Guided Electric Transit Systems (GETS) represent a class of public transport options that would be a new technology for Australia. In the media, they have been referred to as “trackless trams”, but they represent much more than that.

Despite the naming issues, trackless trams have become one of those seductive ideas with a catchy name that captures the imagination of opinion makers. To some people trackless trams are a panacea for a range of urban woes; for others they are nothing more than elaborate buses.

**So, what are they?**

Trackless trams, or guided electric vehicles, are public transport vehicles that look like articulated light rail vehicles but which operate with rubber tyres and no tracks. Some configurations do not require driver steering and use no more than painted line markings on the road. While their steering is generally automatic, a driver controls acceleration, deceleration and speed, and can manually override the automatic steering when required, for example to avoid an obstacle. Automatic guidance means vehicles can steer very accurately, allowing close tolerances and easy access boarding at platforms.

Those searching for alternative vehicle technologies to light rail in inner and middle urban areas may consider trackless trams or biarticulated electric and hybrid-powered guided buses. The most recent alternative vehicle technologies include combinations of new and emerging technologies, such as:

- Extended high-capacity, bi-articulated buses
- Electric and hybrid buses
- Optically guided buses
Bi-articulated buses

The latest iteration of guided bus systems that have an optical guidance system and sensors to follow line markings along the road are still in test mode and have not been widely implemented, except in China. However, there are multiple manufacturers of bi-articulated buses in Europe, which have been put into service in many European cities with positive feedback from a range of stakeholders, including:

- Bus customers who like the smooth ride and vehicle comfort and ease of access through the doors;
- Bus drivers who feel safe in a separate compartment with good visibility and security from riders, and who benefit from the buses good operational manoeuvring and comfort; and
- Bus companies that like the lower cost maintenance and the flexibility of using these vehicles on other high-demand routes, in addition to be integrated with a light rail corridor.

One example of a GETS in operation is the Van Hool bi-articulated bus in Barcelona. Customer feedback highlights that the vehicle is well-accepted by users for the smooth ride quality and comfort. Operationally, it has the capacity to move as many passengers as a light rail line when implemented in a dedicated laneway.

The technology underpinning guidance systems for trackless trams is developing all the time. In one incarnation developed by China’s CRRC, the tram’s wheels are configured like train bogies, meaning that they can negotiate relatively tight corners without the wide swept paths of conventional articulated buses, and also avoid the swaying motion that is characteristic of these vehicles. The ride can be as smooth as that of a light rail vehicle, although this is influenced by the quality of the road surface and the skill of the driver.

Composition and features:

CRRC’s trackless trams look similar to modern light rail vehicles and have a capacity of about 300 people in a 3-car configuration and 500 people in a 5-car configuration. By comparison, the capacity of a 6-car set on Melbourne’s heavy rail system is 900 people.

A trackless tram service combines the operational characteristics of bus rapid transit (BRT) – road-based public transport that operates best in its own right of way – with the higher passenger capacity of a light rail service.

It also enables step free DDA access at bus stops/platforms similar to trams. This supports universal access and reduces boarding and alighting times.

Similarly, key features of a GETS include on-route quick charge electric vehicles with intelligent guidance. It was determined that a GETS is well suited to inner urban corridors where conventional light rail is too costly or does not have the dedicated space for the track with the overhead catenary.
What is so good about them?

According to the hype, GETS can be deployed using no more than some bespoke line marking. This would have obvious benefits for implementation time and cost savings over an equivalent light rail service. Similarly these features have appeal for those affected by the disruption associated with construction of light rail systems over the last couple of years. Imagine implementing a public transport service with light rail characteristics that did not require costly underground services to be relocated.

Wong (2019) cites deployment cost of about US$7-15 million per kilometre, compared to US$20-30 million per kilometre for light rail systems and US$70-150 million for heavy rail systems. Capital cost for each vehicle is quoted as US$2.2 million.

Ironically, the significance of trackless trams rests on the hype that surrounds them as much as on their operating characteristics and reported low implementation costs. They present as a modern new mode, although much of the technology that underpins them is not new.

What impact might they have on urban development and operations?

Given this type of transit fills a similar operational niche to light rail vehicles, they may be successful in attracting patronage from people who do not want to use buses. Their substantial capacity means that they could have a measurable impact on travel patterns in the right circumstances.

Nonetheless, challenges still exist around the implementation, including the following:

1. **Which corridor?** Trackless trams could be part of an integrated transport solution where a light rail line is considered too costly. In cities without an established heavy rail service, they can provide an intermediate capacity public transport solution along direct linear corridors, linking major activity centres.

2. **Own right of way.** These vehicles operate in a road corridor and so they can encounter the same congestion and delays as buses and tram routes. To achieve the perceived benefits of a high-quality, high-capacity light rail service, dedicated road space is needed. It is effectively a variation of Bus Rapid Transit (BRT) with vehicles that have the look and performance of conventional trams.

3. **Appropriate infrastructure.** To achieve the appearance and benefits of a light rail service, additional infrastructure such as DDA-compliant stops with built-in charging capability will need to be built. Similarly, improvements to road infrastructure may be required for the optical guidance system and to ensure the smooth ride that makes this mode so attractive. This may demand additional implementation efforts, such as strengthening the road surface as well as painting the line markings.

“**For Australian cities where a stigma tends to attach to buses, GETS offer most of the attraction of light rail without the associated cost.**”

Creating a “New Mode”

These vehicles may well be an attractive alternative mode that in the right circumstances will attract new passengers to public transport. Given many of the proposed solutions are electric, they represent a better alternative for urban environments and a shift towards green mobility.

They resemble light rail carriages rather than buses which typically have a poor identity and passenger experience relative to rail-based public transport.

As our streets are becoming more congested, public transport should be planned and designed to be a more attractive alternative to private vehicle use. However, we need to be realistic about what trackless trams represent. They are only an alternative transport technology that provides a more attractive option to customers than conventional buses.

From a developer perspective, there may also be some reluctance in investing too much along a trackless tram corridor. Besides stop infrastructure and line markings, there is an element of uncertainty insofar as service corridors could change from one to another. By comparison traditional LRT lines with tracks and overhead infrastructure provide more certainty to invest in that corridor.

In any respect, their undeniable appeal may be useful in generating political and popular support where more prosaic public transport solutions are unable to do so. We should never underestimate emotional power!

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