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Ultra Personal Rapid Transit: a million autonomous electric miles and counting

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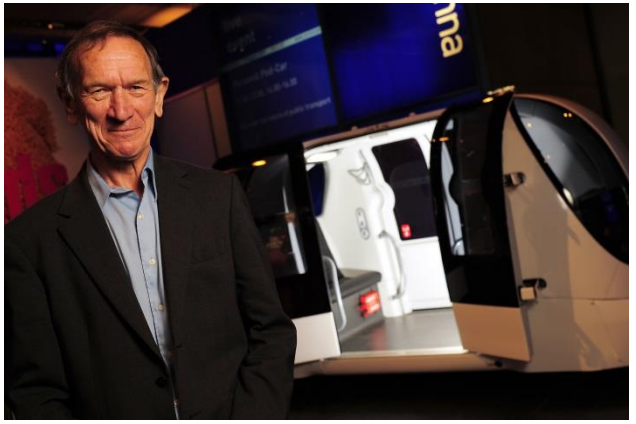
ULTra: Urban Light Transport:

Started January 1995 at University of Bristol

To define an urban transport system for the next century, meeting future needs for flexible personal transport, while being highly acceptable in an urban environment.

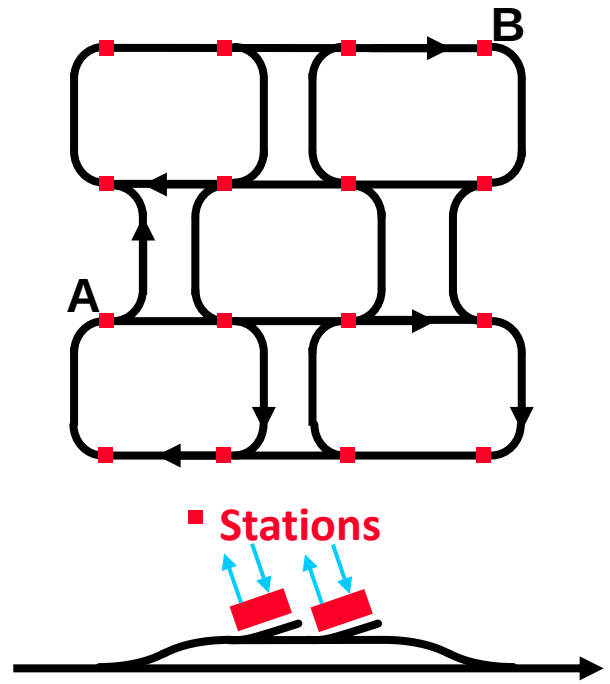


Passenger Requirements

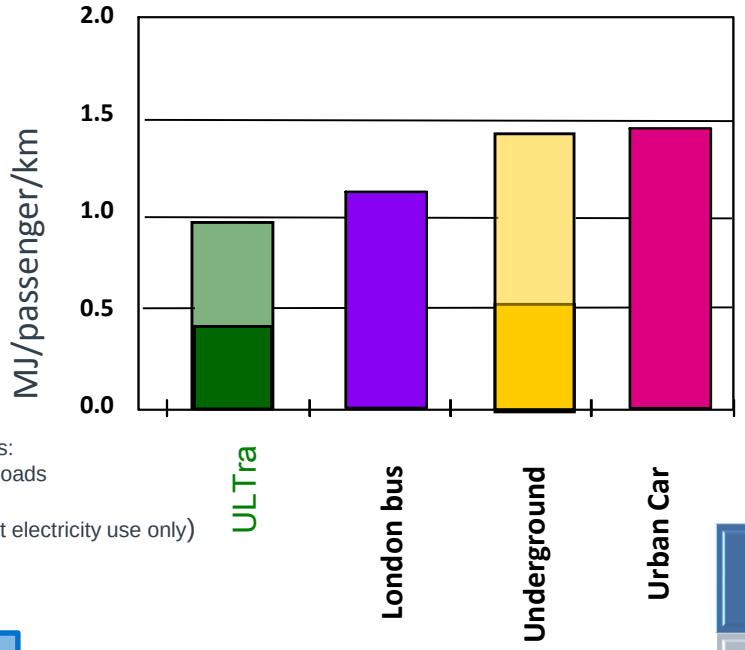
Automated transport by small electric vehicles on a dedicated guideway network with off line stations

Requirement

- Available on Demand
- Goes everywhere
- No Stops
- Environmentally friendly
- Safe and Secure
- Low Cost
- Integrates with other modes

