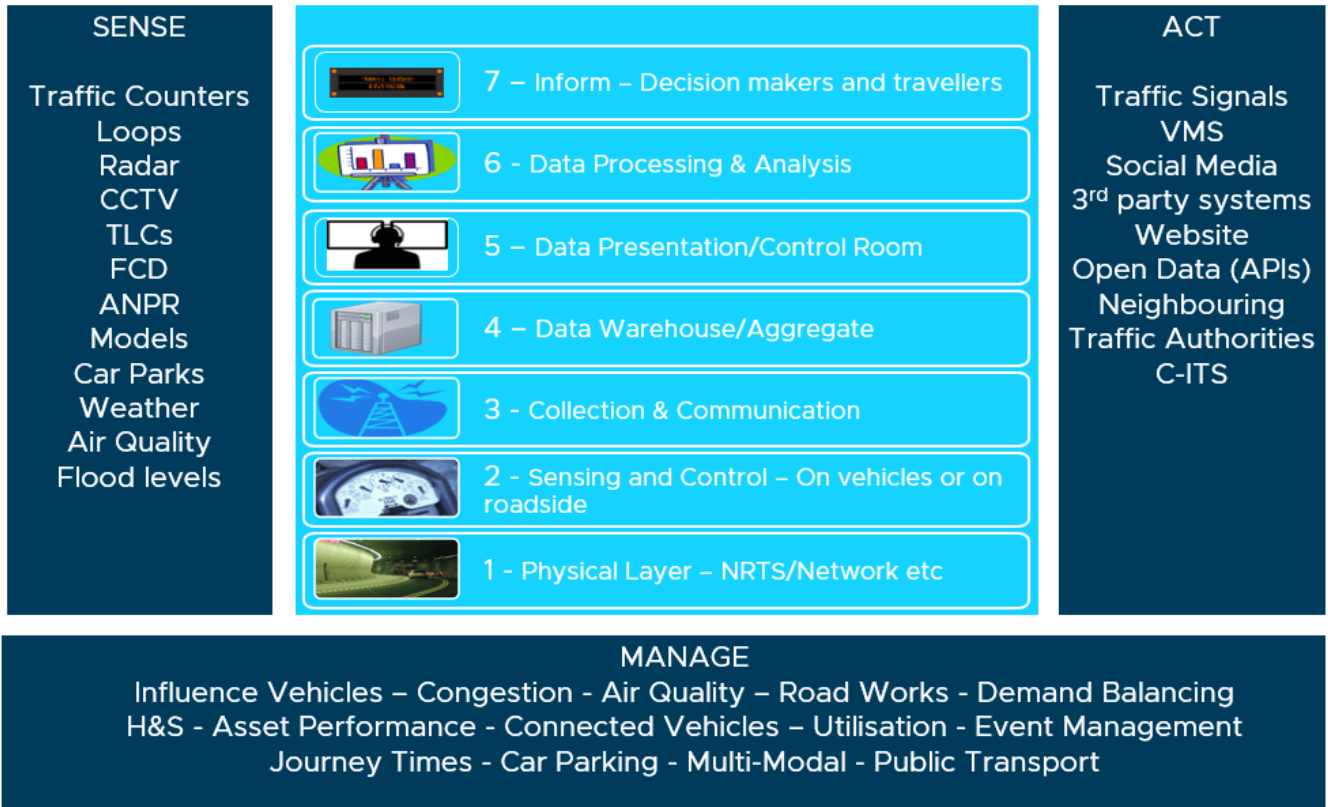
Our projects and services range from small installations through to new build and refurbishments, within the Strategic, Urban and City Road networks. We help our clients to find solutions to address both their and industry wide challenges, providing a consultative engineering driven approach to develop innovative and cost-effective solutions. Our strength is around complex projects and applications requiring a high level of availability and reliability.

This document is aimed at providing a summary of solution examples which have been deployed and proven in the field. By combining sensors, data aggregation and monitoring systems we can help solve many challenges and help provide automated solutions.

Demonstration / test facilities are available at our offices in Derby.

