PROPOSAL TITLE:	London orbital virtual hub	Group:	Other
SUBMITTED BY:	Private individuals (2) and Interlinking Transit Solutions Ltd	Reference No.:	60

PROPOSAL

The proposal is to link the London airports by a rapid transit system to enable passengers to interline between airports. The surface transport systems would also be connected to the national rail system to facilitate improved surface access for travellers and workers, reducing road congestion and associated pollution, and to facilitate substitution of air feed of connecting passengers into the hubs from, for example, Manchester, Leeds and Newcastle by rail. Three alternative rapid transit systems have been proposed: a light rail system; a MAGLEV system and high speed underground railway.

ASSESSMENT COMMENT

Connectivity: Currently only a small proportion of passengers transfer (interline) outside of airline alliances (typically 10% of transfer traffic). A significantly smaller proportion would be likely to transfer across airports, because of the inevitable time penalty. Airlines and alliances are likely to continue to co-locate for efficiency and cost sharing purposes (e.g. alliances are co-located in terminals at Heathrow (T5 for BA and Iberia), new T2 for Star Alliance and T4 for SkyTeam). It is likely, therefore, that airlines will voluntarily split their operations across airports only in response to constraints. For the virtual hub concept to be feasible minimum connect times would need to be able to compete on time with other transit options at competing airports e.g. Schiphol and Charles de Gaulle. Typically targeted maximum gate to gate connection times at major European airports is approximately 45 minutes. Light rail is unlikely to achieve this where rail connect times (excluding transit times through the terminals and expected waiting times for trains) are 26 minutes (LHR-LGW) and 43 minutes (LHR-LTN). For the MAGLEV solution, the time between airports is estimated at 20 minutes. With a 10 minute terminal transit time at origin and destination, and a five minute waiting time for trains, this may just enable a 45 minute journey time. Such a virtual hub would be poorly positioned to compete with overseas hubs with on-site transfers. Even with very high speed transfer between airports, the virtual hub seems unlikely to be able to compete with other single site airports in terms of convenience.

Capacity: Likely to deliver limited additional capacity by transferring domestic connecting flight passengers to rail. With HS2, journey times from Manchester, Leeds and Newcastle would remain relatively long (typically 1.5, 1.75 and 3.0 hours respectively to Heathrow). Despite this some connecting domestic air traffic might be expected to substitute. However, air would remain competitive. The majority of traffic from those destinations is point-to-point (typically 85% to 90%); better rail connectivity to the airports from the English regions would likely have little impact on slot usage at Heathrow, although some small mode shift might occur. The proposal is, therefore, not expected to free any material capacity at the London airports. (Refer to Template 59.)

Benefits: Benefits arising from the proposal are likely to be mainly those associated with any improvement in surface access to an airport, rather than any material aviation benefit. There will be no additional airport capacity created and limited increase in connectivity. There might be some benefit in terms of reduced road congestion and associated pollution as surface access to the airports is improved and modal shift from road to rail occurs.

Environment: The proposal will have minimal environmental impact associated with aviation. It will not affect aircraft emissions nor noise. It might reduce road congestion and associated emissions. Rapid transit system likely to have negative environmental impacts, net of the minor impact on road congestion. There would be geographically extensive environmental impacts associated with the construction of rail lines.

Costs: The capital costs for infrastructure associated with the proposals are estimated to be approximately £10 billion for light rail or £20 billion for MAGLEV or £15billion for the high speed underground railway for the London connection only. Given that these are large infrastructure projects, some of them novel, there must be a significant risk of these costs escalating to a larger scale. Sources of funding for the proposal are not identified and are not likely to come from airports or airlines, which will accrue few benefits from the proposal.

Delivery: The proposal involves construction of large-scale infrastructure around the M25 with spurs to airports and to connect to the national rail network. The large scale nature of the proposal indicates that it is likely to suffer substantial cost and programme risks. Two of the options – MAGLEV and a high speed underground system – are novel technology, with higher risks. The proposal is likely to take at least 20 years to deliver.

