

Institute for Transport Studies

FACULTY OF ENVIRONMENT



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## Personal Rapid Transit (PRT)

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## Outline

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- PRT and other automated transport systems
- The CityMobil project
- Potential for city-wide application of PRT
  - Strategic modelling to estimate demand
  - Business case
- Real-life applications: Heathrow Airport





## What is PRT?




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- Four to six seat automated taxi
- Light weight to reduce infrastructure costs and power requirements
- Separate light weight guideway with little or no interaction with other traffic or pedestrians
- High manoeuvrability permits integration into current buildings and infrastructure
- Available on demand (“public transport that waits for you”)
- Station to station routing; no intermediate stops; off-line stations
- Operating speeds of around 40 km/h
- Automated guidance, merging and diverging
- Electric propulsion (battery, linear motor)
- User target: alternative to taxis, buses, walking







## Other automated transport systems





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- Cybercars
  - Driverless vehicles, electronic guideways
- High tech buses
  - Electronic guideways
  - Driven on city streets
- Dual mode vehicles
  - Automated following
  - Driven on city streets









## The CityMobil project



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- Funded by EC DG Research
- €11m funding; 40% on demonstrators, 60% research
- Led by TNO (Netherlands)
  - With 28 partners from 12 countries
- Five years from May 2006
- [www.citymobil-project.eu](http://www.citymobil-project.eu)



## The role of the predictive tests



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- To assess the likely contribution to urban transport policy objectives of each of the four technologies
  - If applied at a significant scale
  - In representative European cities
- To contribute to an *ex ante* evaluation of these technologies
- To complement *ex post* evaluations of specific applications
  - Cybears in the new Rome exhibition centre
  - PRT in London Heathrow
  - High tech buses on a corridor in Castellon, Spain
  - A series of smaller showcase applications



## The approach of the predictive tests



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- Modelled using a sketch planning model, MARS
- Compared five applications
  - Cybercar and PRT in the city centre
  - Cybercar (or PRT) as a feeder service
  - High Tech Buses on radial corridors
  - Dual Mode Vehicles throughout the city
  - With and without supporting policies
- In four case study cities
- 2005 base year
- 30 year modelling period



## The four case study cities




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- Four cities
  - Selected to be reasonably representative of different city types in Europe
  - With commonly specified policy tests and appraisal in all four to permit comparison of the potential for each technology in each city
- The four cities
  - Tyne and Wear (UK) (1,100k)
  - Madrid (ES) (3,200k)
  - Trondheim (NO) (200k)
  - Vienna (AT) (1,600k)

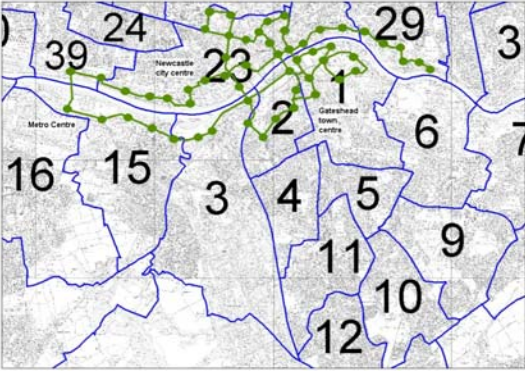



## Tyne and Wear PRT scheme




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- 54 MARS zones in total
- PRT network:
  - 8 MARS zones
  - 56 stops
  - 21km route length
  - Inner city network





## PRT in the city centre: local impact on trips




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**Index for PRT local effects in 2010 peak (M0 2005 = 100)**


2010 peak	Gateshead	Madrid	Trondheim	Vienna
Car	95.8	98.3	98.7	91.9
Total PT	146.9	102.6	126.1	102.7
Slow	91.4	90.6	92.5	99.8

