Seamless Mobility Design Manifesto

by Timothy Puglia

COPILOT

powered by Δlom

Truly seamless mobility can only be attained when seamlessness itself is not consciously perceived: upon the realisation of being in a seamless experience, does it fail to exercise its duty. It is a purely cognitive concept in which actions are without intent and decisions are based solely on heuristics. Therefore, travellers must not attempt to consciously interact with a seamless journey if they want to experience her operations undisturbed.

—Master thesis Timothy Puglia
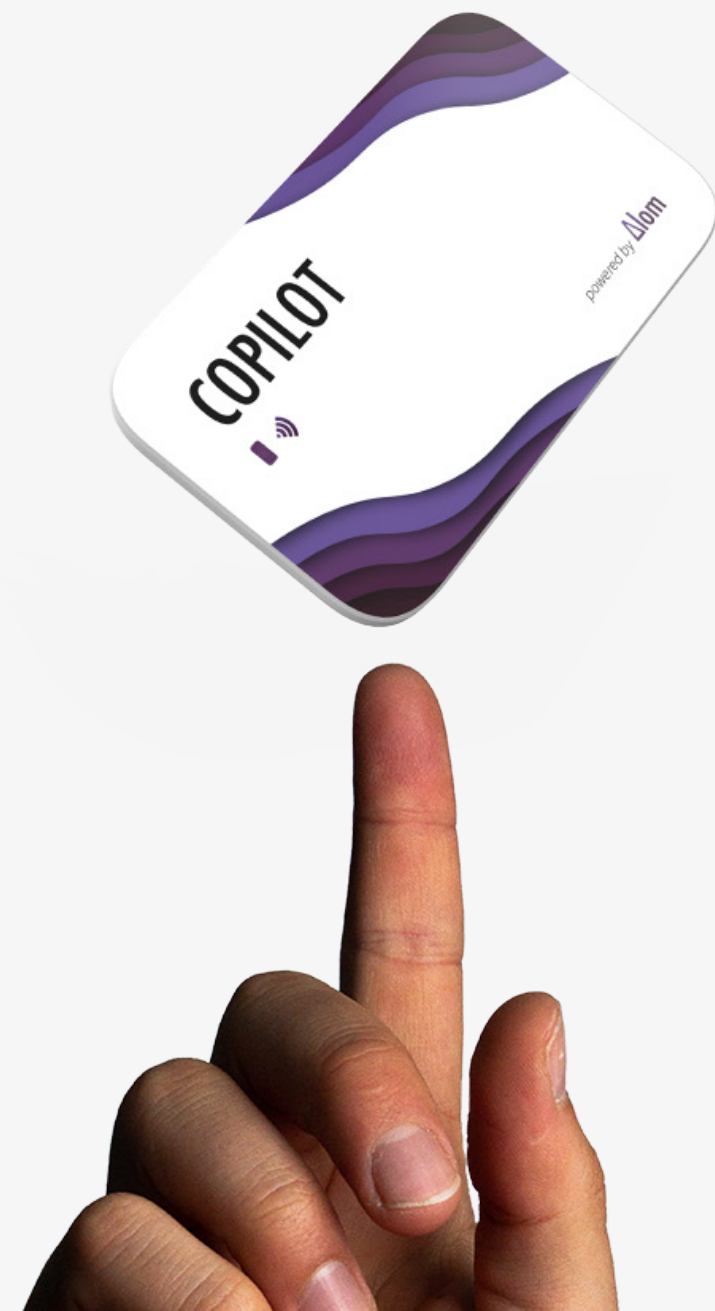
The manifesto

This design manifesto is part of a double degree graduation project at the Delft University of Technology. The design manifesto is a concise document highliting essential aspects of the project. The entire thesis can be downloaded on the university's education repository. In the end, the two masters arrive at two results: a strategic intervention blueprint and a complementary personal travel product for the masters Strategic Product Design and Integrated Product Design respectively.

The problem

Just a couple of years ago the delineation between the public and the private sector was clear. However, with the introduction and proliferation of shared mobility providers, the boundary is becoming fuzzy, especially since these newcomers all use their own specific way of checking in and out. Because they are not incorporated into a single digital ecosystem, the journey from door to door is becoming less seamless the more mobility providers are added to the market.