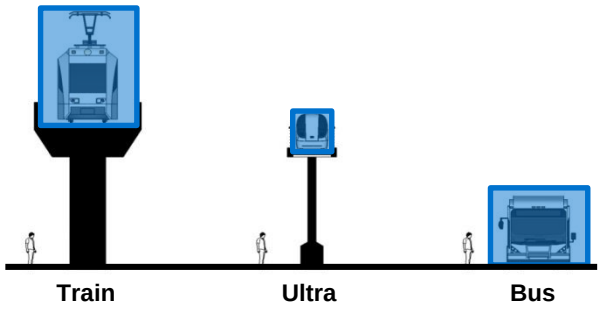


Cost-efficient and sustainable transport for cities



UK Data. Assumptions:
- Average passenger loads
- Well to wheel

(darker shading - direct electricity use only)

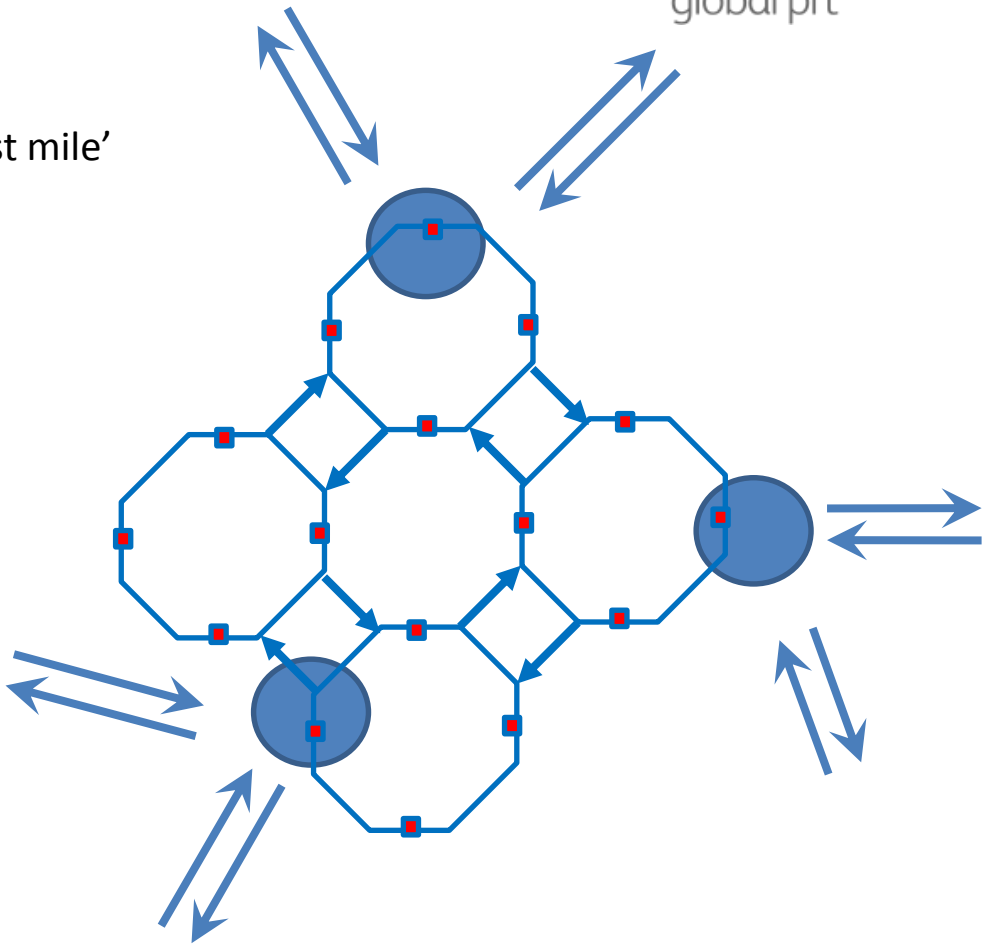


- No on site emissions
- Very quiet and minimal vibration
- Infrastructure is lighter weight and lower cost than rail
- Due to the light weight design the system is highly flexible to install and can be retrofitted into space constrained urban environments.
- Cost £5-10M per mile compared to average cost of £25.4M for light rail in England.