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OVERVIEW

Proposal	London orbital rail links to create a virtual hub.	
Approach	An orbital rapid transit system (light rail, MAGLEV or high speed underground railway) would provide interconnectivity between the London airports to facilitate interlining across airports. The proposal asserts that connections to the (conventional) national rail network would facilitate some air-rail substitution of connecting passengers from Manchester, Leeds and Newcastle.	**Capital Cost (£bn)** **Airport**: 0 **Transport**: Light Rail: 10 MAGELV: 20 HSR: 15
Benefits	▪ Limited benefits mainly in terms of modal shift for surface access traffic resulting in reduced road congestion and associated pollution. ▪ Unlikely to create a virtual hub as the scheme is only likely to capture interlining traffic that transfers outside of airline alliance structures. This is currently around 10% of transfer passengers. ▪ Unlikely to attract more than a negligible number of international interlining traffic due to immigration, security and customs requirements for transferring between airports.	**Runways**: Airport **0**, Net **0** **ATM**: Airport **0**, Net **0** **pax**: Airport **0**, Net **0**
Key Issues & Risks		
Surface Transport	▪ Relies on large scale construction of an orbital system (at least 188 km long). The light rail solution appears to be the lowest risk with the MAGLEV and high speed underground solutions being of higher cost and programme risk ▪ There is little to suggest that any of the schemes will deliver tangible benefits other than slightly better accessibility to the London airports afforded by interconnection to the national rail network enabling passengers to avoid transfer in central London and perhaps promoting modal shift from road to rail.	
Environment	▪ No impact associated with aircraft/airports. ▪ Slight reduction in road congestion and associated pollution if modal shift occurs, enabled by the light rail solution. ▪ Rapid transit system likely to have negative environmental impacts, net of the minor impact on road congestion. There would be geographically extensive environmental impacts associated with the construction of rail lines.	
Strategic Fit	▪ Does not create additional airport capacity.	
Economy	▪ Economic benefits likely to be minimal.	
People	▪ Potentially better access to the airports for workers and passengers through interconnection with the national rail network and park-and-ride schemes.	
Cost	▪ Cost estimates range from £5 billion to £10 billion for infrastructure alone, but doubling with risk and optimism bias. These costs appear low and may represent only the minimum potential cost. ▪ Operating costs likely to require taxpayer subsidy as fares unlikely to cover costs	
Operation	▪ No impact on airport or airspace operation. ▪ All international passengers interlining would be required to clear immigration, collect luggage and clear customs, adding significantly to the cost and inconvenience of interlining.	
Delivery	▪ High risk from cost and programme perspectives, especially novel technology options. ▪ Likely to take at least 20 years to deliver. ▪ Light rail option would be the longest such line in the world by a wide margin (over 100kms). ▪ Funding mechanisms are unclear and unlikely to come from the aviation industry. ▪ Likely political resistance from areas new railways transit without any local station.	

ECONOMY

Impact on Industry (summary commentary)

Limited impact on the air transport industry. This would create no extra capacity and would likely only result in a small percentage of passengers interlining between airports. Competition for interlining traffic in comparison with overseas on-site hubs is likely to be weak.

Airports	Not material.
Airlines	Not material.
Passengers	Potentially more convenient transfer between London airports for those few passengers that interline across airports, although gate-to-gate transfer time likely to remain long. Better surface access to airports.

National Economic Impacts (summary)

None, excluding additional costs to taxpayers that are not recoverable.

Local & Regional Economic Impacts (summary)

- Some modest employment benefits from constructing, maintaining and operating new railway infrastructure.
- Some surface transport connectivity benefits in providing improved public transport connections between locations with industry clusters that are currently relatively weakly connected by public transport. However, such benefits may be better realised by designing systems dedicated to connections to the airports from sources of passengers and employees, rather than connecting airports.

SURFACE ACCESS

Accessibility to Population & Business centres

The light rail system could potentially improve access/reduce travel times from significant catchment areas for passengers and workers by connecting national and regional rail services to the orbital system, but this would be dependent on the location of stops and the frequency of stopping vs express services. Increased connectivity to stations and areas of population would likely reduce benefits for interlining traffic. The MAGLEV and high speed underground systems would only connect the airports to each other

Accessibility to Transport Interchanges

The light rail would likely improve access between airports and national and regional rail systems

Accessibility to Workforce

Would potentially allow modal switch from car to the light rail system for airport workers through connection to rail systems and a park and ride type scheme. This would not be available from the MAGLEV and high speed underground systems.

COST

Commentary on Approach to Cost Estimation and Forecasting

Only rough order of magnitude costs are provided. For the light rail system, a capital cost of £31M per km is quoted, scaling by 188 for the circumference of the M25 gives an overall cost estimate of approximately £6 billion. The MAGLEV proposal references a cost of £6.7M per km results in a capital cost of £1.3 billion. However, the proposed Japanese MAGLEV network quotes £135M per km[1] and the Shanghai experience shows a cost of approximately £28M per km for MAGLEV, indicating that a total capacity cost of approximately £11 billion might be more realistic. Costs for the high speed underground are unknown but likely to be very high, typically £60M per km[2] giving a minimum capital cost of £11 billion.

These estimates appear to significant underestimate the technical challenges delivering the systems with the congested urban environment of London, and of the knock-on consequential works necessary to deliver the main infrastructure. Allocating risk and optimism bias doubles the base cost and given the scale and novel nature of the works, this treatment may itself understate the potential cost.

Critical Risks

- The proposal has high cost and programme risks.
- There is little evidence of a reasonable return on investment and the benefit to the aviation system in terms of capacity and connectivity are minimal.

Summary Comments

The proposal is high cost and high risk.

OPERATIONAL VIABILITY

Resilience

Potentially adds a small amount of resilience to the London airport system by allowing quick access between the true destination and other airports in the case of diversion, e.g. if a Heathrow flight were diverted to Luton, passengers and could easily be transferred using the orbital system. However, the "virtual hub" concept would also need the surface transport system to be resilient to continue to function increasing the risks across the whole radial network.

Scalability

Not scalable. Adds no capacity to the overall system

DELIVERY

Timescale	Approximately 20 to 30 years for the light rail system. Unknown for MAGLEV and high speed underground system)
Commercial Deliverability	High benefit to cost ratios claimed for the light rail system but these are largely unsubstantiated, almost certainly will require substantial if not 100% taxpayer financing. Likely political resistance from areas the new railways transit without any local station.

[1] http://evworld.com/focus.cfm?cid=122

[2] Tunnelling for rail. What it really costs. http://www.ecotransit.org.au/ets/files/Rail-Tunnelling-Factsheet.pdf assuming an exchange rate of £0.58 to AUS$1