

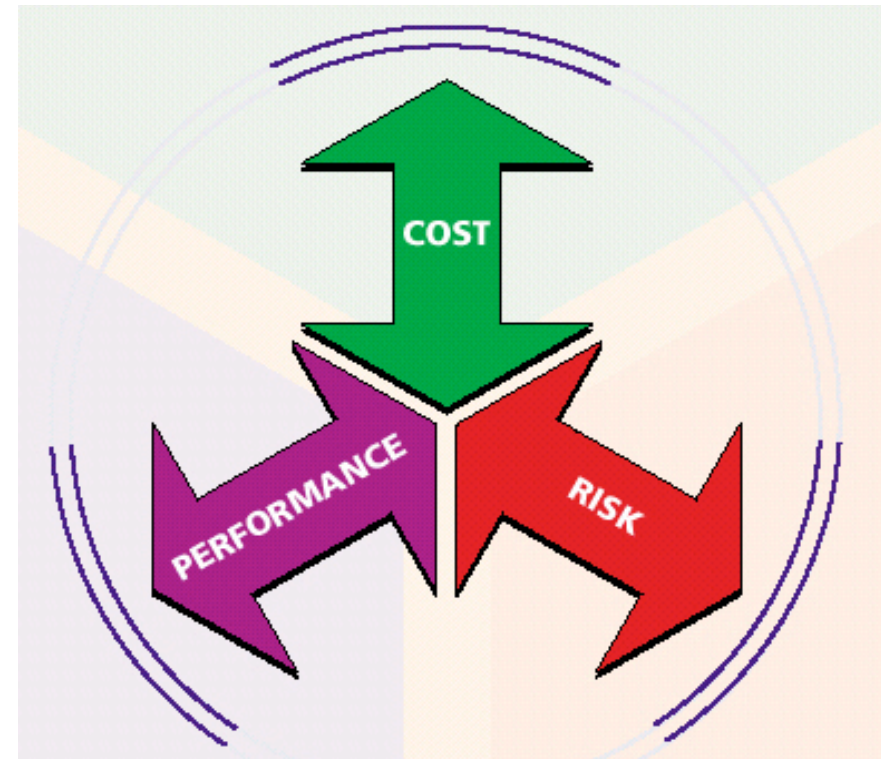
## **Asset management using real time information from vehicle control systems**



**Steve Mustard, Managing Director**

# Introduction

- Telematics is now technically/financially viable
- Acquisition of real time data from vehicles/delivery of services to vehicles now a practicality
- Many potential uses - in-car entertainment, tracking, insurance
- but in addition consider the benefit of the information itself for effective asset management