# ITS ECO System

The diagram below illustrates the components which form an ITS ECO system as well as the type of applications they cover. Our solutions described in the next section, comprise of combination of anything from roadside sensors, communications, data storage as well as operational and business management systems.

| SENSE | | ACT |
|---|---|---|
| Traffic Counters<br>Loops<br>Radar<br>CCTV<br>TLCs<br>FCD<br>ANPR<br>Models<br>Car Parks<br>Weather<br>Air Quality<br>Flood levels | 7 – Inform – Decision makers and travellers<br>6 - Data Processing & Analysis<br>5 – Data Presentation/Control Room<br>4 – Data Warehouse/Aggregate<br>3 - Collection & Communication<br>2 - Sensing and Control – On vehicles or on roadside<br>1 - Physical Layer – NRTS/Network etc | Traffic Signals<br>VMS<br>Social Media<br>3rd party systems<br>Website<br>Open Data (APIs)<br>Neighbouring<br>Traffic Authorities<br>C-ITS |

## MANAGE

Influence Vehicles – Congestion - Air Quality – Road Works - Demand Balancing
H&S - Asset Performance - Connected Vehicles – Utilisation - Event Management
Journey Times - Car Parking - Multi-Modal - Public Transport

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# ITS Applications

## Active Travel

Cities and urban areas around the world are struggling to control the increasingly busy urban traffic. Although advanced traffic management solutions exist, there are still aspects of urban traffic that are difficult to control. Encouraging bicycle use, for example, is an obvious choice to counteract the pressure of car traffic. But how do we measure, monitor and regulate bicycle flows through the city? And, often just as important, how do we do this for pedestrians?

FlowCube brings the technology to achieve exactly that. This intelligent, compact box is a sensor that measures traffic flows (vehicles, cyclists, and pedestrians) based on Deep Learning, 24 hours a day, 7 days a week. Our technology makes it even possible, without compromising privacy, to match the cyclists (as well as other modalities) detected by multiple FlowCubes, thus providing insight into the patterns of movement through the city (travel times, origin/destination matrices).



FlowCube Functionality

**Features and Benefits:**

- Presence detection (virtual loop)
- Traffic volume (counts)
- Speed
- Travel times
- Origin/Destination matrices
- All traffic modes
- Overview of routes and travel times
- Live insight of traffic situation
- Easy mounting and installation
- Secure 4G Wireless VPN
- Remote management
- Central data platform

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# Environmental Monitoring

The environment and the transport network are very much interrelated to each other. From a global warming perspective with the challenges caused by emissions, poor air quality and global warming. As well as the climate and seasonal weather changes having an impact on the availability of the road network.  Technology plays an important role in monitoring air quality and inclement weather; application examples are listed below.

## Flood Prevention – Pump station/Gulley Monitoring

Heavy rainfall coupled with blocked drains can cause dangerous conditions and flooding on highways. Through active monitoring and reporting of sumps and gullies, floods can be prevented and mitigated against. Avoiding road closures and danger to road users.

**Features and Benefits:**

- Centralised Monitoring of roadside pump stations and gullies, with status and alarm conditions
- Monitored on a centralised server via Instation.
- Outstations provide monitoring of each site (power, battery, pump status, water level)
- Cloud or site hosting options
- Data monitored.
- Secure 4G Wireless VPN or wired Comms.
- High availability
- UPS Battery backup

## Air Quality Monitoring

Our solutions can monitor a variety of applications including ambient environmental conditions around congested cities, highways and within tunnels. Instruments range from traditional weather stations measuring the most important weather parameters or lower cost smaller footprint sensors for a variety of highway applications.

**Features and Benefits:**

- Intuitive Interactive Map
- Remote Access
- East to install.
- All parameters measured from one tool.
- Open interface and export tool
- Self-cleaning
- Secure 4G Wireless or wired Comms.
- Range of sensors to monitor.
  - Air quality
  - Noxious Gases
  - Noise
  - Odour
  - Temperature
  - Frost detection
  - Wind Speed/Direction
  - Barometric Pressure
  - Precipitation
  - Visibility

# Journey Time management & Vehicle Classification

Journey time monitoring provides an important source of information within a traffic managers tool set, enabling informed decisions to be made to prevent congestion, identify incidents, and direct traffic around the network. A range of technologies and data sources are available ranging from ANPR, AI Traffic Sensor, Bluetooth, and floating car data.



