MASS TRANSIT SOLUTIONS FOR THE FUTURE

A Paper for the Transport Committee of UK2070- by Dr Peter Ewen CB DPhil BSc (Hons) CEng FRAeS - Dated 25 Apr 2023

The Issue

Public Mass Transit systems are fundamental to the Gross Value Added (GVA) of a City's growth plan. However, the huge initial Capex, ongoing Opex and asset replacement costs, mean that only the wealthiest of cities can afford them, and only then if heavily subsidised. The result is our cities are polluted, have poor connectivity and are plagued by congestion from cars and buses, in turn costing billions annually in lost productivity. This situation is set to worsen as, by 2050, the number of people living in cities will grow by 60%. This issue will not be resolved by fettling with current systems, it requires a complete rethink on how connectivity can be achieved.

A Paradigm Shift

What is required is a solution that shifts the paradigm of urban transport; comparable to the way urban rail changed cities in 1863 and motorised buses replaced electric trams in the 1920s, while providing more flexibility than fixed rail-based systems.

Such an alternative solution must address the huge environmental costs associated with the construction of traditional versions of public Mass Transit systems. To underpin wider social mobility, a new solution should also provide better service coverage and a step change in service quality compared to traditional transit options, e.g. Light Rail Transit (LRT), Bus Rapid Transit (BRT), metro rail, or trackless trams.

A further consideration is that by relying on today's solutions of high fixed cost rail-based systems, we are constraining development along corridors determined by today's known needs rather than enabling options in the future.

Potential Solution – Creating the Future, not Reinventing the Past

An example of a potential solution that will deliver the required paradigm shift is Dromos Transit's Autonomous Network Transit (ANT) system. ANT is a cleantech mass transit solution, delivering rail levels of capacity at a fraction of the environmental impact, cost, and space consumption.

ANT adopts a **Fast Drip Feed** approach to deliver mass transit capacity using small, lightweight autonomous Electric Vehicles (EVs), operating at short headways on demand and on segregated traffic space. Contrary to a common misconception, this is not a low capacity "robotaxi" or "autonomous shuttle" system that people often think EV "pod" systems are limited to. ANT is a medium to high-capacity urban transit system, delivering capacities that to date were only achievable by expensive and invasive rail solutions, or at the medium level tram or bus-based solutions, all with heavy environmental footprints, large space requirements and higher embodied

carbon impacts. With ANT, passenger and freight journeys are direct: no stops, no congestion, no interchange, and no sharing of vehicles with strangers. The infrastructure is light, modular, inexpensive, and sustainable.

The key benefits of the ANT solution include:

- Construction and operating cost 50-70% lower than current Mass Transit solutions, which minimises or fully eliminates government subsidies for public transport. Thereby putting local government bodies in greater control of the nature, scale and timing of transport enhancements.
- Markedly faster to design and build, and can be developed modularly, allowing passenger service to be achieved within months rather than years/decades. Thereby allowing more rapid and flexible response to local development initiatives.
- Higher stop density, greater service coverage and 24/7/365 operation, reducing first/last mile distances and connecting areas currently impractical to service with buses, LRT/BRT or metro rail. Thereby increasing social mobility for those living in the outer reaches of conurbations.
- Outstanding disability compliance providing marked improvement in accessibility to public transport, with barrier free roll on/off wheelchair access everywhere on the network. Thereby increasing social mobility and reduced need for specific infrastructure.
- Easy roll on/off for bikes, scooters, and freight. Thereby providing intermodal collaboration with emerging personal transport options for first/last mile.
- Half the travel time compared to traditional transit. Thereby providing a greater incentive for modal shift.
- Circa 70% less embodied carbon for infrastructure provision and the lowest energy consumption per passenger km of any mass transit system. Thereby making a real contribution to the achievement of environmental targets.
- Recyclable materials for selected vehicle and infrastructure components. Thereby making a positive impact on meeting environmental targets.

Potential Way Ahead

The alternative offered by an ANT system is viable, but requires a sponsor with both the need and the long-term vision to bring it to fruition. Therein lies the challenge for local government sponsors.

For example, Dromos Transit won a global competitive tender to design the 160km Cambridge Autonomous Metro (CAM) system in the UK, surpassing established rail, bus, tram (including trackless) and robotaxi players. The original CAM Light Rail system was costed at £4Bn and the Dromos Transit solution was independently costed at £1.6Bn. Unfortunately, due to a change in administration the project has been put on hold.

What is needed is a city, or regional authority, that recognises the need to change the paradigm and that a new solution, such as ANT from Dromos Transit, has the potential

to revolutionise Mass Transit for the world, and showcase the UK as an innovation leader. If an Dromos Transit ANT system were to be adopted, the first step would be to build a demonstration line to show a working system before launching a full system build. The demonstration line would take 24 months to develop, build, operate and demonstrate, at a cost of circa £15m. Private investment funding is available to supplement government funds, on the basis of a firm commitment to a revenue system once agreed KPIs have been proven.