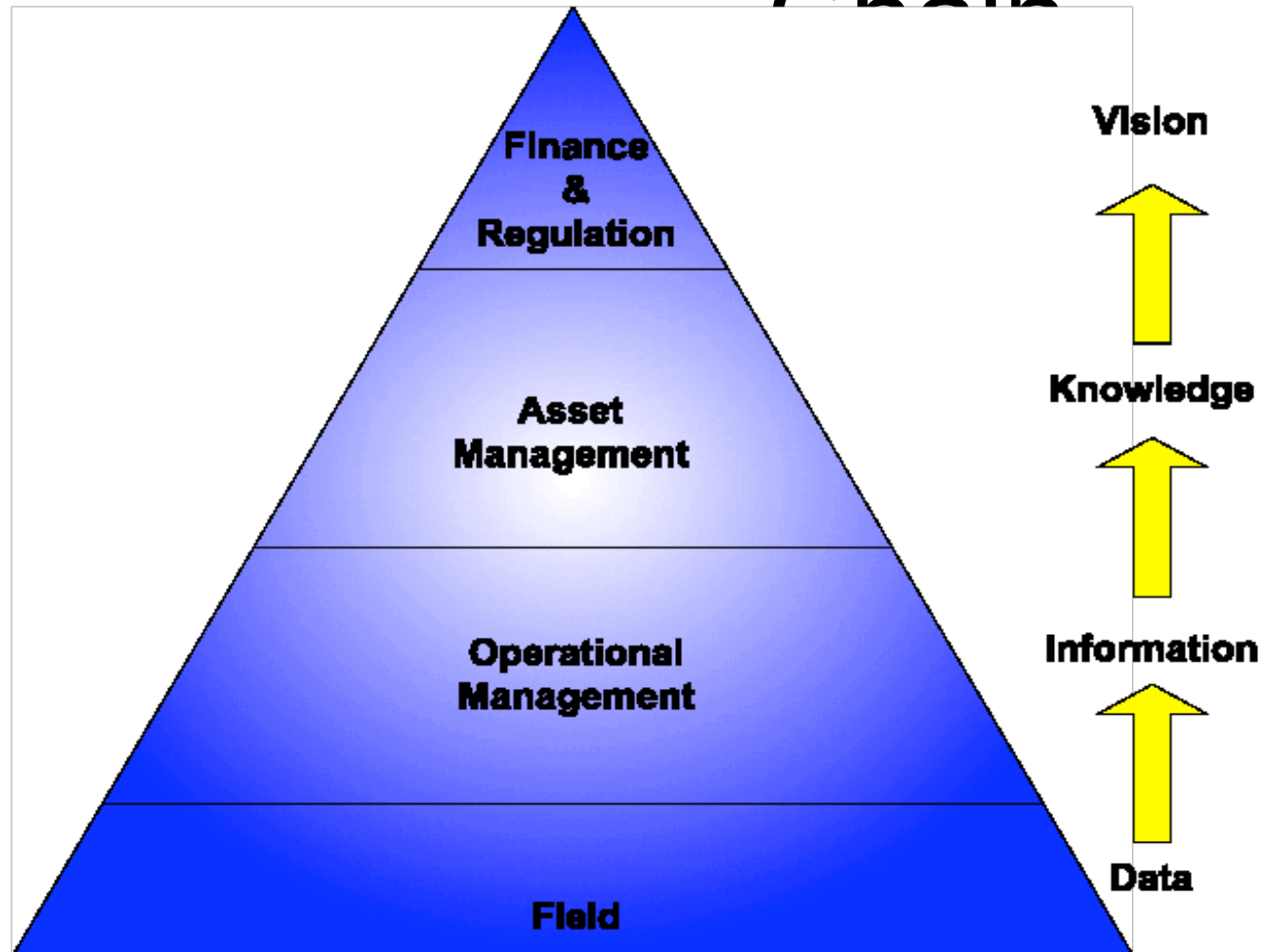


# Effective Asset Management

- Maximise revenue and enhance reputation in competitive market
- Reduce labour costs and concentrate skills
- Minimise capital expenditure whilst meeting tighter regulations
- Driving down whole life costs
- Understanding the assets themselves
- Relinking a fragmented value chain