**Features and Benefits:**

- Interactive Map with user definable routes and pinch point monitoring

- Origin and Destination

- Support for Multi-Modal transport

- Traffic Insights

- Classification (8 modes)

- Open interface to traffic management systems

- Range of sensors and solutions supported.
    - AI Traffic Sensor
    - ANPR
    - Bluetooth
    - Real-time Mobile data set

- Comprehensive reporting

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# Over Height Detection

Collisions between over height vehicles and road structures can be very costly to repair and represent a danger to road users. Technology can play an important part in preventing collisions, resulting congestion, and damage to the structure itself. Our over height detection system can be used to protect low bridges, underpasses, and tunnels. Our solutions range in complexity, depending on whether integration with ANPR cameras and Variable Message Signs are required. The system monitors approaching vehicle heights notifying the driver and operators with enough notice to avoid the structure and make a detour.



**Features and Benefits:**

- Centralised monitoring system
- Detection of over height vehicles
- Protect low bridges, underpasses and tunnels.
- Range of complexities
- Each OHVD Outstation can operate independently.
- Logging over-height vehicle records and equipment fault.
- High availability, high integrity performance
- Monitoring and control of
  - OHVD sensors – Laser or, Photoelectric beam
  - Automatic Number Plate Recognition (ANPR) cameras to identify over-height vehicles.
  - Local Variable Message Signs (VMS) and Lane Control Sign (LCS) to inform road users. Traffic barriers and traffic lights to restrict access.

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# VMS Control and Management

High availability, fully integrated control room system used to control and monitor city wide critical transport assets.



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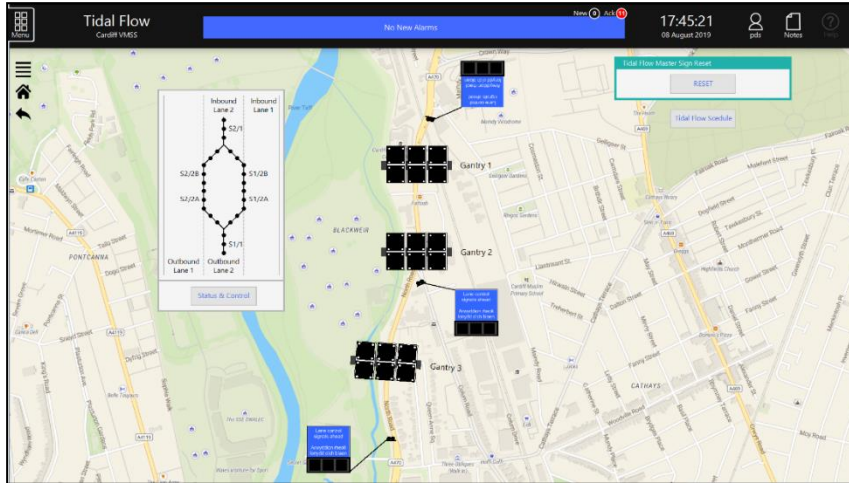
**Features and Benefits:**

- Control a range of assets.
- Variable Message Signs
- Rotating Prism Signs
- Tidal Flow System
- Bollards
- Tunnel Lane Control
- Fully integrated Control and Management System
- Master/Standby High Resilient Architecture
- UTMC Integration
- Cloud or locally hosted

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# Tunnel and Underpass Systems

Through our history, we have built up a comprehensive range of specialist solutions for tunnel ITS applications. This includes our lighting control solution for tunnel and underpass applications, which can be configured for any application where efficient delivery of optimum lighting is required to provide enhanced safety and operational cost savings.



**Features and Benefits:**

- Providing lighting solutions since 2008
- Full Turnkey Delivery
- LED, SON or Fluorescent luminaires
- Lowest lifecycle costs
- Significant reduction in energy costs
- Reduced maintenance / road closures.
- Luminaire operational verification
- New PLC/HMI version
- Advanced user interface
- Scalable upgrade options to increase system resilience and optimise maintenance.
- Remote monitoring

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# Enquiries

For further information on our systems and services, please don't hesitate to contact our technical solutions team, who are ready to discuss your application in more detail. Our standard solutions use open standards and interfaces which can be readily adapted and customised to meet your requirements. Contact us by email at info@pdslimited.co.uk or by calling us on 01332 280195.

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