

# Future Intelligent Transport Systems Project - FREEFLOW

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**ACIS**  
informing communities

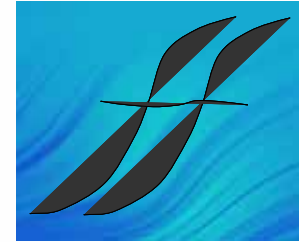


**FREEFLOW**





## Background



Future Intelligent Transport Systems (FITS) initiative supports highly innovative and wide-ranging research, innovation and technology demonstrator projects

FITS supports a limited number of initiatives that:

- Develop innovative solutions to transport problems;
- Stimulate and/or accelerate industry investment in innovation;
- Demonstrate innovation in transport operations & exploit project outputs;
- Adopt a multidisciplinary approach;
- Show promise of high quality research outputs.

Department for  
**Transport**

**Technology Strategy Board**  
Driving Innovation

**EPSRC**  
Engineering and Physical Sciences  
Research Council



## Competition Winners



- Foot-LITE, which is designed to encourage safer, more environmentally friendly driving styles and behaviours through the development of better driver/vehicle interface systems and services.
- Ideas In Transit, which will address the underpinning theme of the FITS programme by looking at users of the transport system as a source of inspiration.
- FREEFLOW, which aims to benefit both transport users and operators by turning data into intelligence.





## FREEFLOW Partners



- Knowledge & experience :-
- Transport Networks
- Existing systems
- Tracking systems
- Standards
- Military Situational Awareness





## Challenge



FREEFLOW aims to fundamentally change how we use transport data

FREEFLOW's specific objectives are therefore to:

- Understand what traffic managers want from “intelligent decision support”
- Develop new data from currently under-used sensors like CCTV, GPS
- Use “situational awareness” tools that go beyond “data” we collect now;
- Measure effects on network performance in York, London & Kent
- Understand and solve the technical requirements for new services

For road users specifically, FREEFLOW aims to assist them in knowing what is happening, why it is happening, what will happen next and what action they can take to make things better for them.



# Project Plan



We have focussed on 6 clearly defined work packages to ensure FREEFLOW delivers: -

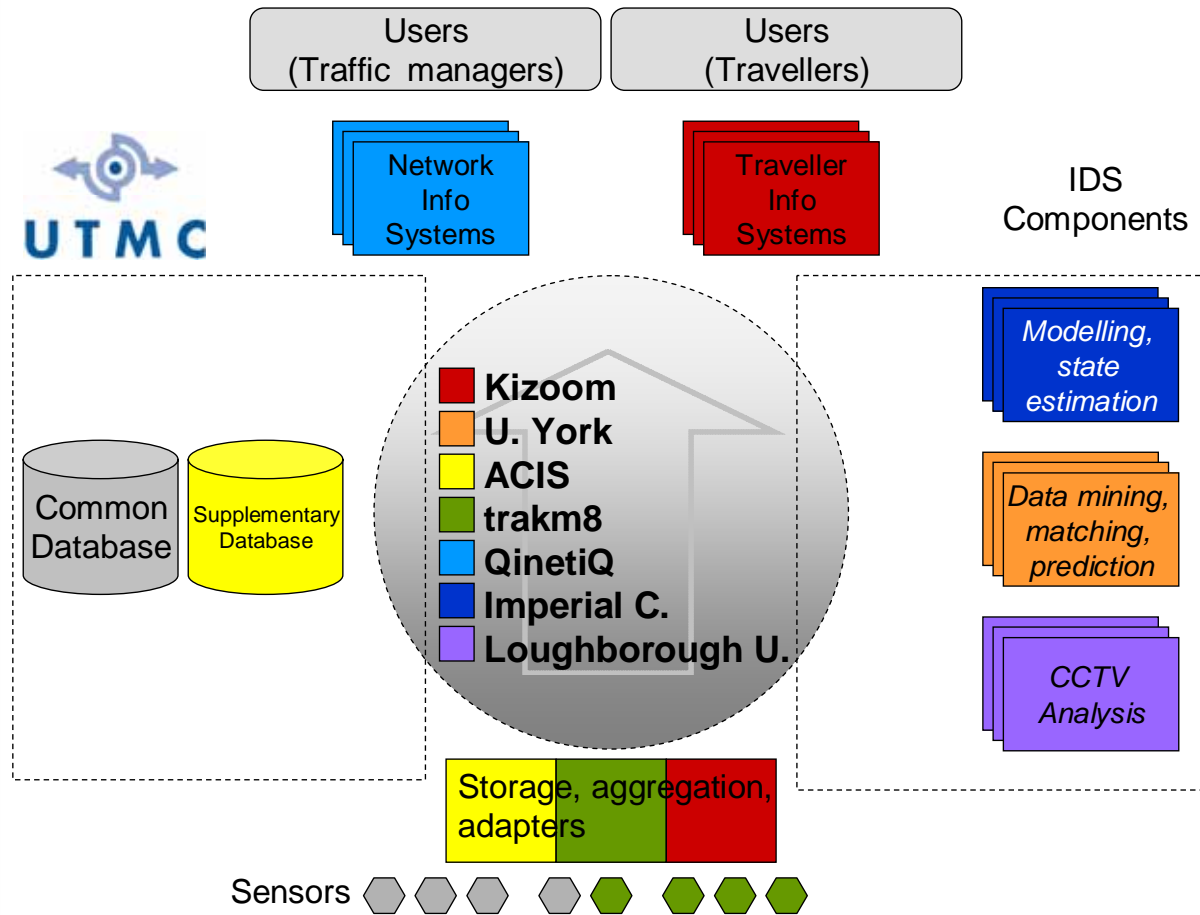
- WP A on **user and market needs**, for network managers and travellers
  - WP B - Build a **route map for technology** to deliver these needs
  - WP C - Develop the technology for **intelligent decision support** in York, London & Kent
  - WP D for **demonstrating** the technology on site
  - WP E for **evaluating** its benefits
  - WP F for **managing the project and disseminating its** outcomes to stakeholders
- 
- 3.5 year project timeline
  - TfL is the Project Coordinator using PRINCE2