Project/System	Cost per km	Cost Per KM if PRT Were Used
Light Rail at Toronto International Airport	£38m per km	£9-10m per km
Montpellier Light Rail System	€21.8m per km	€5.6m - 9m per km
Oakland Airport Connector	£32m per km	£6-8m per km

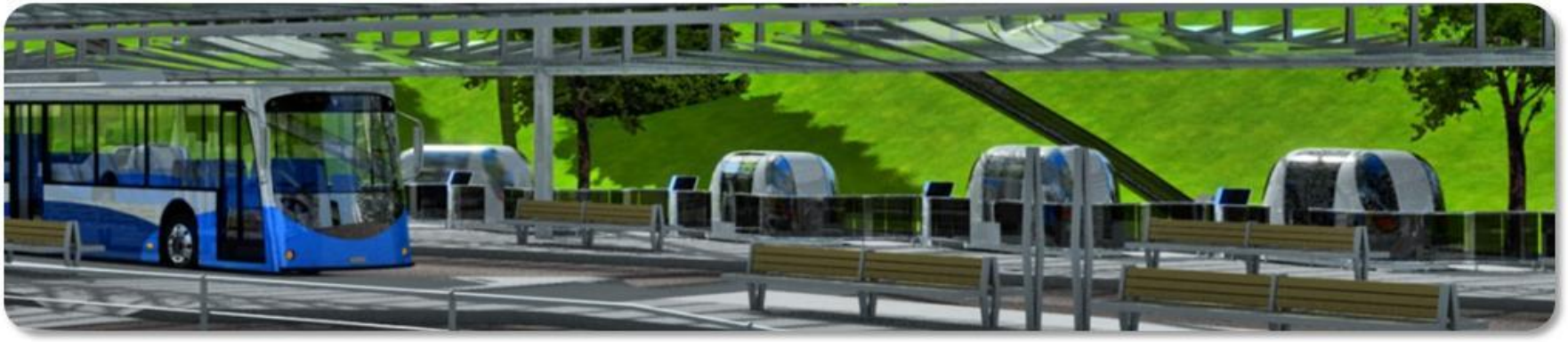
Enabling multi-modal transport use and increasing public transport interconnectivity

- PRT network provides transport within a city.
- Connects with other transport hubs to provide ‘last mile’ connectivity.
  - Rail
  - Bus stations
  - Park and Ride
  - Car clubs/Rental Cars



PRT connectivity enhances public transport

- Independent studies by Arup and ITS Leeds show significant benefits to existing bus & rail services when they are supported by an on-demand PRT network.
  - Cardiff (UK): A PRT system covering the last 2km to the Bay area would increase patronage by >100% on existing bus & rail services.
  - Gateshead (UK): a 21km PRT network serving the inner city would increase the use of rail travel by 168% in the peak and 232% in the off-peak.



Overview of the Heathrow POD

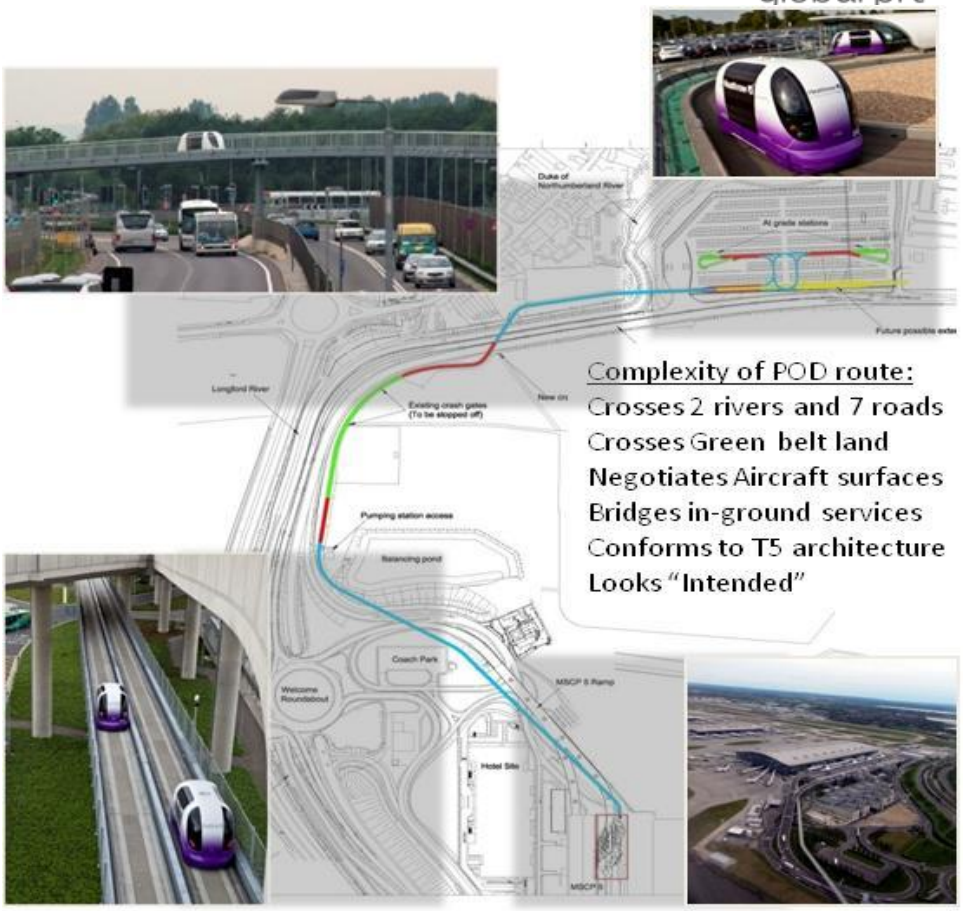
Built to demonstrate the benefits & viability of a PRT system for Heathrow Airport, connecting T5 to Business Parking

