Space Technology Solutions for Urban Transport – A Bus Perspective

Or

Buses to the Moon

Simon Mathieson, Area Director

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Agenda

- Vehicle Design
- Fuel Usage
- Driver Management
- Real Time Control

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Vehicle Design – Weight and Lifespan

Vehicle weight:

- use of lightweight materials and composites becoming more widespread
- more thorough design to include life testing to reduce 'over engineering' of systems and components
- better system redundancy to improve vehicle 'up time' and reduce failures
- hybrid technology increases weight

Major Unit Lifespan:

- better use of condition monitoring and functional testing to more accurately predict failure and potential failure
- use of telematic systems to monitor critical systems health in 'real time' so early intervention can reduce repair costs and improve vehicle 'up time'

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Vehicle Design - Integration

Vehicle Integration:

- some development of semi-autonomous technologies within the bus industry to improve vehicle safety such as assisted braking systems and driver alerts
- a long term move to fully autonomous vehicles to further improve safety and reduce costs
- Autonomous buses for the future - Google bus?

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Fuel Usage

Ending Fossil Fuel Reliance:

- further development of hybrid systems for both drive and auxiliary systems to improve propulsion efficiency taking place – battery life an issue – high up front cost
- further development of alternative fuel systems including hydrogen and full electric taking place but limited in scale
- Euro VI Diesel engine in 2015 and ratings beyond - come with many complicated systems to reduce emissions
- energy recuperation systems are now available but they affect vehicle driveability which has minimised their widespread uptake

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Driver Management

Issues:

- Average management to driver ratio is 1:100
- Remote workers away from base for up to 5.5 hours before a break
- Traditional scheduling based on 1986 agreements
- Traditional form of monitoring through accidents, feedback, random drug and alcohol tests
- Basic Telematics to review but not in real time

Solutions Sought:

- Confidence that driving standards are being maintained
- Live reporting of incidents and issues
- Reassurance around issues of driver fatigue and health – planning and in real time

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Real Time Control

Issues:

- Passengers ever more demanding for live travel information
- Supervisors need to be better informed about location of vehicles, traffic information, known delays, likely delays
- Drivers need to be communicated with
- 92% of buses in England have GPS technology fitted

Solutions Sought:

- Arriva App exists for journey planning and live status but lacks integration with other sources such as Local Authority information

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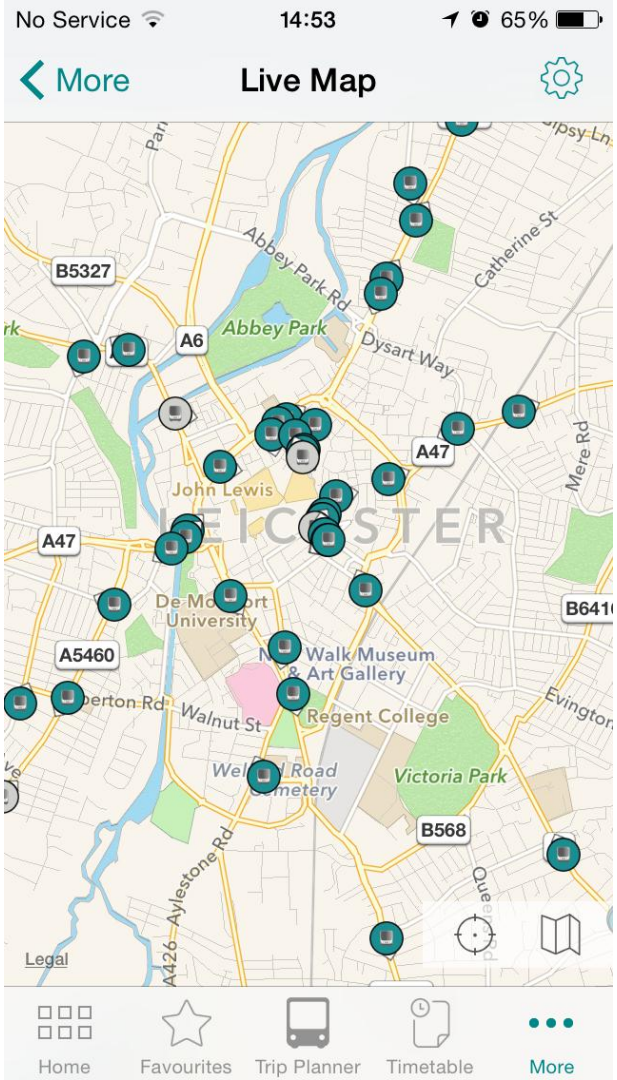

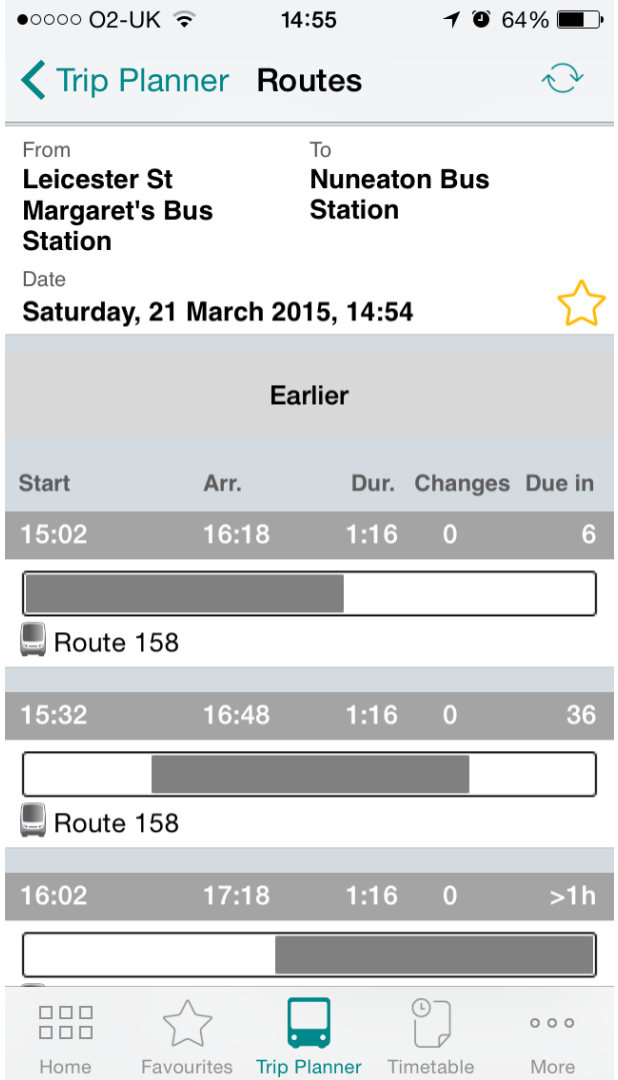

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Real Time Control

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Solutions Sought:

- Arriva App exists for journey planning and live status but lacks integration with other sources such as Local Authority information
- Back office of App allows Supervisors to see where buses are but lacks forward planning capability – live rescheduling
- Safe, legal communication with drivers is very difficult
  - No radio
  - Messaging through ticket machines limited

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Conclusion

- Less sexy end of the public transport world but
  - 4.7bn passenger journeys in England in year that ended March 2014
  - 105,000 employees in England
  - 84% of buses in England are accessible
  - 7.7 years average age
  - Over 1500 hybrid buses in use
- Manufacturers are responding to some challenges but operators traditionally risk averse – confusion over which technology is best
- High up front costs are a barrier
- Partnerships outside of industry rare
- The appetite is growing, particularly around vehicle technology

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