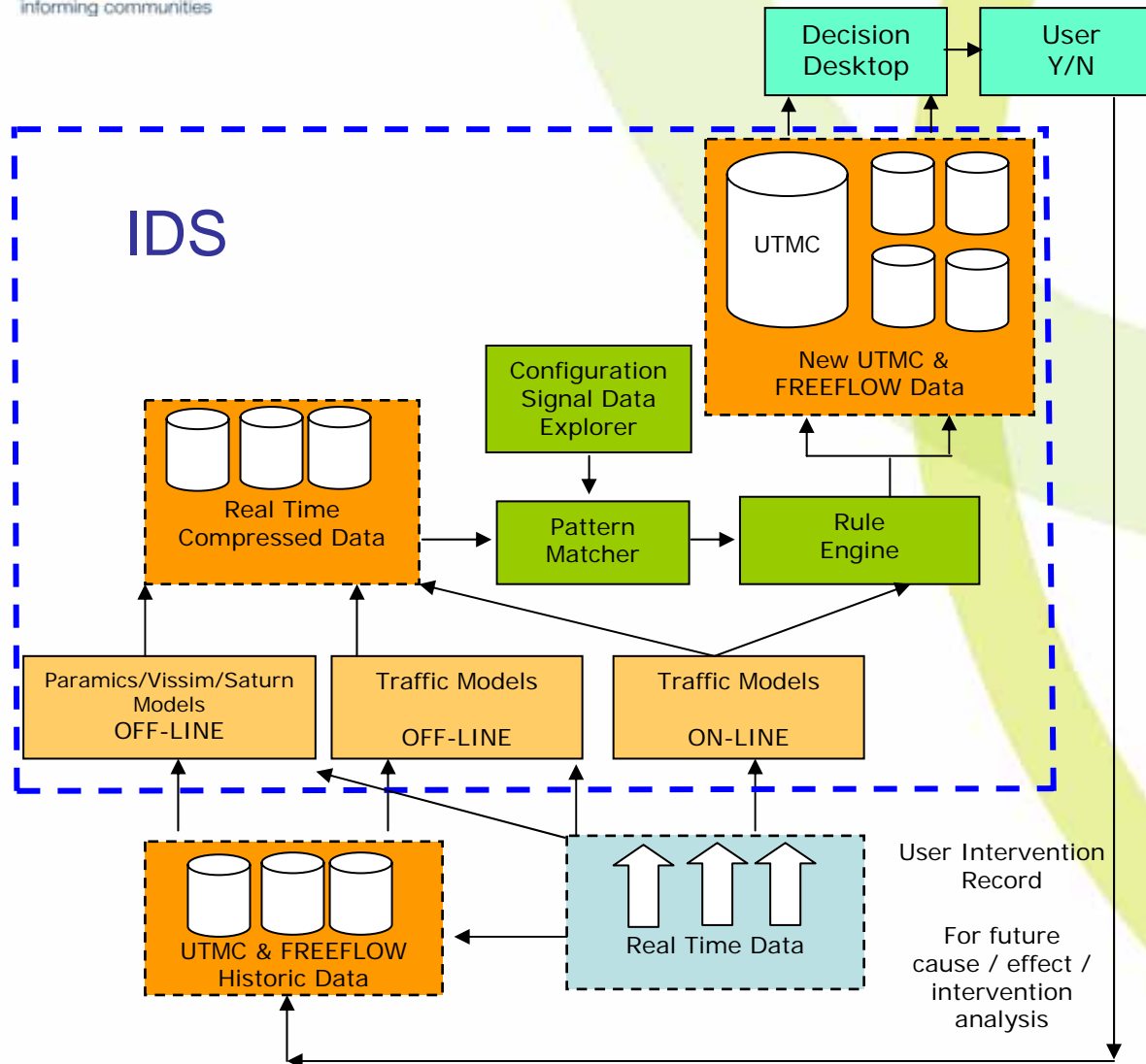


# Technology Roadmap



Grey = existing systems, sensors and applications

# Intelligent Decision Support

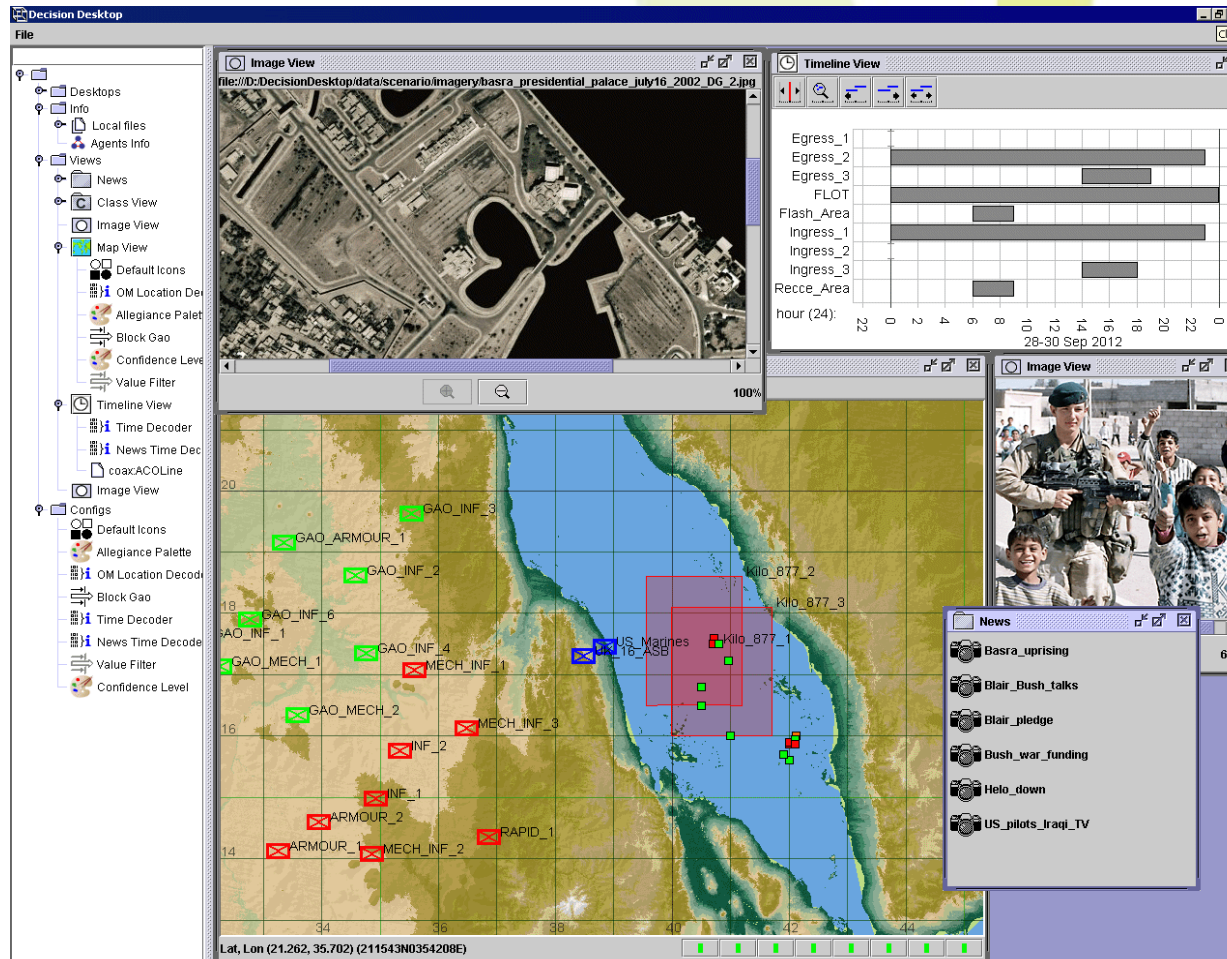


- Real time data = GPS, Loops, CCTV, HA etc
- Traffic models estimate the state of the road network to determine if intervention is needed (also predict the state in the short-term future)
- Signal Data Explorer will be used to configure the pattern matcher
- The pattern-matcher will compare the estimated and predicted states with historic states recommend intervention actions, if required
- Rule Engine will recommend action based upon pattern matching
- Off-line traffic models will be used to enhance the historic data set with synthetic data
- IDS will learn faster than a human





# Situational Awareness



## Coalitions

- Tfl, HA, LAs = SAS, US Marines, Foreign Legion..
- Many people involved – all interact – no single controller
- New data, and partners, join all the time
- Traffic Management Act requires coalitions

## Data

- Various data types - "dodgy" data
- Need to know – not all data shared but impacts are!

## Real time decisions

- Sharing intelligence - not data – for consistency

One approach is

**"The Decision Desktop"**





# Situational Awareness



The screenshot displays the 'Network Control Decision Desktop' interface. On the left is a tree view with categories: My Desktop, Data Sources (CCTV, Scoot, Streetworks, Trackm8, ASIS, CAD, Oyster, Roadworks), Views (Roadworks, Bus Progress, CCTV A402 North 27, Incident reports), Configs (Default Icons, Colour by status, Colour by type, Time Decoder, Filter by type, Filter by status, Location Decoder, Time Decoder 2), and Tools (Network modelling, Data mining, Plan generation, Anomaly detection). The 'Tools' section is circled in red. The main area contains several panels: 'Roadworks' (a Gantt chart showing work durations for Works 1-7), 'Bus Progress' (a map with bus locations), 'CCTV A402 North 27' (a live camera feed), 'Incident reports' (a list of reports 1-4), and 'Plan Outcome' (a line graph of throughput over time for three scenarios A, B, and C).





# York Hull Road Proof of Concept



1

## What is FREEFLOW?

FREEFLOW aims to fundamentally change how we use transport data by developing technology to generate transport intelligence and give transport network operators greatly enhanced strategy selection tools. It is a 3 year programme which is being funded by the UK Government's Technology Strategy Board (TSB), The Department for Transport (DfT) and the Engineering and Physical Sciences Research Council (EPSRC). Partners in FREEFLOW include The University of York, Imperial College, Loughborough University, City of York Council, Transport for London, Kent County Council, Qinetiq, ACIS Ltd, Mindsheet Ltd, Trakm8 Ltd and Kizoom Ltd.

2

## The York Phase 1 trial will monitor and manage one radial into the City Centre (Hull Road). The specific objectives are:

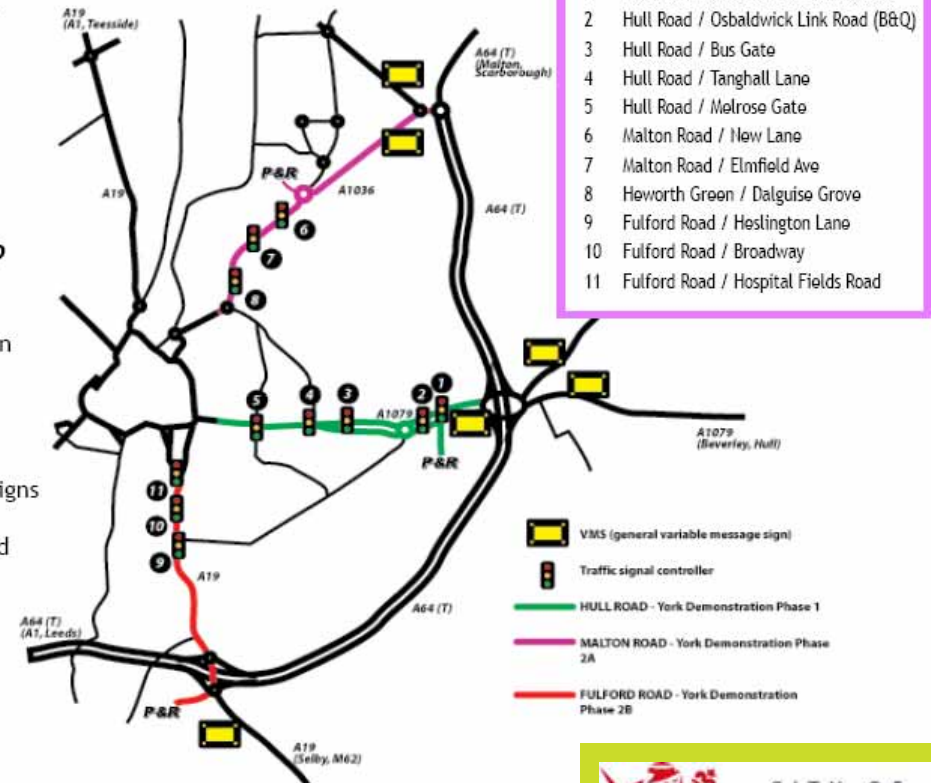
- demonstrate the end to end process:
  - data collected from traffic counters and the bus Real Time Information (RTI) system passed into the UTM Common Database and then data transfer to the newly developed FREEFLOW IDS (Intelligent Decision Support) - see figures 2 and 3;
  - operation of a basic IDS system;
  - modification of traffic signal operation and setting Variable Message Signs (VMS) in response to IDS outputs;
- provide a platform for roll out to subsequent demonstrations in York and elsewhere;