- One-way trip length: 1.7km
- Trip Time: 5 minutes (vs 10-15 minute bus)
- 21 Passenger Vehicles, 3 POD stations

First phase system with three primary aims:

- ✓ prove the technology
- ✓ show ability to generate revenue
- ✓ confirm positive passenger reaction

Heathrow POD has exceeded expectations for all three objectives



How does the Ultra PRT Perform?

Proven Reliability & Capacity

- ✓ >975k passengers carried so far
- ✓ >2,000,000 vehicle km completed
- ✓ >99 % service availability
- ✓ Average waiting time for a vehicle <15 seconds
- ✓ >80% of passengers have no wait at all

Revenue generation

- ✓ Car park tariff is 23.4% higher than other Business Parking
- ✓ Car park occupancy 10% higher due to PRT, limited by capacity
- ✓ Brand sponsor of PODs provides advertising revenue.
- ✓ Fare paying passengers from hotel adjacent to business car park.

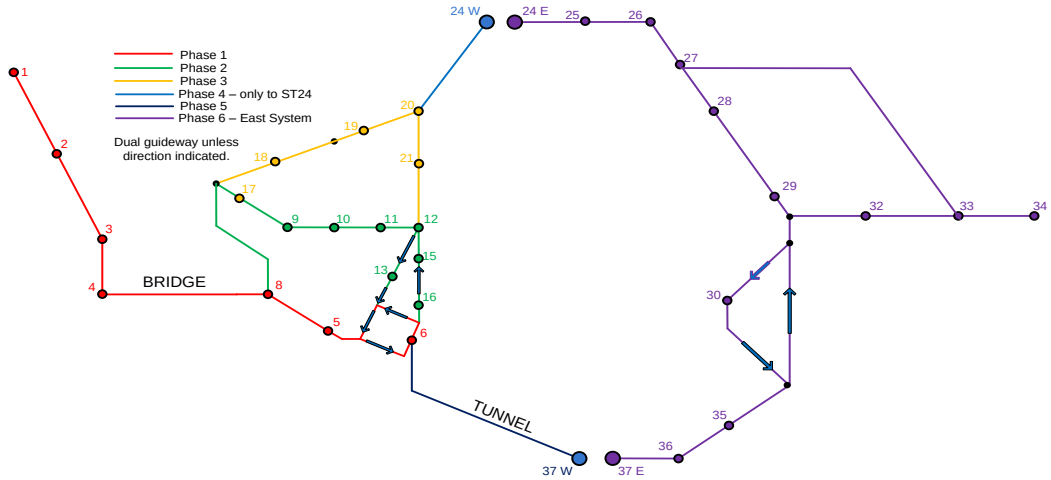
Non-financial Benefits

- ✓ 70,000 bus journeys saved per annum
- ✓ 200 tonnes of carbon saved per annum
- ✓ Passenger survey scores of 4.7/5 – best service on the airport
- ✓ Multiple awards

