IV.2. Reflection

Research, design and policy tasks foreseeing AV

Following the evaluation according to the liveability criteria, the project makes a series of recommendations which can be put on the table by urbanism in the interdisciplinary discussion over the future of automated vehicles. These are in the form of a task book with three parts: research, design and policy tasks.

The research tasks devised for AV design are the following: to develop economical and performing electric vehicles in parallel to driving automation; to optimise vehicles for high- and low-speed environments to make them less polluting; find synergies between AV and railways and other modes; make AV pedestrian and cyclist friendly and safe. Other connected research directions include: how to solve conflicts of direction and speed on surfaces shared by AV with other users; research optimum size and gabarits of pedestrian zones / shared space; psychological acceptance of AV; work towards home-car-road smart energy systems; further research the impact on urban sprawl.

A number of design tasks for urbanism and architecture were devised: use design to improve safety of pedestrians in shared spaces; design the contact between surfaces belonging to different modes and speeds; address transfer hub accessibility and convenience for disadvantaged users; improve accessibility of residential pockets; add green spaces in dense urban fabric; design urban edge parks as attractors; if AV leads to economic disruptions, re-functionalise gas stations, car sales centres and maintenance garages, keeping in mind local economy and social networks; manage urban dispersion and water networks, resources; design shared space to maintain sidewalk experience, social and economic encounter; design access of buildings to regional highways; and research the future section of today's motorways; new architectural programs that integrate AV; re-think parking, delivery, emergency vehicles access to buildings; re-design former on-street parking space into green, cycle lanes, pedestrian areas in innovative ways.

The task book is completed by policy tasks directly regarding AV for public authorities to consider: encourage shared and electric vehicles; limit city centre access to shared vehicles or consider charging a mileage fee, but ponder how this will impact the social and economic vitality of the area; trial railway reconversion to fast AV lanes; compel private transport operators to serve marginal areas in return for licence; provide space for car parking racks and maintenance on city edge to save central land; automatically limit speeds of AV in proximity of residential areas and at night. There are also a number of policy directions of secondary implication of AV: encourage active mobility through walkable urban environments and cycling infrastructure; set urban edge areas as 'innovation and fun' spaces to create alternative to city centre and commercial clusters; in densification scenario, keep certain areas low density and low price for key industries in the economic chain to have room to experiment and develop; in a dispersion scenario, encourage clustering of niche activities; create alternative job opportunities for people displaced by driving automation; design policies which encourage a balance between urban and ex-urban development in order to contain urban growth while offering a variety of housing and workplaces.

Reflection on the methods

The project started from a particular technological challenge and applied it to a site, not the opposite way which is typical to most urbanism projects. Therefore, **building a method** to assess a potentially high impact new technology gradually took a leading position in the aims of the project due to the future uncertainties of AV. It aimed at becoming a reusable method in other situations of technology and site.

Overall, the Dutch method of **scenario construction** is helpful in this particular case of multiple unknown parameters (AV development, social acceptance, other factors), but also challenging and limiting in reaching a clear result. It is especially difficult to discern developments where AV will have a direct impact, an impact in convergence with other trends, and developments completely independent of AV. As AV is a new technology, with implications into many branches of human life on which multiple opposing ideas are being circulated (Should we live in compact cities or closer to nature? Should we trust technology with human lives? etc.) Therefore, the methodological clarity of the scenario construction process was not ideal, and many choices had to be made subjectively or randomly. In addition, some developments of the driving forces could have led to similar outcomes, but the more different ones were chosen in order to widen the contrast between scenarios.

The **transect** method was useful in understanding the region in a simplified way, pointing out the liveability critical points and choosing the case study sites very methodically. While the transect enabled a focusing of the study on the impact of AV in main urban areas, it is also true that the chosen transect was a very specific metropolitan one, excluding other parts of the territory. From the urbanisation trend, it is the more marginal areas that are densifying at the strongest rate. Thus, choosing the transect was also a choice between analysing the impact of AV on existing urban fabrics or on newly developing and future ones, with the choice being the former. The transect was also a time consuming method, as the same results could probably have been extracted from a traditional regional analysis of the data. Nevertheless, the elegance and the urbanism specificity of the method made it valuable to be included in the project structure.

Further, the visionary **urban section** proved a more useful method than initially thought in order to assess the research and design dilemmas arising with automation. The section is certainly the least identically replicable part of the whole method, due to its subjectivity and the background of each designer in part. In order to overcome this situation, a method of 10 options (Haddon 1970) was tried, however proved less efficient than the 'traditional' problem solving designer-at-work. The approach lead to exciting results as well as difficult questions from the architect/urbanist to the other professions regarding AV. In conclusion, the urban section should be considered as only an illustration of the search for answers.

Finally, the effects of the scenario construction are highly **contextualised** in the Netherlands: high share of cycling and active mobility, relatively short distances, commuting and multiple jobs in different places as part of the economic culture, the lack of a strong automobile industry, urban development limited by water management. However, the main Western trends of urbanisation are present: urban expansion, high share of road in modal split, a mix of traditional (city centres) and new (motorway junctions, industrial parks, city edges) activity concentrations. Thus **generalising** the results is possible but limited by the context factor.

Forerunners not followers

The urbanist should be a forerunner who starts the debate from what the technology should provide for the city, rather than a mere follower, continuously trying to catch up with innovation. In order to actively participate in the shaping of novel technologies, the urbanism profession must rely on its own aims and strengths: (1) focus on liveability, (2) use its own methods of foresight and through-sight, and (3) drive inspiration from the daring visionary projects of the past.

Confronted with the challenge of a novel technology such as automated vehicles and the impacts it might project on the urban environment, this project aimed to design a method using the instruments of spatial scenario construction, regional transect and urban section. The end result is a workable method, with its limitations described before, which offers a way to approach the old subject of mobility and the new subject of automation from an urban point of view, always having in mind liveability as the goal.

The scenarios resulting from this method offer a picture of the contrasting worlds a small technological change might lead to. Overall it cannot be said that any of the scenarios is better than the other, but that is not the aim of the research. The real aim is to explore new possibilities, as well as to point out the spatial resistances of the city and the technological resistances of automated vehicles which have to be overcome in order to reach liveability.

Just as Haussmann or Cerda, who started from edilitary and hygienic principles, imagined and created a new society through the Parisian boulevard, respectively the Barcelona block, the automated vehicle offers the 21st century urbanist the chance to build the premises for a new type of society, starting from the conditions to make a city liveable. What could be the new boulevard or block? Is shared urban ground level an answer? Or perhaps the digital cloud which gathers all the data to make the smart city function? Or maybe neither of these?

This thesis aimed not necessarily to give the answers to these questions - as any answer would have to be confirmed by reality and time in any case - but to open windows for the urbanist to imagine the future of the relationship between city and technology starting from liveability. A future for the self-driven, not driverless city.