Vehicle automation is developing rapidly, nevertheless a lot of work is still lacking, as we are not yet at a point where vehicles are able to drive themselves on a road without a human behind the wheel. One of the possibilities of automation is its use as public transport. In the WEpods project, led by TU Delft, we are looking at the technology but also on the operation and passengers' acceptance of this way of travelling.

Vehicle automation is in fashion. Many universities, car manufacturers and even software companies are developing their own systems for making it possible for an automobile to drive without any human control on the road, what we call full-automation. Noteworthy, in the recent years, are the cases of the google car, one of the most visible in the media, and Tesla’s model S, which from one day to the next has become partially automated. However, Tesla is advising drivers to keep their hands on the wheel “just in case” as they cannot promise total safety in lane changing and other automated tasks that the car is now prepared to do. This shows that technology is indeed developing fast but it is not quite there yet.

Full automation has the potential, not only to change the way we drive our cars, but also the way we travel in public transport networks. Public transport, if properly planned and operated, is indeed a more sustainable way of moving big flows of travellers in a city or region. Automation is already well-known in rail systems with examples as metro lines, or personal rapid transit systems at airports. However, with regard to road transport, that’s another story. Only in the recent years research started to address the possibility of providing fully autonomous buses on the road. The Netherlands is a pioneer country in automated vehicles development and implementation, the famous, still in operation, bus line of Rivium in Rotterdam, was a breakthrough at the time it was inaugurated (Figure 1). Still, buses have to drive with a high level of segregation from other road users, especially car traffic, and vehicles follow magnets on the road.

The great challenge for the future is making it possible to have buses on the road that are completely autonomous in the sense that they will not need special guidance and that they will be able to interact with other vehicles, pedestrians and bicycles in a safe way. Full-automation does not only fulfill a technological wish. By creating total driverless buses that are able to drive in any segment of the road network, innumerable possibilities of accessibility that are not possible today because of human driving constraints, are unleashed. In fact, the advantages go beyond the obvious savings on drivers’ salaries because attaching the vehicles to schedules and personnel shifts hinders today many transport possibilities, such as for example providing accessibility to low density areas.

In order to make this technology possible there is the need to do rigorous research on the systems to be implemented in these future vehicles, but also in their operation and user acceptance. The WEpods project is a good example of such research that is being lead by TU Delft and financed by the province of Gelderland, the Netherlands. Bart van Areun was challenged by the province to initiate a pilot for connecting the station of Wageningen to the campus of the Wageningen University. For the region, this project is about technology aiming to match in the transportation system their cut of the edge research and practice in agricultural technology. For TU Delft this has been a great opportunity for extending DAVI (Dutch Automated Vehicles Initiative) to the public transport sector.

A consortium has been formed where different partners with the necessary expertise have joined to provide the automated bus solution: TNO, Mapscape, Connel<ett and Robot Care Systems. The consortium is led by Rinder Happee in JME and Jan Willem van der Wiel from Spring innovation management, commissioned by TU Delft (Figure 3).

Work is being done around the clock to fully automate two pod vehicles which were bought from Easymile, a company specializing in services robotics (RoboSoft). In January the first tests should happen in the presence of the Dutch minister of Infrastructure and Environment Mrs Melanie Schultz van Haagen, where vehicles will be driving on a short road segment to test the sensors and driving capability. Safety will be systematically evaluated by assessment of the reliability of the sensors in detecting other road users. Safety will be ensured by redundant sensing and control loops, conservative speeds and control strategies, and monitoring by a control room.

At the same time that the technology is being developed and installed, here at CTG we are working on the next stages, assessing how the general public will accept and use such automated buses. A survey is being set up to measure the attitudes of passengers towards riding in a driverless bus. Previous experiments that have been done with the same purpose are showing that the general population is not that well informed about automated driving and that they may be suspicious of the idea, especially regarding safety (accidents) and security (crime). WEpods is here to research on those limitations and possibly eliminating them, opening the doors to new public transport possibilities that will bring a more social, environmental and economic sustainable passenger mobility system.