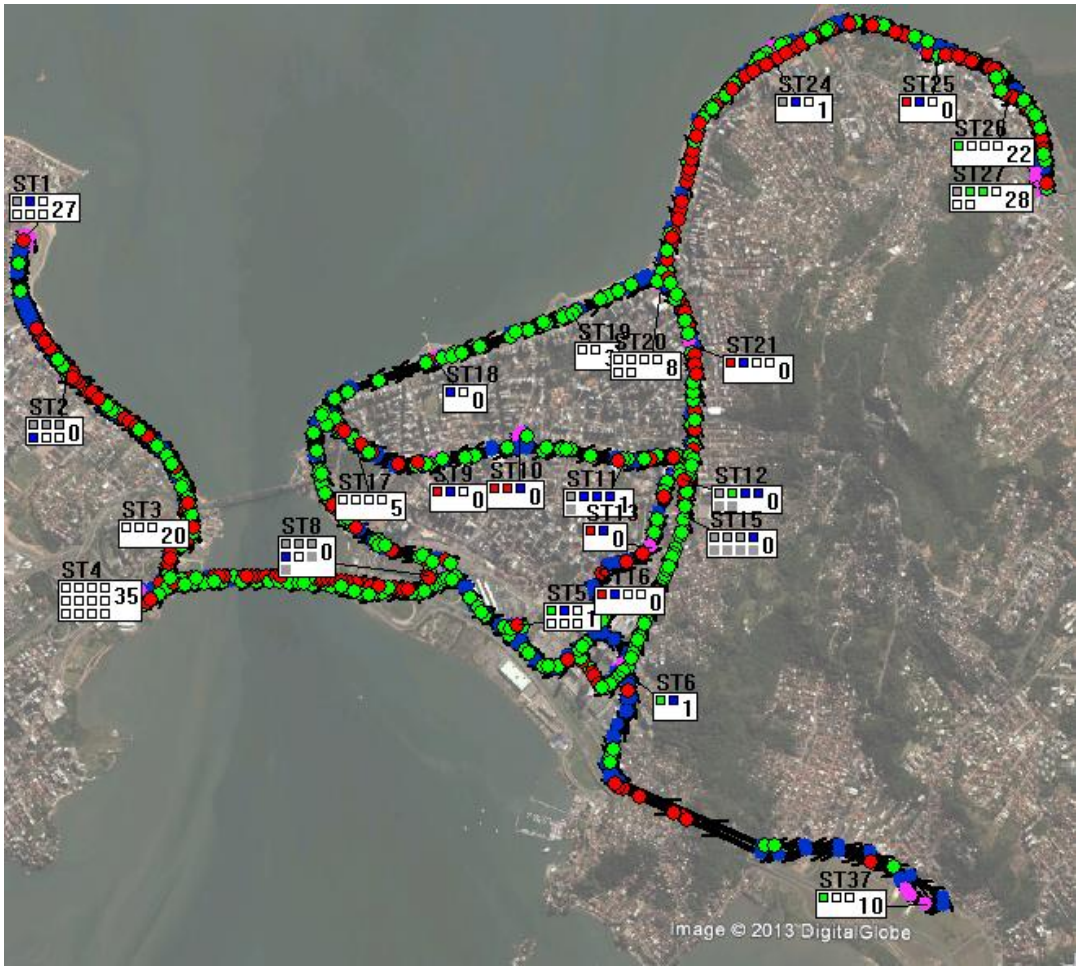
Future Systems

- Working with partners to develop urban system applications:
  - Florianopolis, Brazil
  - Linkou Taiwan
  - New UK airport railway station link.
- Modelling and simulation using existing system technology demonstrate Ultra PRT is scalable to meet future system requirements

