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Sustainable Urban Living and Mobility Concept

The Vehicle Concept that no Longer Needs a Parking Space - From Concept to Design

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Abstract

Living and Mobility 2030 (LiMo 2030) is a completely new living and vehicle concept with the potential to revolutionise urban mobility. It combines the advantages of a private car (own passenger compartment) with the traffic-related benefits of car sharing - all this in a convenient (barrier-free), sustainable (parking spaces become green spaces!) and cost-effective (no underground car parks required) way.

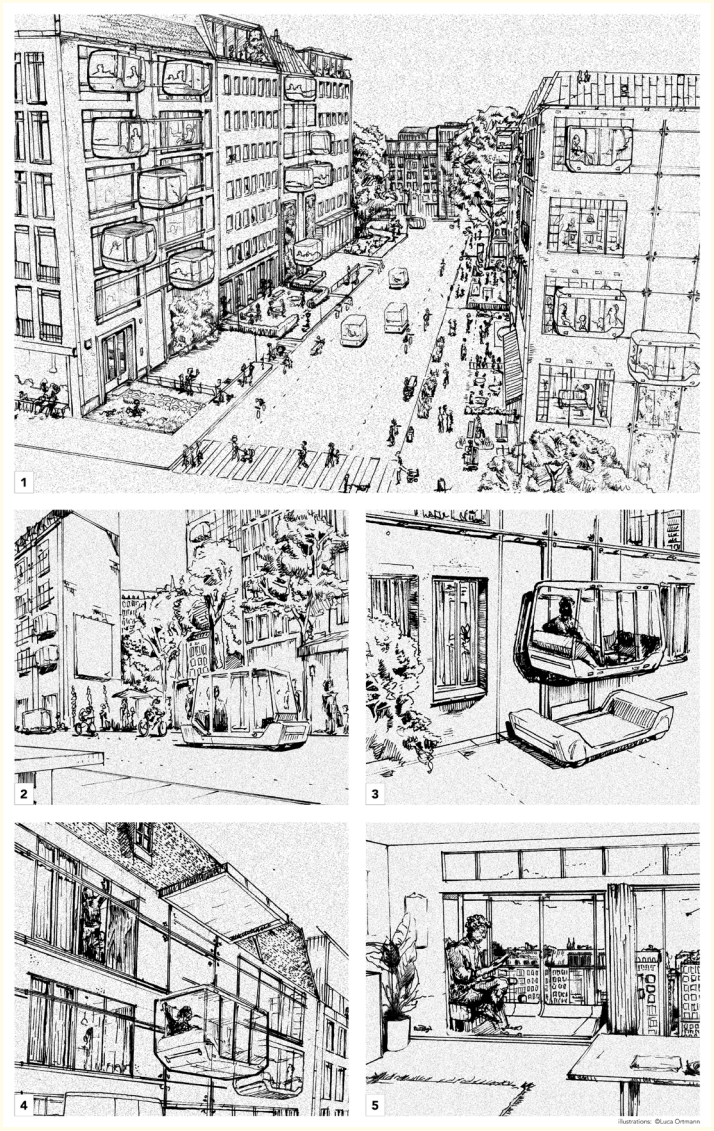
Keywords: Sustainable mobility; modular vehicle concept; car sharing

Concept idea

Our cities are characterised by wide streets, multi-lane main roads and space-consuming intersections; necessary to cope with the high volume of traffic, which is mainly caused by individual car traffic. How can individual mobility be maintained in urban areas alongside scooters and cargo bikes if conventional vehicles will no longer be allowed to enter city centres in the foreseeable future? And how can urban living be combined with individual mobility? Could it perhaps look like the first illustration in picture 1? - No cars and no car parking spaces, but lots of new living space.

LiMo aims to combine living and mobility in a practical, cost-effective and sustainable way - with a vehicle concept that (virtually) no longer needs a parking space. How can this work? When a vehicle is no longer in use, it has to be parked somewhere. The trick as to why it still works is the modular design of the vehicle cabin and chassis [1].

If the cab and chassis can be separated, there are interesting options for parking both the cab and the chassis. The cabin is not only a vehicle cabin, but also a lift cabin and, above all, part of the flat, i.e. most of the time the cabin hangs on the building like a kind of glazed balcony (mini conservatory), illustrated in drawings 2-5 in Fig. 1.



1. The cityspace with LiMo, 2. LiMo on the road, 3. The cabin takes off, 4. … drives up, 5. … and parks in front of the flat.

Figure 1: Illustration LiMo 2030 ©Ortmann.

Technical realisation [1]

The mobility of the future, especially in cities, must meet a wide range of requirements such as sustainability, user-friendliness and reduced space consumption. Promising approaches include modular concepts with a separation of "utility cabin and chassis" as proposed in [2] and [3]. The LiMo concept developed by students at Esslingen University of Applied Sciences consists of a multifunctional cabin that can not only be integrated into different transport systems (chassis, rail, cable car), but also offers significant additional benefits in conjunction with the building (Fig. 2). If you want to be individually mobile, you can use an app to book a chassis that comes along autonomously and waits until the cabin and its occupants travel downwards via a sophisticated rail system, dock and travel to the desired destination [1].

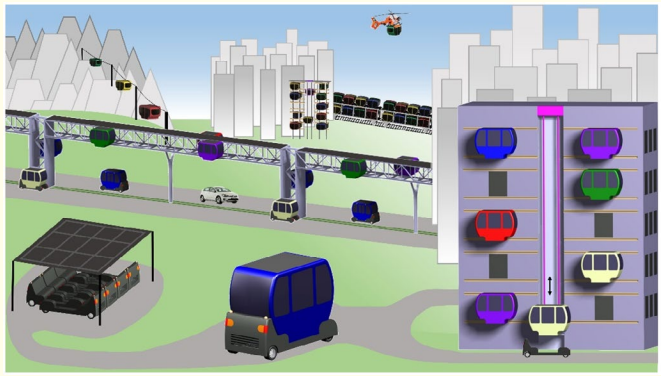


Figure 2: CAD-Construction LiMo 2030 ©Tai [1].