- benefit bus operation in York by improving journey reliability;
- Provide a 'Proof of Concept' for elements of proposed FREEFLOW technology.

3

## After Phase 1, the following development is planned:

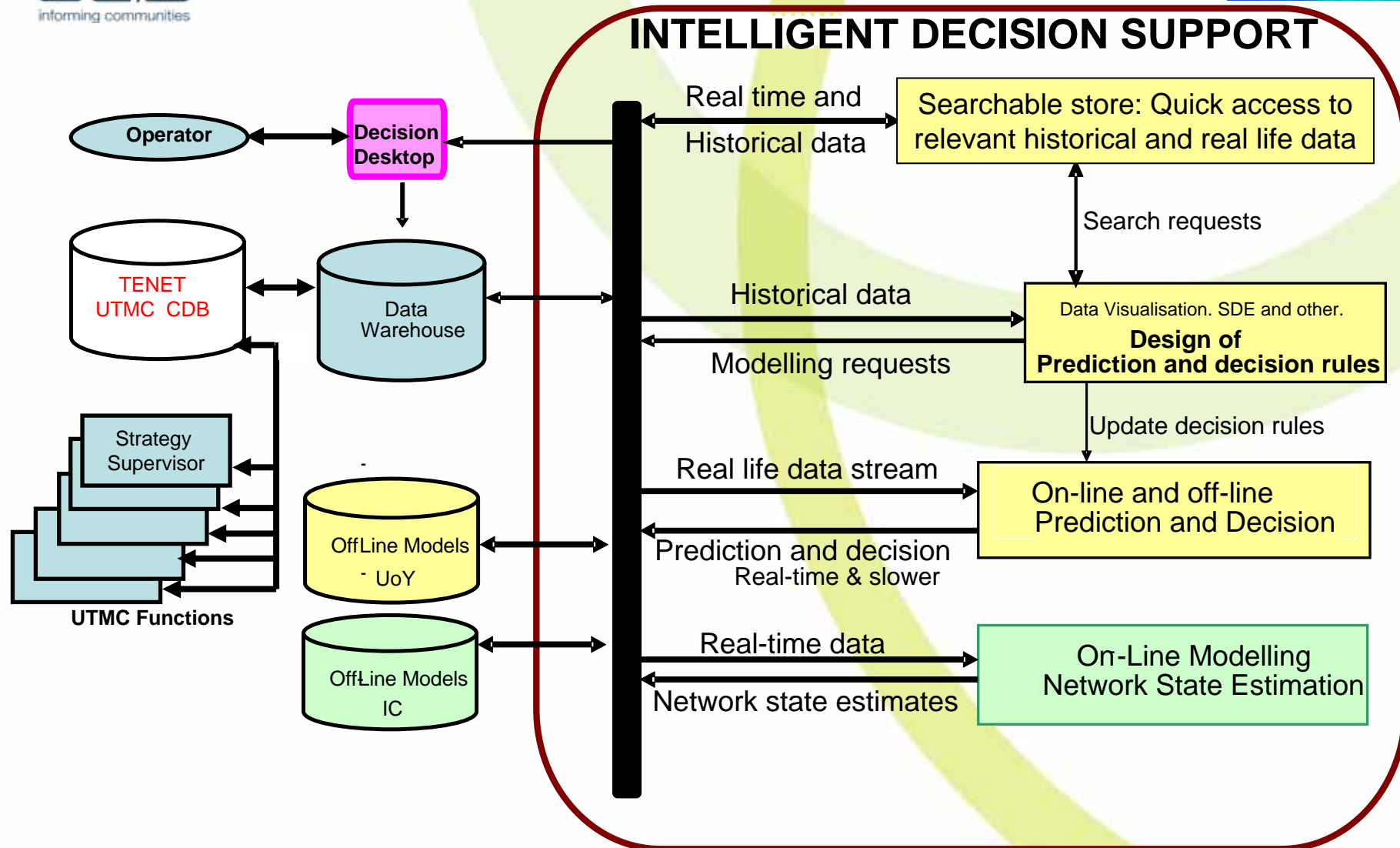
- Phase 2:
  - monitoring of two additional radials; and
  - provision of route guidance plus P&R information for three radials;
- Phase 3:
  - geographical expansion to cover the full City including route advice;
  - additional data sources and data fusion;
  - enhanced functionality, including enhancements to the IDS and the Decision desktop.