The goal is to provide an integrated, care-free ,door-to-door travel experience that incorporates various methods of transportation tailored to the wishes and demands of the traveller. Integrating the services offered by all mobility providers into a single MaaS (Mobility as a Service) application or similar type of platform has been posed as a possible solution, although it has not yet led to a successful application in the Netherlands. Currently, there has been a proliferation of these services, likely adding more trouble than they are trying to take away.
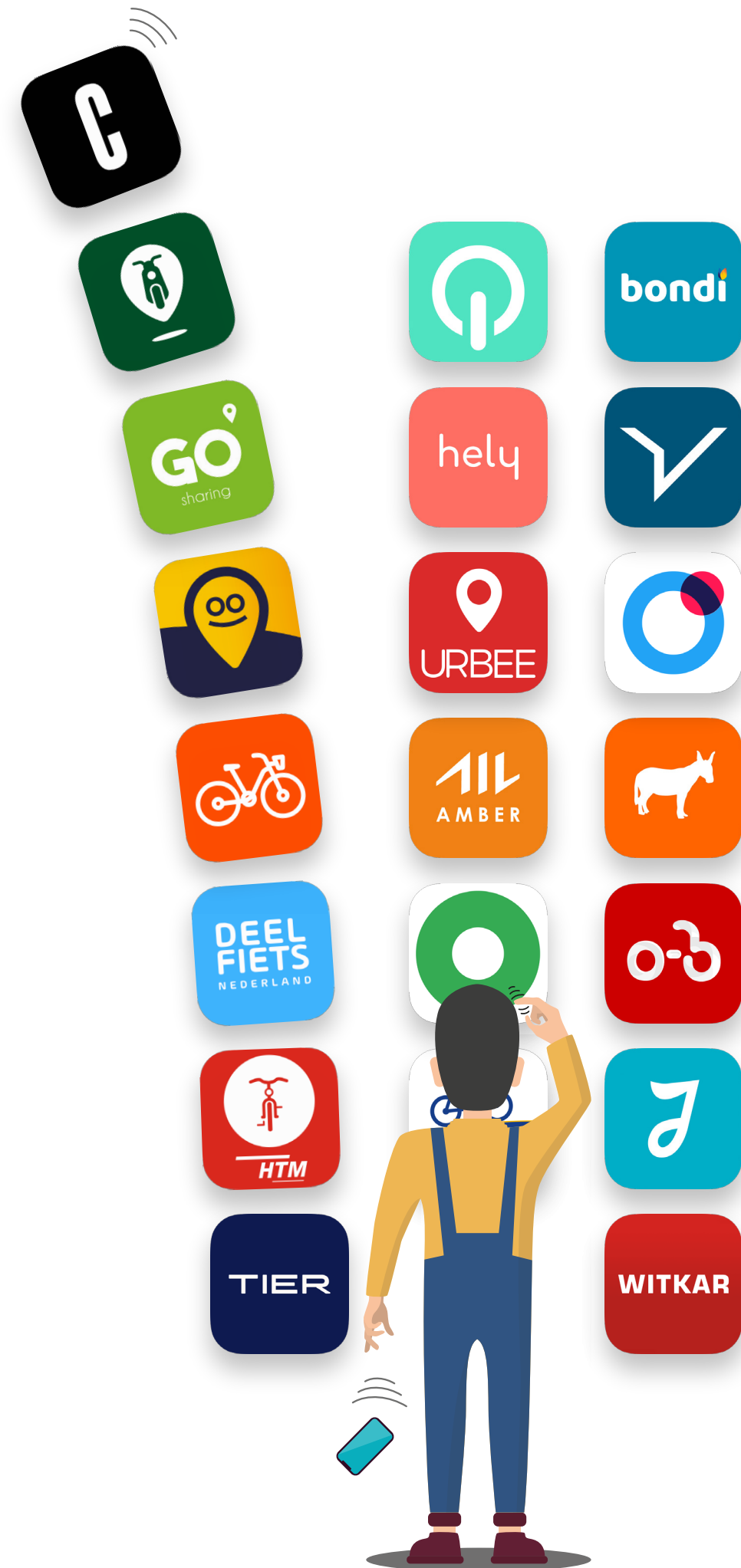
Detachement