The cabin is modelled on a small cable car gondola. It can be integrated into a cable car network or a suspension railway system. Even helicopter transport would be conceivable. The cabin can be individually equipped and furnished, not only as a light-flooded additional living space, but also as a mobile home office, for example. If the cabin has to be parked away from the building, an inexpensive parking tower (Fig. 2, centre) is sufficient, which essentially consists of the vertical and horizontal rails that are also required for transport on the building [2]. If you want to travel in your own cabin, transport by rail is a good option. Thanks to its compact dimensions (2.1x1.2x1.6), two cabins fit next to each other and two on top of each other (Fig. 1, rear). The cabin is made of double-walled recyclable material in sandwich construction (heat and sound insulating).

According to the car-sharing principle, only about 2 chassis are needed on average for 10 cabins. The chassis is leased and comes, for example, from the depot of a service provider who takes care of logistics and infrastructure (space-saving parking, battery charging, etc.).

The current development stage is based exclusively on technology that is available at low cost and fulfils the requirements of vehicle category L7e (m≤450 kg, P≤15 kW, no airbags, no lane departure warning or emergency braking assistants and no crash tests required for road approval). The market launch could therefore take place as early as 2030 [1].

Although the building must also be equipped with a rail and lift system [4], the central lift and corridors to the flats are no longer required. LiMo thus becomes a holistic concept that ensures individual mobility in urban areas even if cities become car-free (by decree) or 'car-poor' (due to a lack of parking spaces and high parking fees) in the future.

Design-Concepts

The design of the cab is a major challenge. The design must not only match the chassis, but also the building. Three different design concepts are used to achieve the balancing act between the stationary state on the building on the one hand and the dynamics when travelling on the other.

Classic

The design is modelled on the conservatory. This consists of glass panes supported by slender metal struts. This creates an open, bright space. The metal frame made of brushed steel emphasises the elegant lines. The chassis is modelled on the classic shapes of the automotive industry in the middle of the last century (Fig. 3).

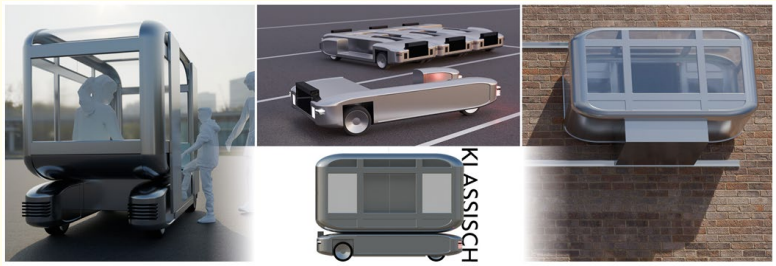


Figure 3: Classic design concept ©Bläsi.

Simple

This design is characterised by clear surfaces and straight lines. The cabin consists of two intersecting cuboids. The horizontal one is rounded at the vertical corners and very transparent - inspired by gondolas, which provide a fascinating all-round view and give the feeling of floating. In addition to the large panes, the design uses matt metal, which emphasises the simple form (Fig. 4).

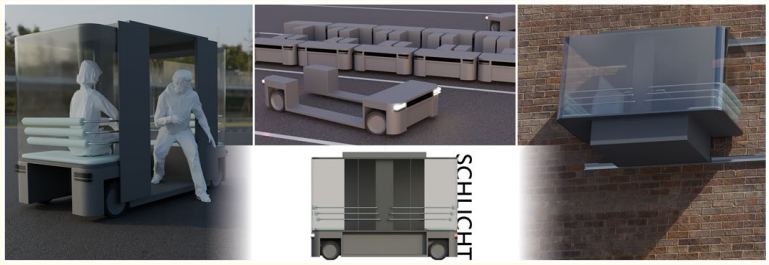


Figure 4: Simple design concept ©Bläsi.

Dynamic

This concept is deliberately asymmetrical with the aim of creating tension and thus dynamism. The chassis is enclosed by an LED strip. The wheels disappear almost completely under the frame to allow the gondola to float above the tarmac (Fig. 5).

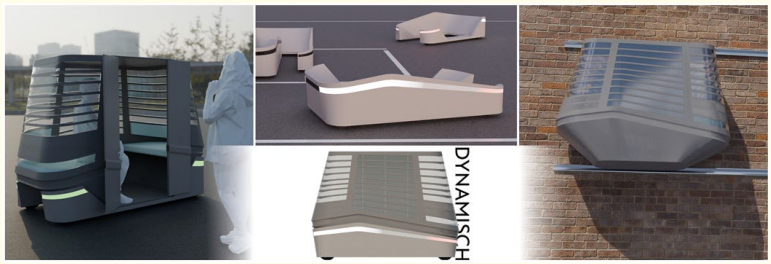


Figure 5: Dynamic design concept ©Bläsi.

Conclusion

LiMo is an exciting concept, from the idea of combining living with individual mobility, to the technical realisation and the final design. A cost-benefit analysis has also shown that LiMo has decisive advantages compared to both private cars and car sharing [1]. Accessibility in the mobility chain is of particular importance here. This starts with barrier-free boarding and ends with the convenience of not having to change from the lift to the vehicle, or from the vehicle to a cable car, aerial tramway or train (for longer journeys). You simply remain seated or lie down (seats can be pulled out).

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