# The Asset Management Value Chain





# Example of effective asset management

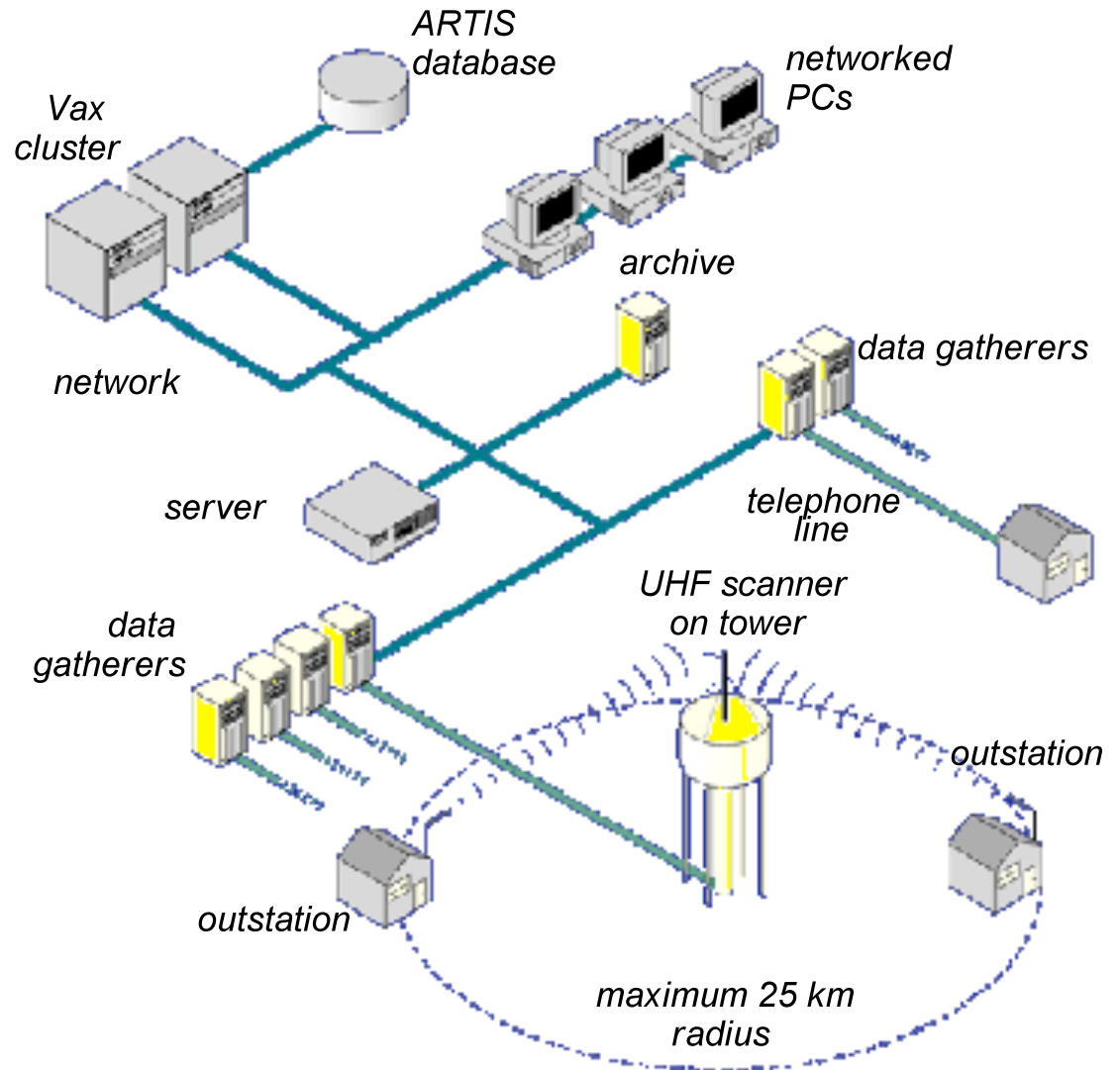
UK Water Industry utility,  
€5,000M asset base,  
multiple schemes:

- Energy Efficiency
  - Combining tariffs & hydraulics
- Decision Support
  - Faster corrective actions, better damage limitation
- Condition based Maintenance Management
  - Automatic trend analysis of pump efficiency