From the bottom-up, shared mobility providers indicate clear needs of being seen like public transportation, that they are willing to accept a unified check-in and out method, and above all, to be treated like a welcoming addition to the mobility sector instead of being seen as a threat. Mobility providers simply want to provide the best possible travel experience to their customers and understand that the traveller does not care about what application they have on their phone, what colour their modality is, or what brand name is on it. It is only, and has always been, about getting the traveller from A to B in the best possible way. Integrating the services offered by the mobility providers into MaaS applications or similar types of platforms is not a goal at the moment. There has been a proliferation of these services, likely adding more trouble than they are trying to take away. Mobility providers are waiting to see which platform becomes 'the one'.

From the top-down, the organisational bodies express a clear desire to facilitate a better integrated form of mobility between public and shared transportation. It has been difficult as regulatory decisions are made per municipality with which naturally geographical restrictions are entailed. Consequently, the expansion of mobility providers is inhibited because they need to adapt to the wishes and demands of every single municipality. Therefore, a clear desire exists to streamline the policies, however, the organisational bodies up in the regulatory hierarchy e.g. provinces, OV-authorities, and national government, do not currently know what their role could be and as a result, have not taken the lead. Furthermore, the municipality desires the geographical demarcation of shared mobility services to increase from city-wide to regional-wide coverage, and finally, to unify the sector as a whole.

This opportunity gap could provide well-structured and organised integration of all forms of mobility, however, the two entities somehow just do not coalesce while they are saying the exact same things. The challenge lies in developing a clear strategy to make sure that the desires of both stakeholders are fulfilled and that the potential of integration is maximised.
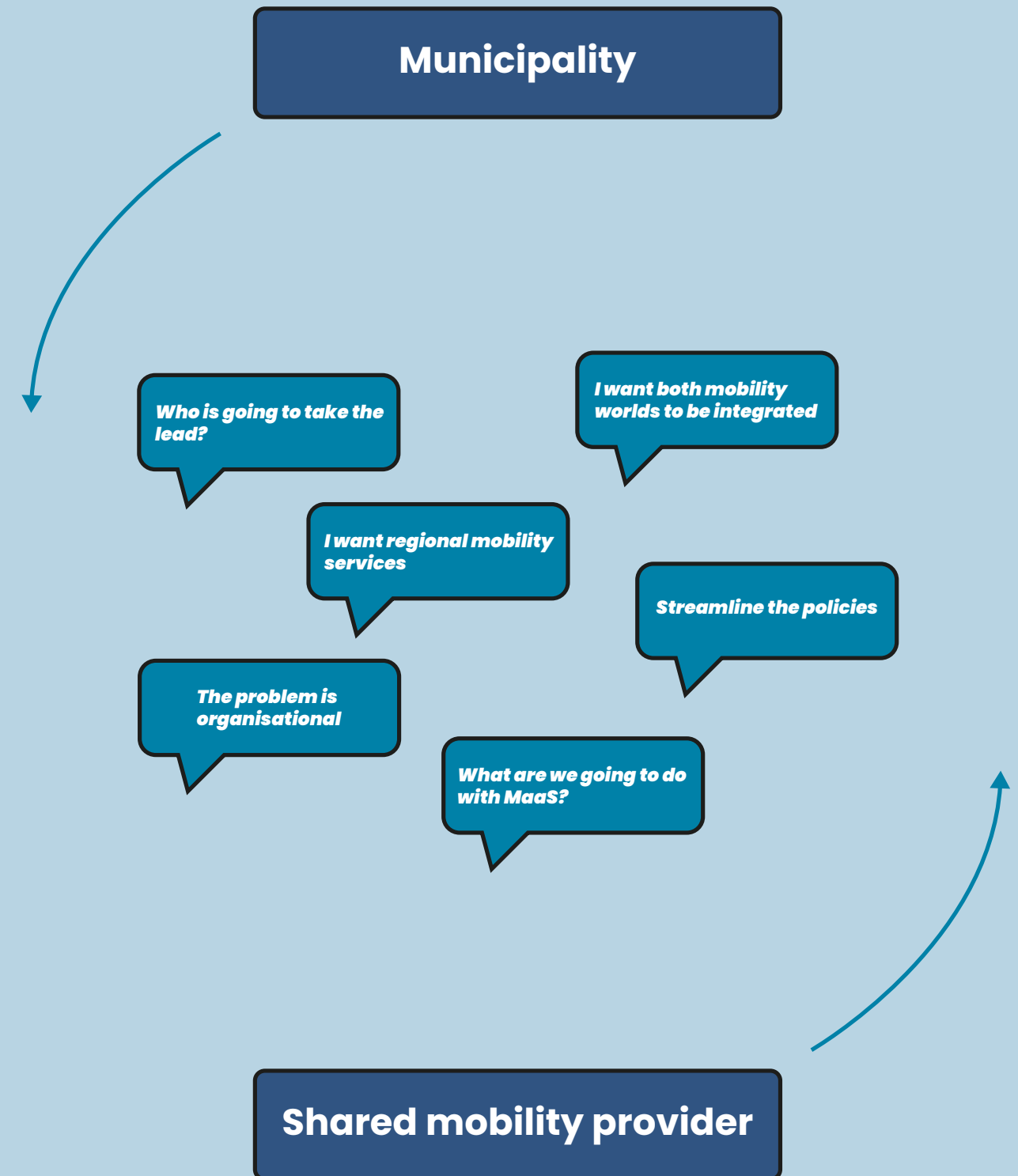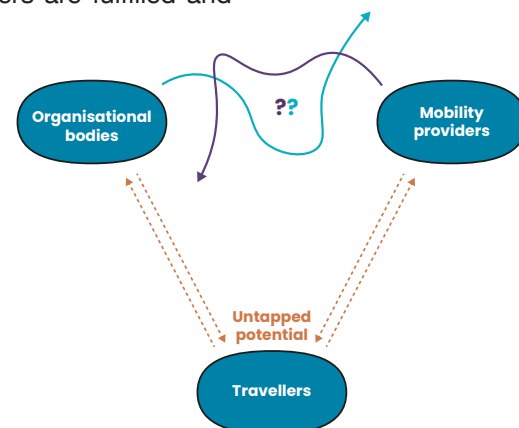
Proposed interaction idea

