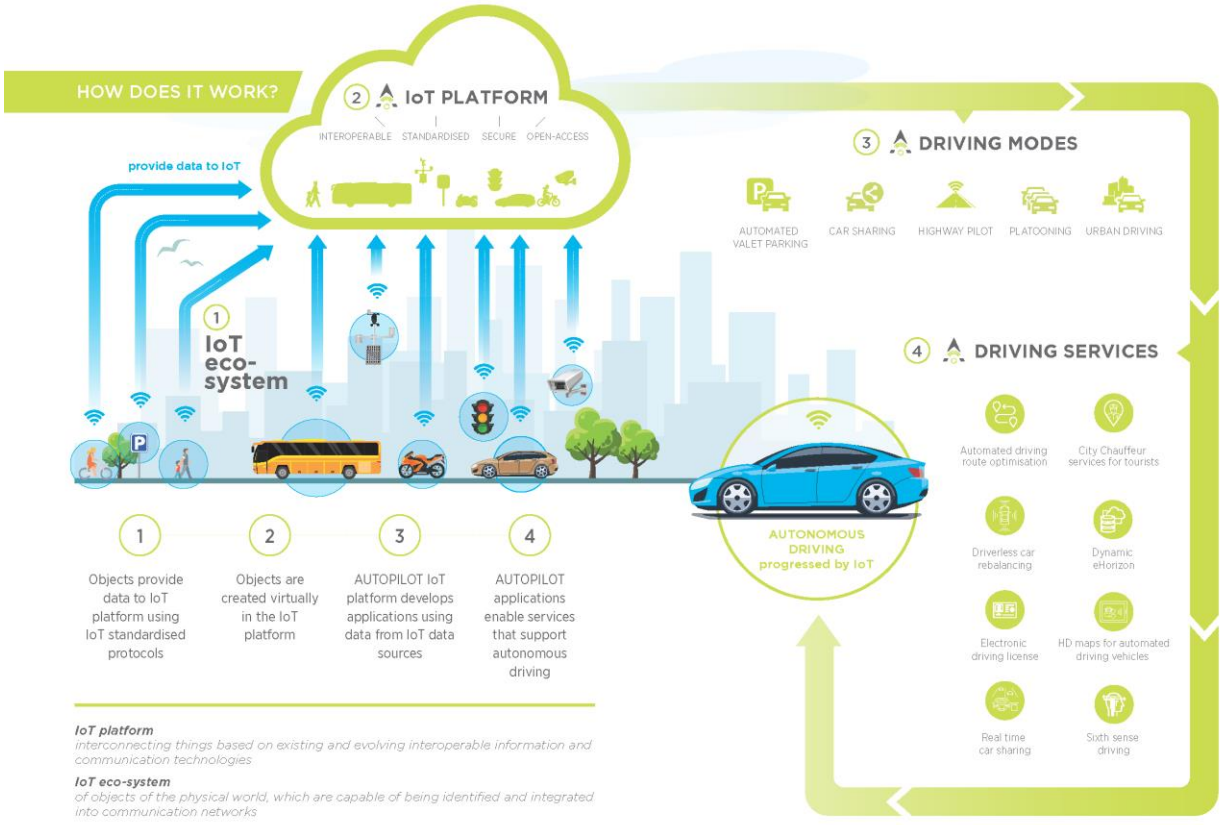
Results and impacts of the AUTOPILOT project

The main objective of AUTOPILOT was to demonstrate the added value of the Internet-of-Things for Automated Driving. The Internet-of-Things (IoT) is a concept in which all kind of devices are connected to the internet to share information and make use of added value services: e.g. pedestrians and cyclists with smartphones, drones, traffic sensors and parking spot detectors. Automated vehicles are also connected to share information from on-board sensors. Services in the cloud use and combine all this information to enrich data and provide added-value services to automated vehicles.



AUTOPILOT has validated the added value if IoT for a number of automated driving services in different locations across Europe.