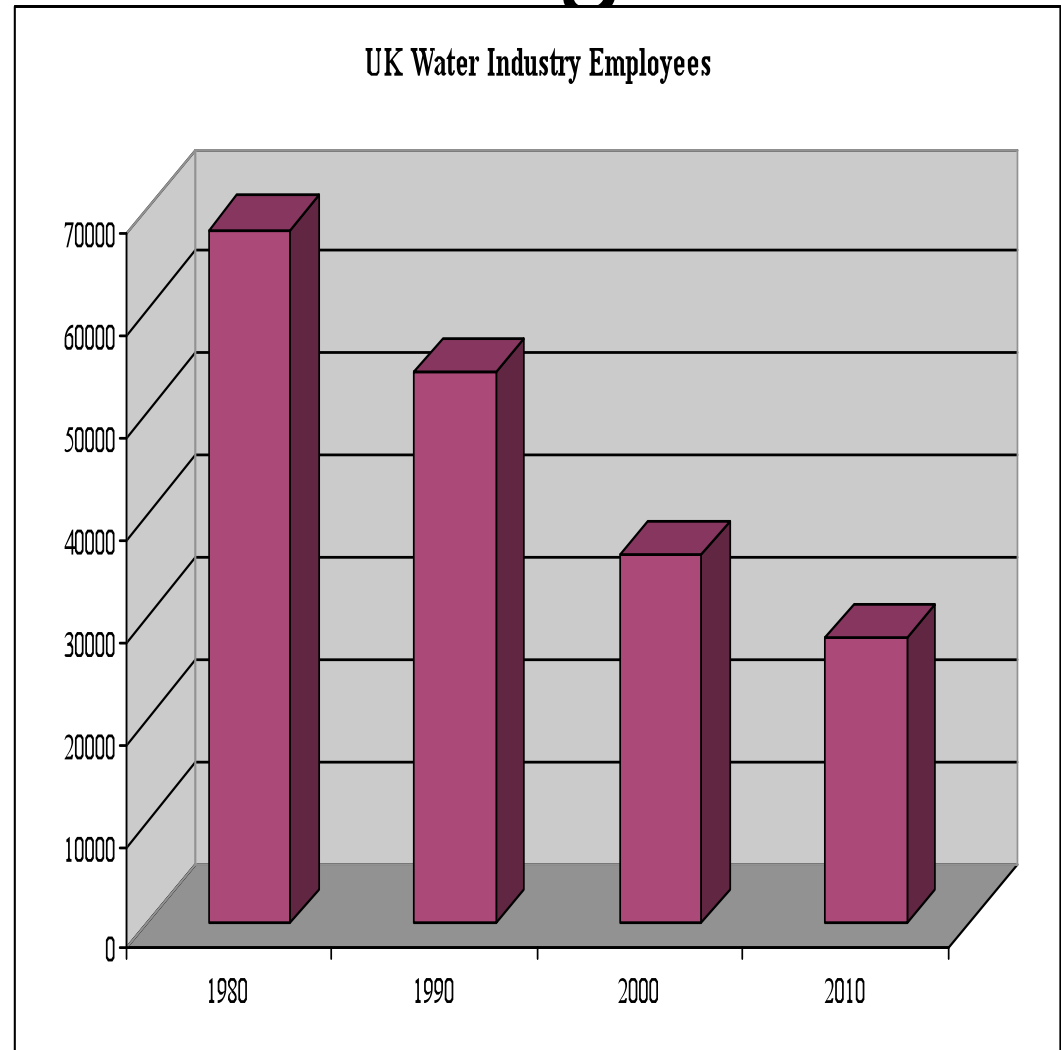
# Real time asset management system

- 10,000+ monitoring stations, 350,000 process variables measured 24/7
- Provide early warning of process problems
- Collect data to
  - analyse usage of assets
  - optimise maintenance schedules
- Collect data to determine production and usage levels