The proposed and reimagined interaction is essentially the inverse of the current situation revolving around the idea of a wireless digital handshake. Wherein the old scenario the traveller must physically present a modality-specific identifier to a permanently closed barrier i.e. gate or moped, a traveller now carries a small modality non-specific token which can be detected by a gate at the train station or by a parked shared modality if it is in close proximity. Check-in gates at the train station are now permanently open and subsequently will only close when a valid token is not detected i.e. the digital handshake cannot be made. The same goes for checking in on a shared modality. Shared modalities are permanently unlocked and turned on and will, for example, cut the power, apply the brakes, or sounds an alarm when a valid token is not detected i.e. the digital handshake cannot be made.
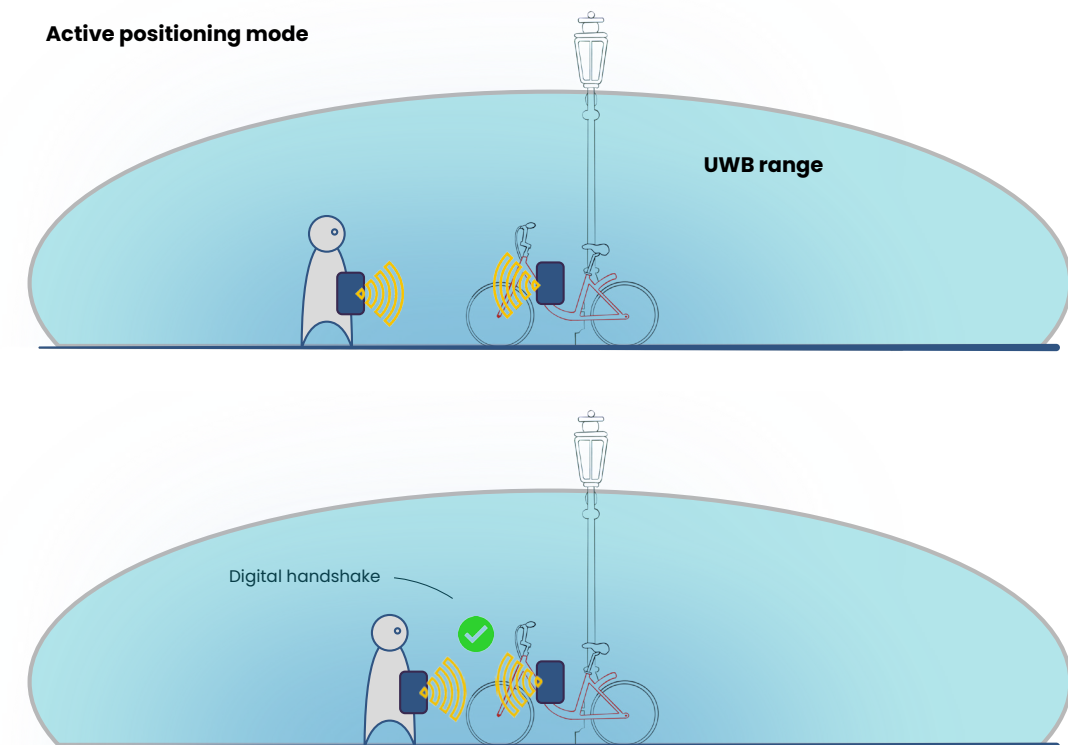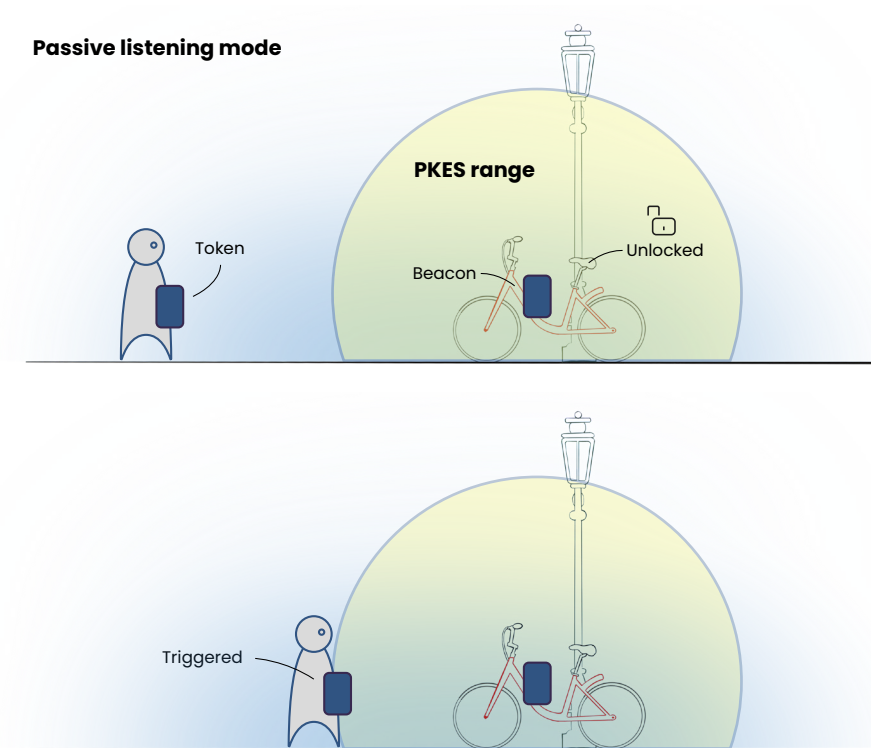
Used technologies