Florianopolis



	Track Length	Average Trip	Longest Trip	Peak Demand	Stations	Fleet Size
Phase 1	11.0km	2.4km	5.2km	1048 pax/hr	7	120
Phase 2	19.6km	3.1km	6.8km	2601 pax/hr	14	380
Phase 3	25.4km	3.2km	6.9km	3110 pax/hr	19	480
Phase 4	32.1km	3.9km	10.2km	3494 pax/hr	23	650
Phase 5	37.0km	4.0km	10.2km	3526 pax/hr	24	700
Phase 6W	33.2km	3.6km	8.5km	4541 pax/hr	21	700
Phase 6E	26.2km	4.0km	6.9km	4024 pax/hr	13	600
Phase 6 Both	59.4km	3.8km	8.5km	6555 pax/hr	34	1300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ST2
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ST3
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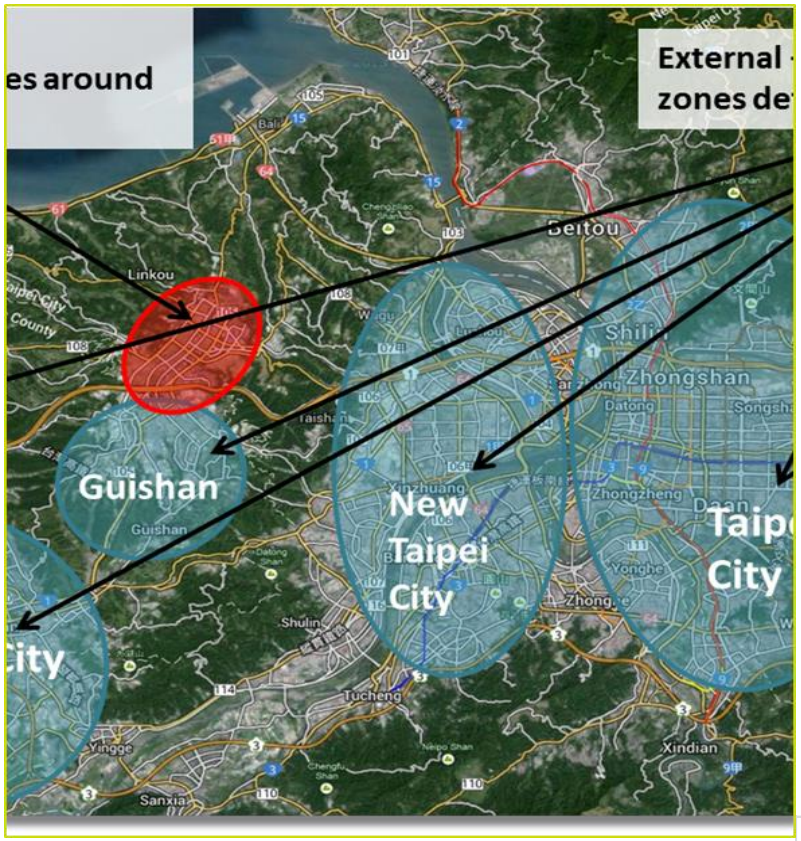
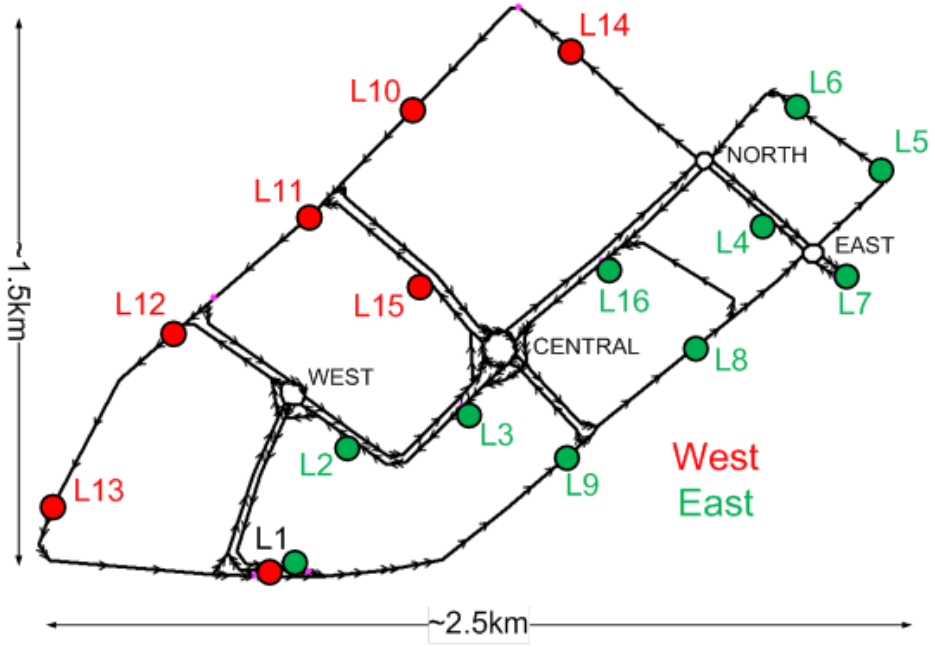
Linkou





Year	Track length	Average trip	Longest trip	Peak demand	Operational vehicles
upto 2023	16.2km	2.1km	4.7km	2160 pax/hr	240
upto 2031				2700 pax/hr	280
upto 2041				3600 pax/hr	340
	pax / hr = passengers travelling per hour (peak is PM)				

INNOVATION IS GREAT BRITAIN

Heathrow pod
Ultra Global PRT

Globally renowned for delivering the world's best transport solutions, for internationally recognised expertise, make the UK your partner of choice.

ukti.gov.uk/greatbritain