Figure 1 - FREEFLOW York Proof of Concept



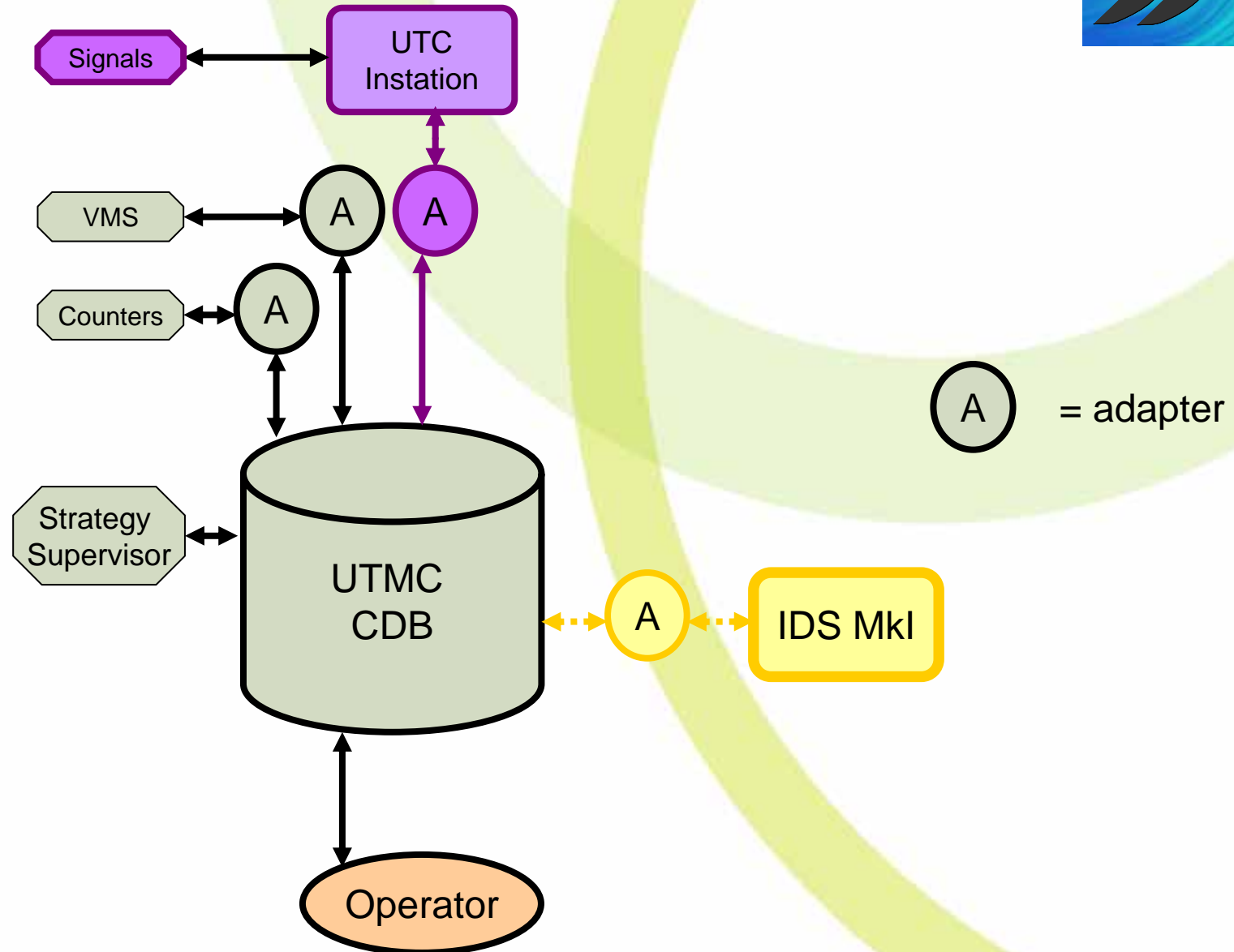


# Proposed IDS in York



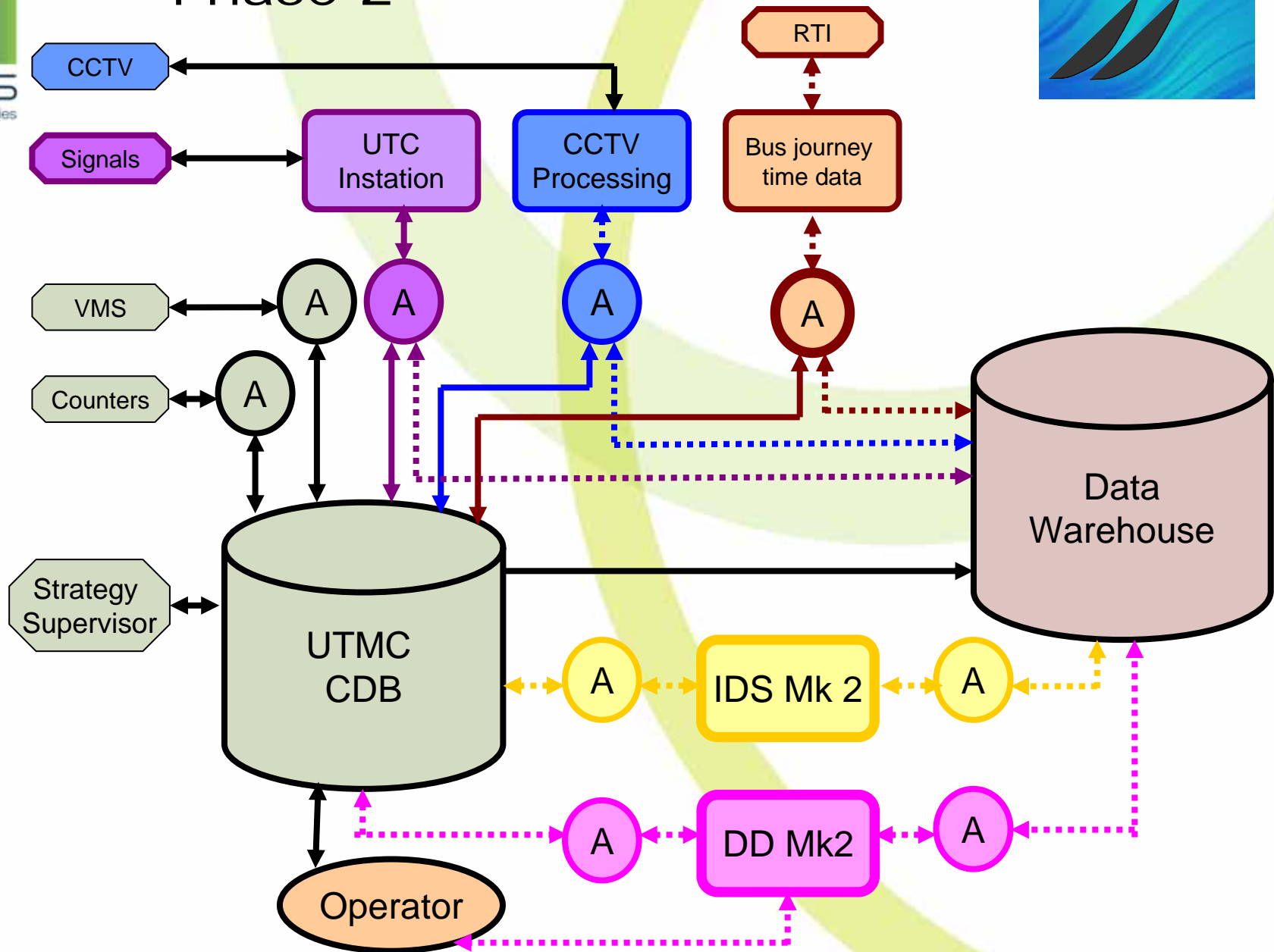


# Phase 1



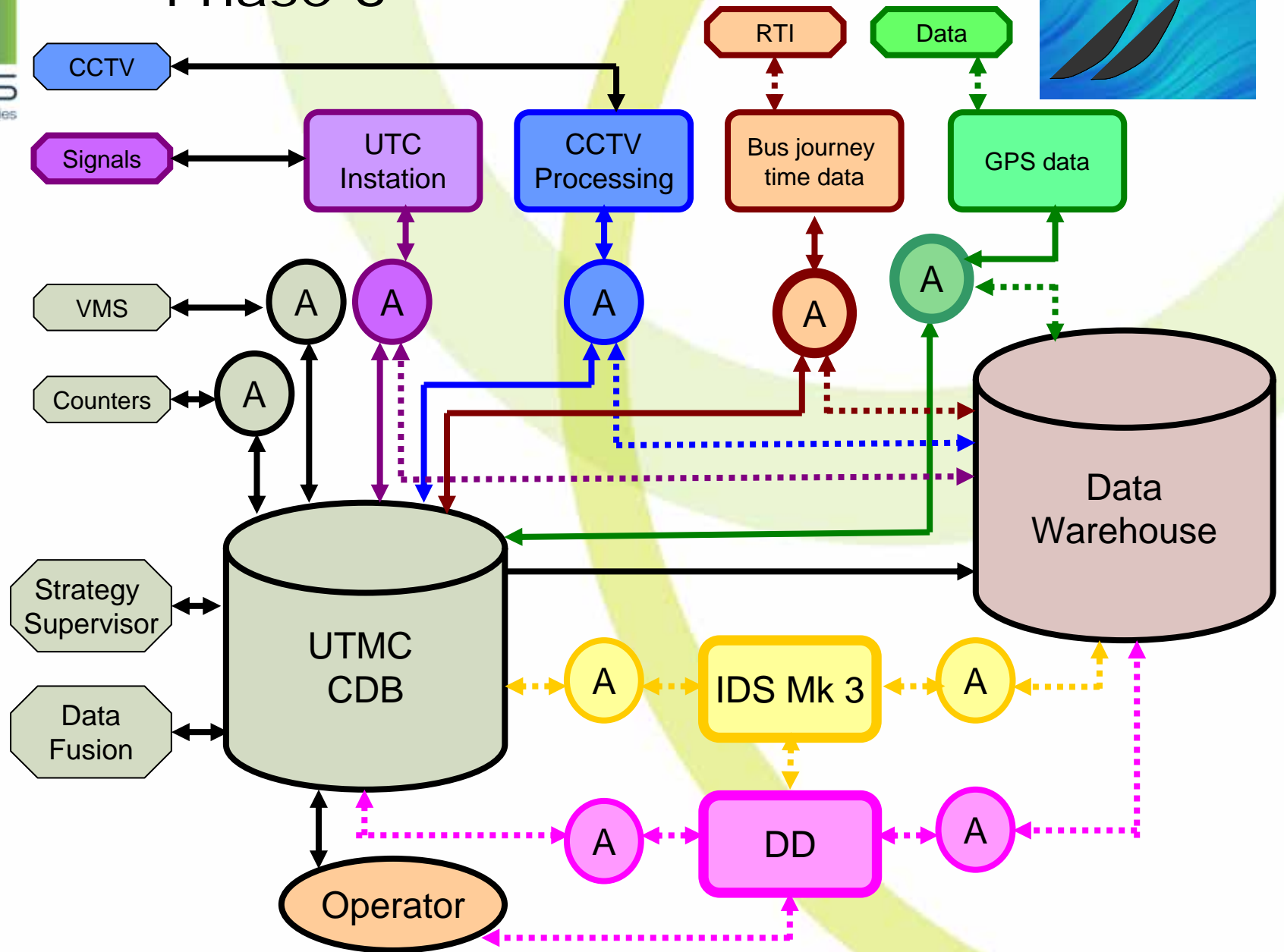


# Phase 2





# Phase 3





## What's Next



- Parallel Process to prepare the ground in Kent & London
  - City of York is a small City Trial - 2008/09
  - London is a large City Trial – 2009/10/11
  - Kent is exploring the interurban interface – 2009/10/11
  
- Reports of our progress will be produced.
- Full Report 2011

# FREEFLOW

a step change in performance



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FREEFLOW