The selected technology is a combination of PKES and UWB. The token works in two modes: (1) a passive listening mode and (2) an active positioning mode.

Passive listening mode
In the passive listening mode, only the PKES chip is active and is merely listening for a low-frequency wake-up probe emitted by a beacon. Only when the user is in the near vicinity of a modality, does the PKES protocol turn on the UWB chip. In the passive listening mode, UWB is at all times fully turned off, yielding several benefits. Battery life is significantly extended since PKES draws substantially less current and there is no constant pinging of location data, increasing user privacy and digital security.

Active positioning mode
Only when a traveller is in the near vicinity of a particular beacon, and only after the PKES protocol initiates the UWB IC to wake up, does a digital handshake occur. The accuracy of UWB is typically sub-10-centimetre. As long as the UWB signal is in range, the traveller continuously updates their position relative to a beacon or array of beacons. When the UWB connection is lost, UWB turns off and the traveller is checked out. Once checked out, a beacon on a modality starts periodically transmitting low-frequency probes to determine if the next traveller is trying to check in.

Passive listening mode

PKES range

Token

Beacon

Unlocked

Triggered

Active positioning mode

UWB range

Digital handshake

Copilot

The copilot is a small token carried by the traveller enabling a truly seamless travel experience. Fully hands-off, Copilot wirelessly and automatically checks in the traveller regardless of the type of modality.
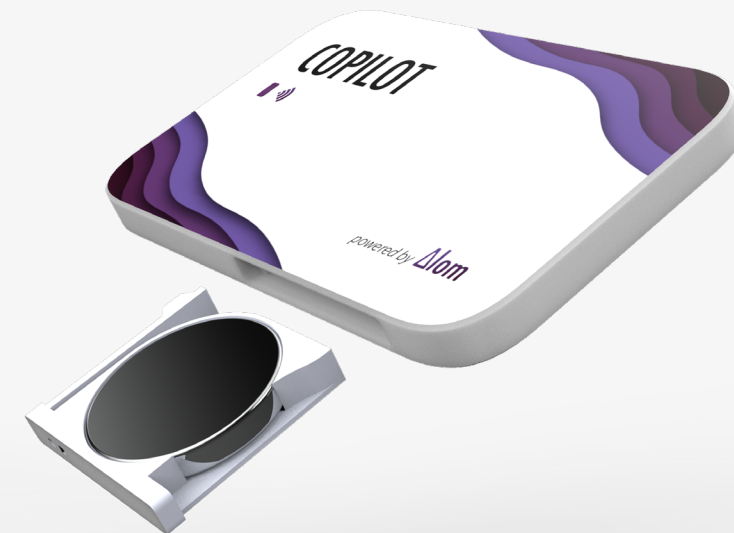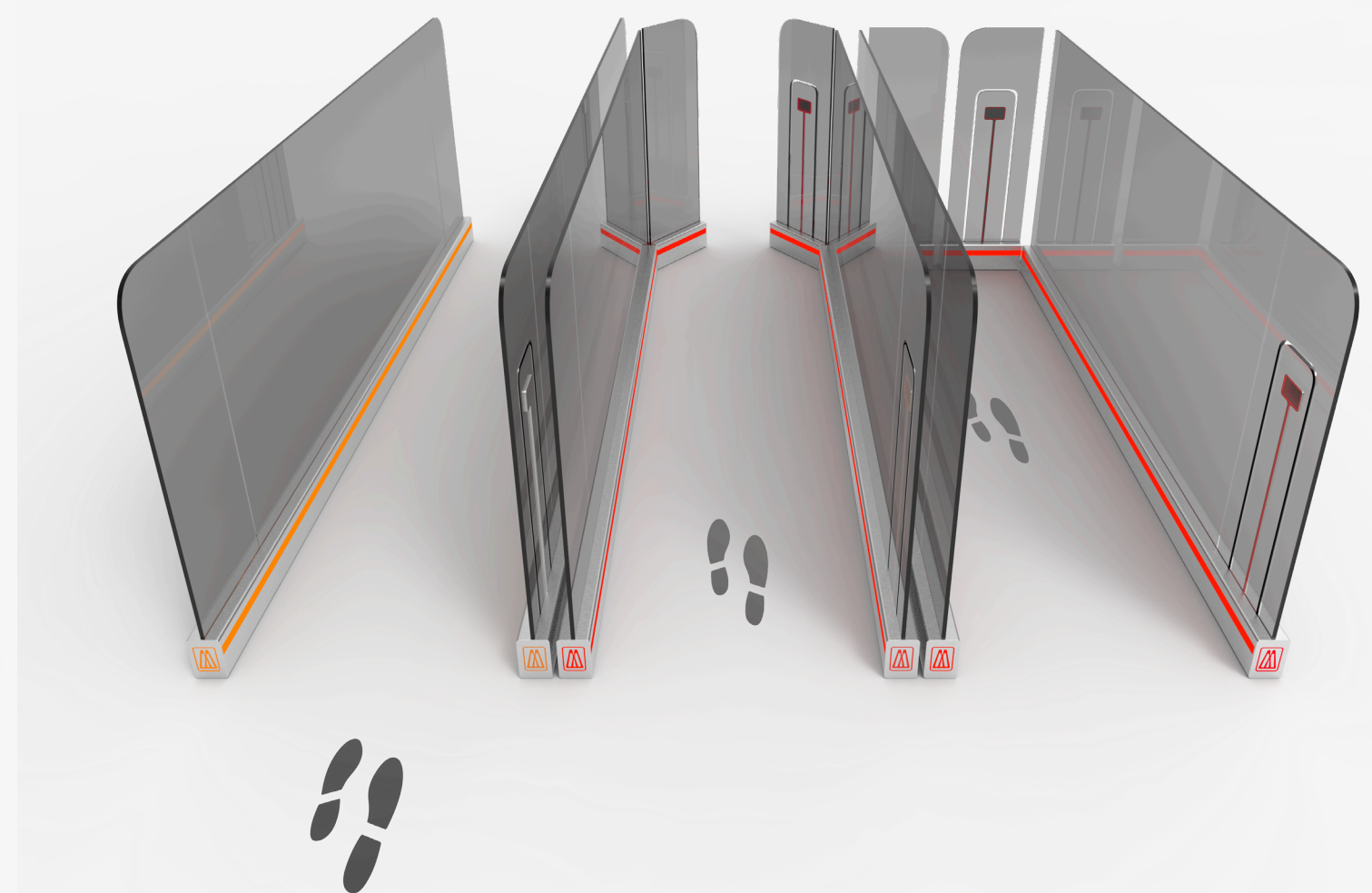
Seamless gate