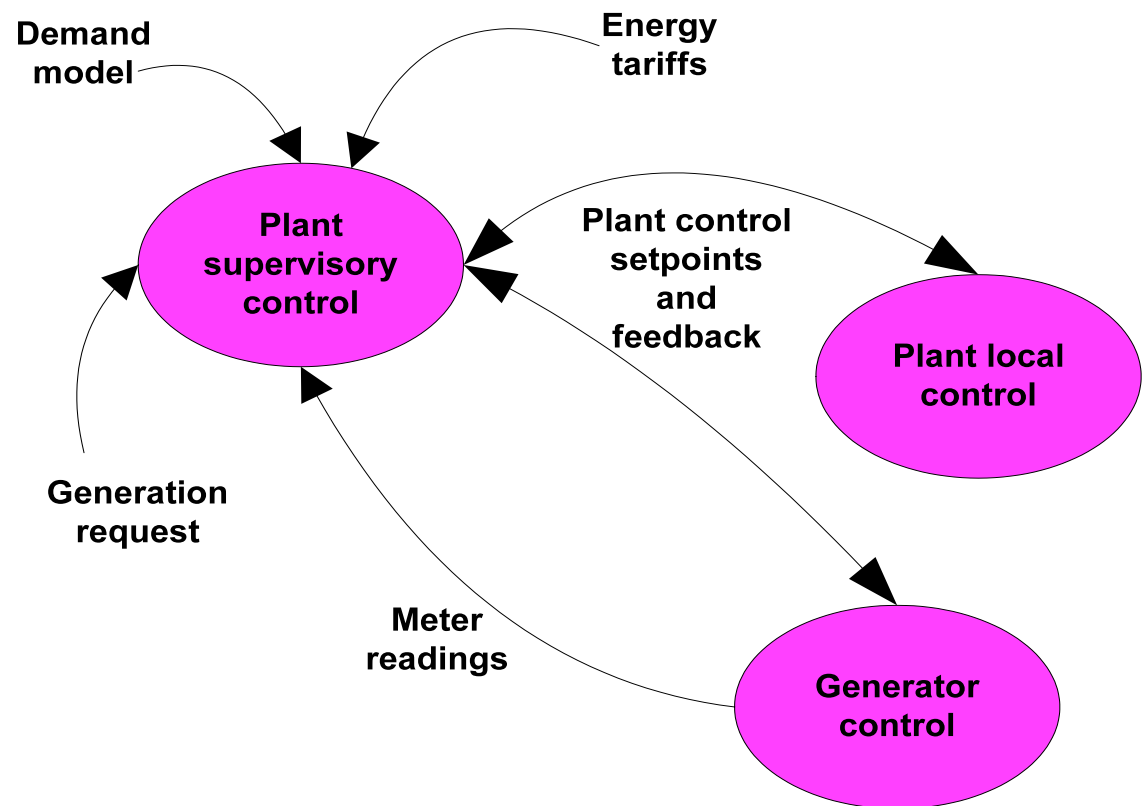
# Example of effective asset management

- Results:
- Savings of €100,000 to €3,000,000 per year per scheme
- ROI of 12 months or less
- Reduced manpower by around 50%
- Extended asset life