**Index for PRT local effects in 2010 off peak (M0 2005 = 100)**

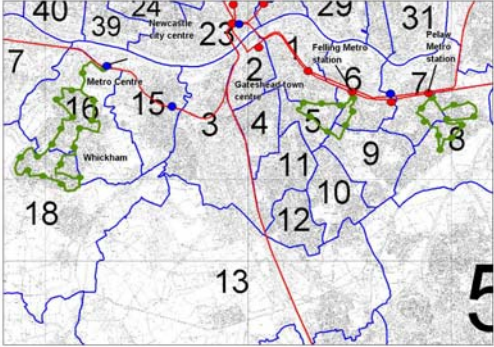
2010 peak	Gateshead	Madrid	Trondheim	Vienna
Car	83.8	97.9	99.8	94.3
Total PT	241.8	114.2	216.2	117.5
Slow	75.3	90.2	92.3	94.9




## Tyne and Wear cybercar (or PRT) PT feeder scheme




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Cybercar feeder scheme	Track length km	Stops	Typical distance between stops km	MARS zones
6	12.7	18	0.5	2
7	4	8	0.4	3
8	5.5	10	0.4	2



## Cybercar feeder results: local impact on trips




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**Index for cybercar feeder local effects in 2010 peak**  
(MO 2005 = 100)

2010 peak	Gateshead	Madrid	Trondheim	Vienna
Car	91.7	91.9	99.6	98.1
Total PT	111.8	129.7	111.7	103.8
Slow	78.3	55.1	97.4	95.5

**Index for cybercar feeder local effects in 2010 off peak**  
(MO 2005 = 100)

2010 peak	Gateshead	Madrid	Trondheim	Vienna
Car	69.9	90.6	100.1	101.1
Total PT	105.3	114.9	100.1	116.1
Slow	52.3	67.6	100.1	99



## Conclusion of PRT modelling work



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- An inner city PRT network can be viable in most types of cities, but less so in the largest cities
- A PRT network can attract trips that would be otherwise made by car
- PRT also attracts walking trips and those made by other PT modes
- PRT could feasibly act as a suburban feeder to existing public transport nodes
- Other opportunities were not tested
  - Small towns (e.g. Daventry new town in England)
  - PRT within major facilities (e.g. universities, airports)



## Heathrow Airport PRT system




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- Pilot PRT system being introduced by BAA
  - With evaluation support from CityMobil
  - Using ULTra system developed by ATS Ltd
- To connect car parks to Terminal 5 as a replacement for a shuttle bus service
- If successful, the future network will connect all terminals, car parks and nearby hotels and offices



## Heathrow Airport PRT system

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The image consists of two parts. On the left is an aerial photograph of Heathrow Airport showing Terminal 5, Terminals 1, 2, & 3, Terminal 4, a tunnel, and a car park. A red line traces a path from the car park area towards the terminals. On the right is a technical plan of the PRT guideway system, showing a 'Dual guideway' and 'Terminal 5'. A red line connects the aerial view to the technical plan.

London Heathrow Airport Personal Rapid Transit Pilot

ITS

## Heathrow PRT

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The image is an aerial photograph showing the Heathrow PRT guideway under construction. A red arrow points to the terminal building labeled 'T5'. Another red arrow points to a section of the guideway labeled 'Guideway under construction'.

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Heathrow PRT

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This slide features a red header with the text 'Heathrow PRT' on the left and the 'UNIVERSITY OF LEEDS' logo on the right. The central image is a perspective view of the Heathrow PRT tracks, showing two parallel tracks with overhead power lines and a metal safety fence on the right. The ITS logo is positioned in the bottom right corner of the slide.

Heathrow PRT

UNIVERSITY OF LEEDS



ITS

This slide features a red header with the text 'Heathrow PRT' on the left and the 'UNIVERSITY OF LEEDS' logo on the right. The central image shows a modern, multi-level station structure with a curved concrete overpass and a glass-walled building in the background. The ITS logo is positioned in the bottom right corner of the slide.

# Heathrow PRT



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# Heathrow PRT




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## Heathrow PRT

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## Heathrow PRT: Current schedule

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- ❖ **March 2009** Shuttle bus survey
- ❖ **Spring 2009** System complete
- ❖ **Spring-autumn 2009** Commissioning
- ❖ **Spring 2009** CM GA & EurATRA @ Heathrow
- ❖ **Autumn 2009** Public operation begins
- ❖ **March 2010** PRT survey
- ❖ **Summer 2010** Evaluation Reports (Deliverables 1.2.4.1/3)

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