A truly seamless check-in experience if a traveller is carrying a Copilot. The green light will follow the traveller unobtrusively through the gate.
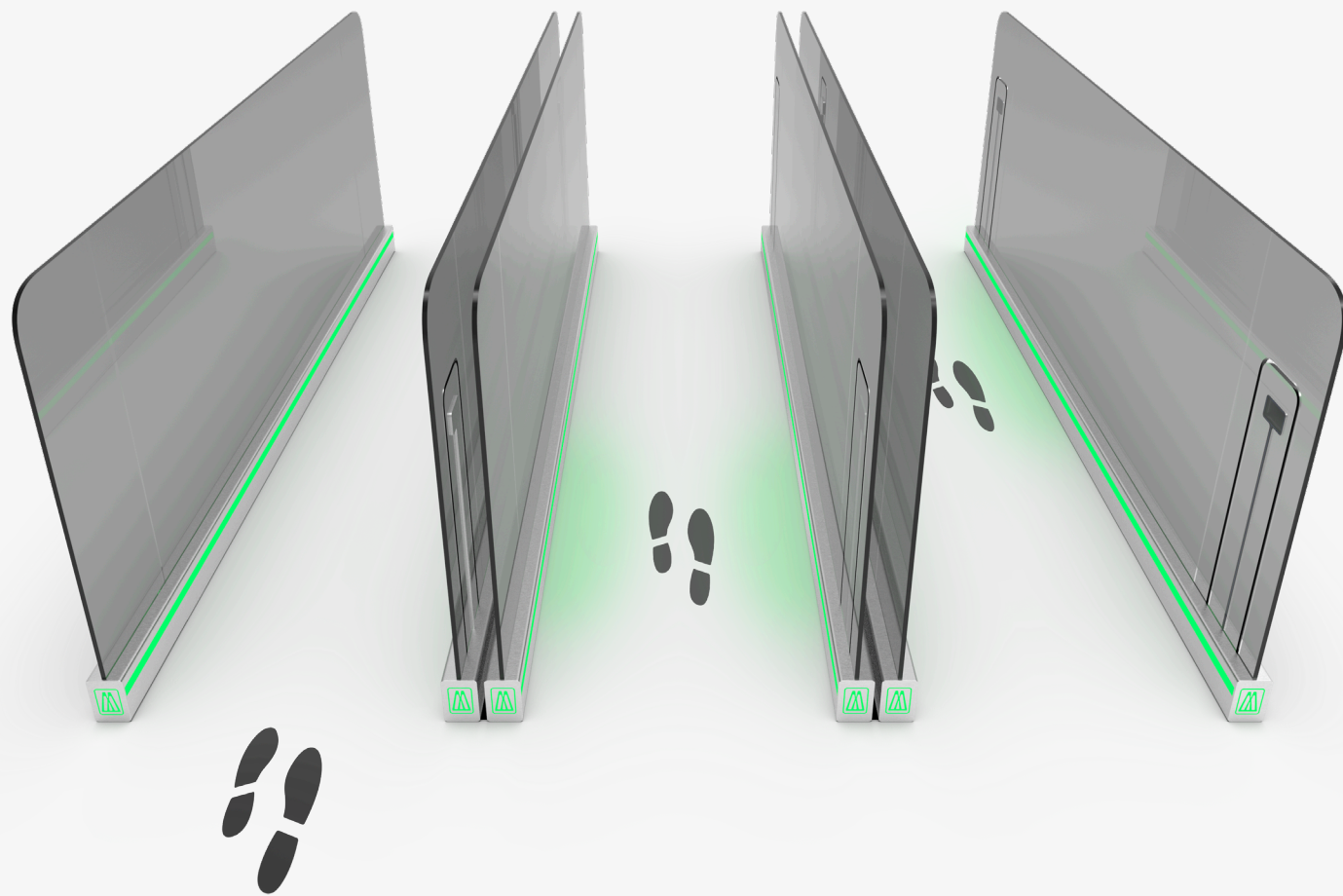
If a Copilot is not detected, the light will first turn orange and the traveller is asked to check in using a legacy option. If the traveller is trying to fare-dodge, the gate will close.