# Energy efficiency

- Control plant based on combination of demand model and energy tariffs
- Respond to demands from energy provider to resell excess generation capacity when required
- Automatically collect meter readings

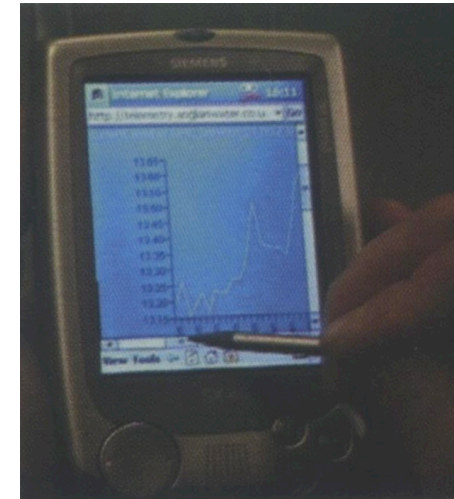
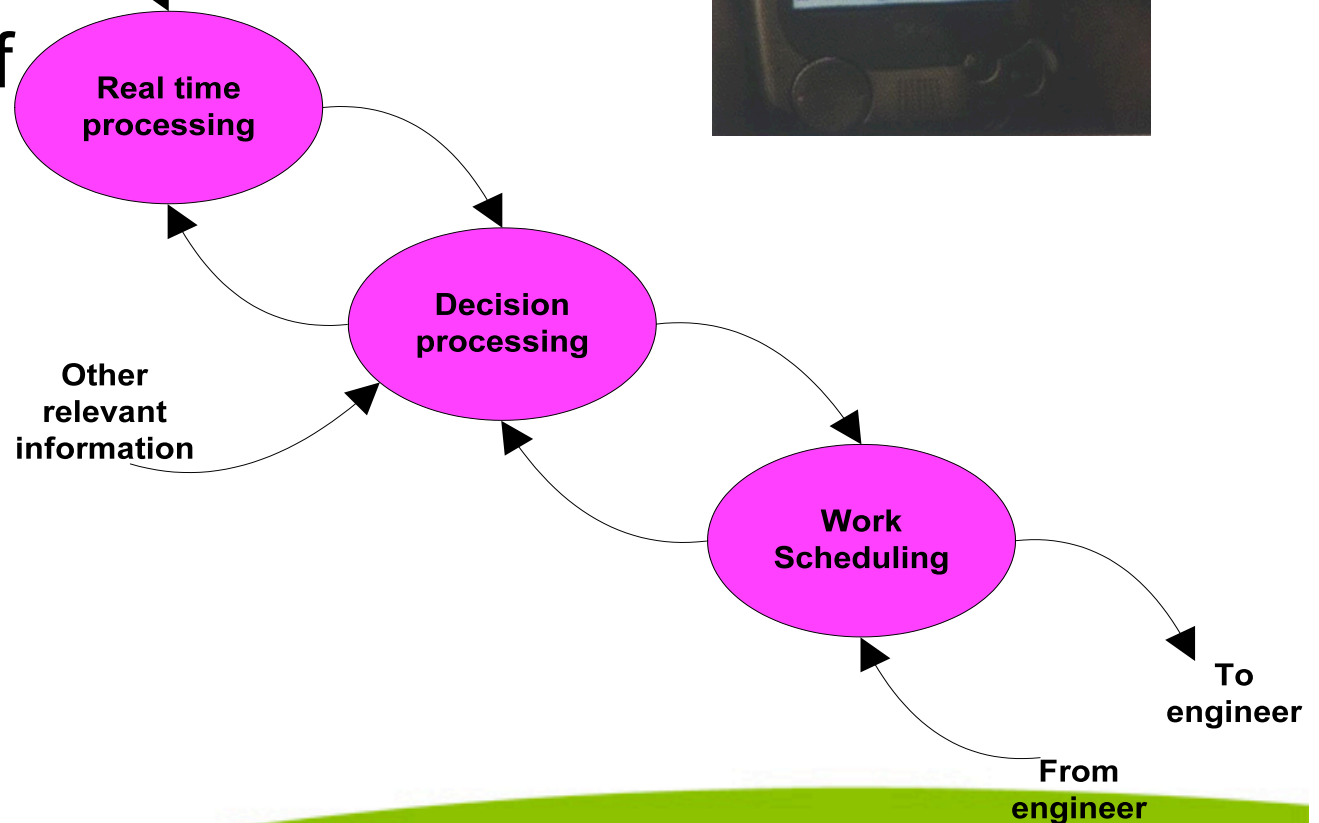