Seamless scooter

A truly seamless check-in experience if a traveller is carrying a Copilot. The scooter by brand 'X' automatically greets the traveller if a Copilot is detected. Check in will occur the moment the scooter is moving. The scooter will not move if no Copilot is detected and the traveller is asked to check in using legacy options.

Hi, Bob
Enjoy the ride!

powered by Λlom

SEAMLESS MOBILITY STRATEGY

Nine strategic interventions

1 Not just a name
This intervention calls for a perception change by all stakeholders to see the mobility sector not as two separate worlds but as one. It provides a new mental model delivering a converged mindset pointing to the same ideal: public mobility.

2 Home sweet home
This intervention aims at housing all types of mobility, that is both collective and personal, under a single shared roof. Personal (previously called shared) mobility will be made private-public and will be organised similarly to collective (previously called public) mobility. Shared mobility will be cheaper (9% taxation rate), allows for subsidies, will see increased usage, and generates a more competitive position to private mobility.

3 It takes three
This intervention proposes to move towards a concession based system organised from a centralised regulatory body for both collective and personal mobility. Three mobility authorities are introduced: the national mobility authority, the regional collective mobility authority and the regional personal mobility authority.

4 Cupido
This intervention is a facilitating entity that is a personal point of contact for the wishes, demands and complaints of the municipality. Cupido also fulfils the role of a matchmaker to ensure that the various modalities fit in the city in the best possible way.

5 Alom
Alom is the central transaction broker tasked with processing all check-in data and status of both collective and personal modalities, and redistributing profits back to the provider.

6 Technology toolkit
Additionally, Alom is tasked with designing the technology toolkit consisting of a beacon, token, and the digital infrastructure allowing for the introduction of a universal check-in method.

7 Truly seamless mobility concept
The truly seamless mobility concept uses the proposed novel interaction scenario ultimately delivering a remarkably comfortable and care-free travel experience. This is only possible if the aforementioned strategic interventions are implemented.

8 Tackling awareness
A conceptual marketing campaign is devised targeting the relevant stakeholders as the proposed strategy will require full acceptance of all the stakeholders.

9 Vision champion
The vision champion is able to transcend all layers in the mobility hierarchy to attain support for the future vision through securing the commitment of people across organisations.