# Decision support

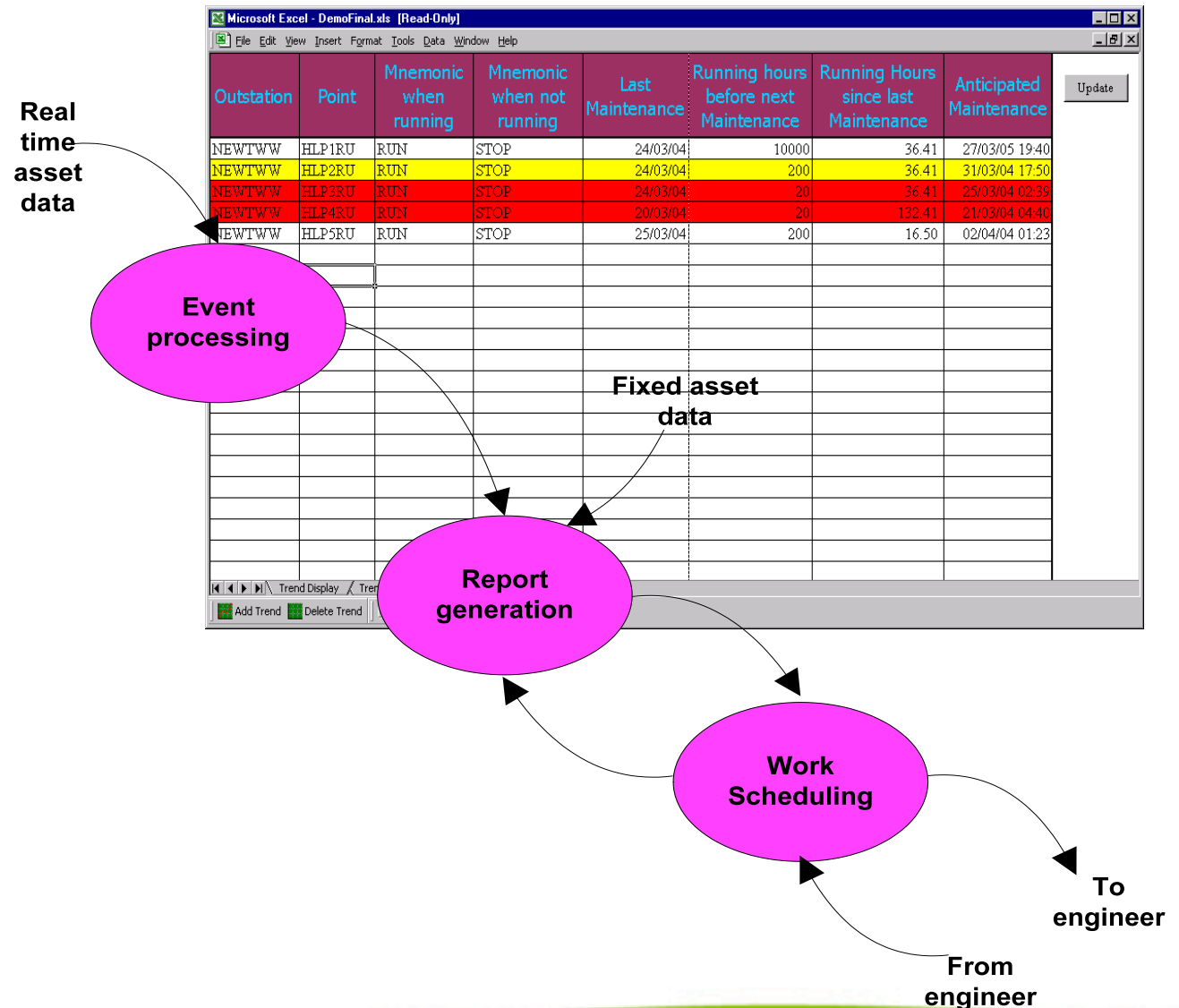
- From notification to engineer with no human interaction
- Reduction in staff costs
- Rapid response to incidents
- Correct prioritisation of activities
- Improved customer service

Notification of incident



# Condition based asset management

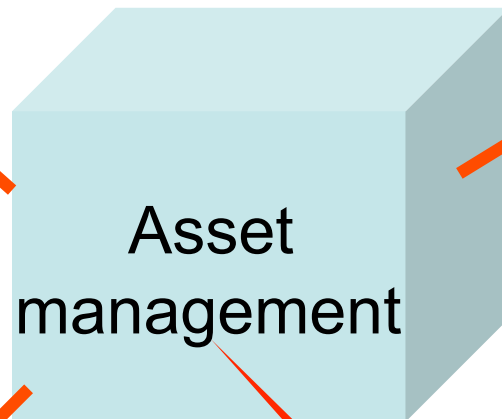
- Combine actual operational data with fixed data to optimise maintenance regime
- Reduce nugatory maintenance
- Target critical assets
- Reduced down time



# Effective vehicle asset management

Improved customer service  
response using decision support

Improved vehicle reliability  
and availability through CBM

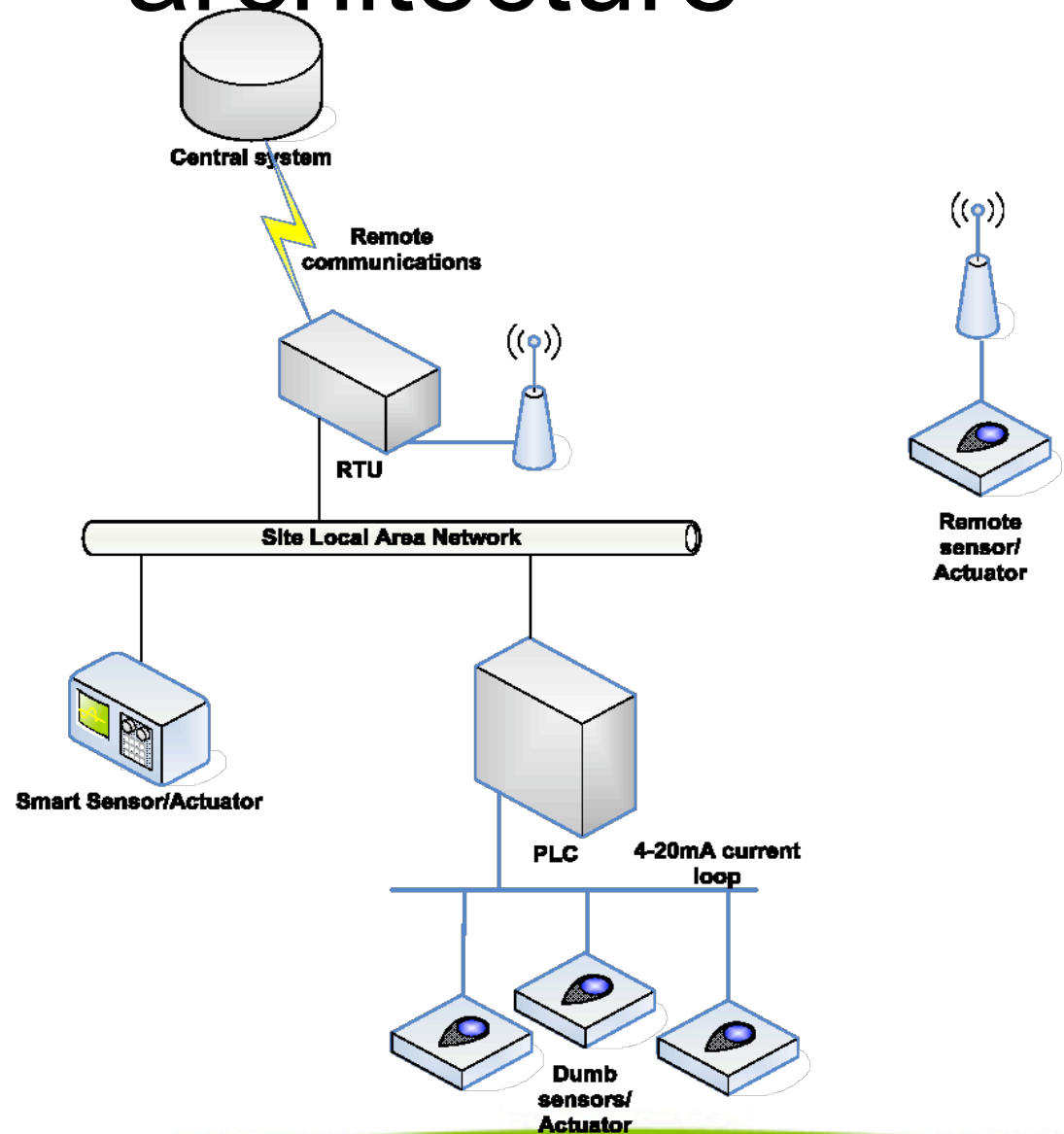


Better investment planning using  
improved performance information



# Utility control architecture

- RTU provides interface between central supervisory control and PLC
- PLC runs IEC61131-3 standard control program
- RTU collects data from PLC and sensors and performs pre-processing
- Diagnostic information included in data
- Standard communications protocols for RTUs, PLCs and smart sensor/actuators
- Changes to control programs based on real time events or new programs downloaded over remote communications link



# Vehicle control architecture

- Sensors for all required parameters installed in a network enabling data exchange in a common format
- Data in/out buffered & formatted at central telematics box
- Changes to control strategy remotely implemented
- Rigorous security & default control strategies implemented & verified
- As more ECUs are added to the network robust validation of interactions between upgradeable software levels required
- Diagnostic/Prognostic tools integrated into network
- Typical energy management applications:
  - Control of speed/acceleration/max rpm based on current location
  - Conserve fuel based on policy or purchase strategy
  - Optimise journey based on knowledge of current traffic news
  - Control based on weather, terrain or payload condition
  - Optimisation of charge balance/storage for hybrid vehicles





# Summary

- The advent of widespread wireless communications and low cost computer equipment has made telematics financially viable
- Effective asset management demonstrably reduces whole life costs and improves asset performance and customer service
- Take advantage of the telematics infrastructure to collect real time asset data to optimise business processes
- Consider impact on vehicle control systems to get the most out of the infrastructure



## **Asset management using real time information from vehicle control systems**



**Steve Mustard, Managing Director**