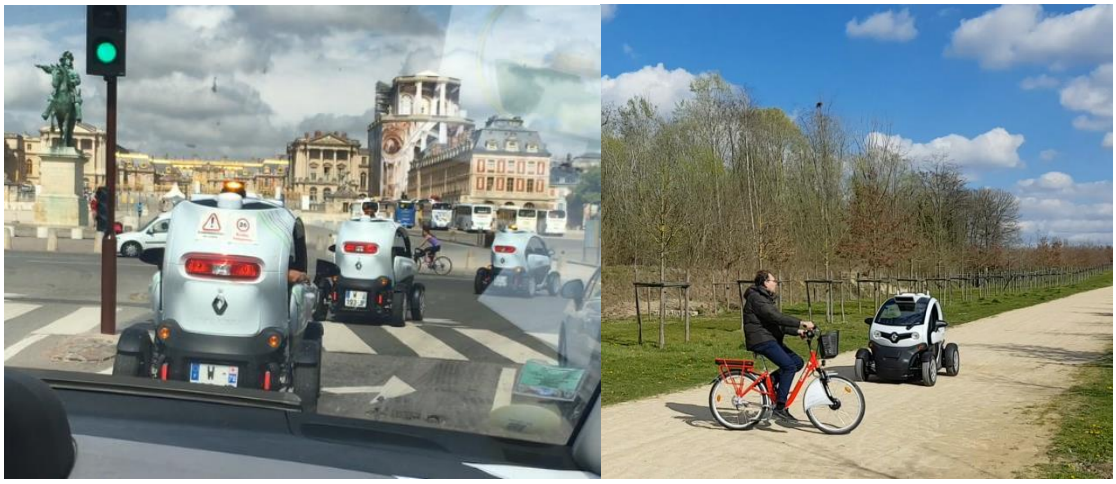
The main achievements of these pilots are to have connected autonomous vehicles as IoT devices and integrated them with cloud services.

New functionalities for automated driving with IoT

The pilots have assessed the feasibility and added value of IoT to enhance automated driving functions, and to enable new functionality and services for automated driving and mobility in general.

For example:

- Automated vehicles can drive as a platoon through a city (namely in Versailles, for rebalancing vehicles between car sharing stations), and receive speed advice to cross intersections, receive warnings to avoid pedestrians and cyclists, and route advice to avoid congested areas. (use case tested in Brainport, Netherlands).



- Automated vehicles can already park themselves. Services in the cloud though can use information on pedestrians or obstacles in the parking lot, and plan an optimal route to available parking spot for the vehicles.

- Vehicles and road side sensors can also detect potholes, other road users, and inform each other so that other vehicles can avoid these or adapt their speed (watch https://autopilot-project.eu/wp-content/uploads/sites/16/2019/08/Autopilot-Highway-Pilot-use-case-@-Brainport-with-integrated-subtitles.mp4?_=2

AUTOPILOT highlights to major technical improvements brought by IoT to automated driving

IoT enhances the detection of objects beyond the range of on-board sensors. IoT information is used as complementary data to the vehicle sensors data or other data sources; it thus helps increasing the confidence level of the data.

IoT can also provide aggregated information, such as 'traffic' and 'crowds' of people that cannot be measured directly but has to be interpreted from many detections of vehicles or pedestrians for example. This information cannot be detected with vehicle sensors alone and allows automated vehicles to better anticipate on imminent events and safety risks.

Consequences :

- **Traffic safety of the passengers in the automated vehicles and neighbouring road users is improved** when the vehicle receives warnings for pedestrians or cyclists on the road, or other road hazards such as speed bumps, puddles and potholes.
- **Traffic efficiency can improve** when automated vehicles receive optimised routes, or is re-routed to avoid congestion or crowded areas. Parking efficiency can also be improved by optimal routes to available parking spot, and re-routing when other vehicles or pedestrians obstruct the shortest route.
- **Ride comfort of automated vehicles can be improved** when advanced warnings enable the automated vehicle to adapt its speed and thus allow smoother navigation and manoeuvring (e.g. without hard braking).

- **Services in the cloud can also collect and process much more information than automated vehicles could.** Examples of such services demonstrated in AUTOPILOT :
  - In addition to warnings for road hazards, cloud services can also provide alternative routes to avoid the hazards, or give speed advice to safely pass the hazards.
  - Speed advice can be provided for a part of the route of automated vehicles, or to cross a series of intersections with a platoon of vehicles.

- Platoons of vehicles can be formed over larger distances, by providing each vehicle a route to a rendezvous point to meet up with the other vehicles.
- Rebalancing of fleets of automated vehicles to pick up points with high demand of new travellers.
- Ride sharing services can be integrated with all of the above services into a complete automated travel, including parking, platooning, urban driving.

Significant impacts on travelling in the future and quality of life

These technical improvements have a significant impact on travelling in the future as well as on the environment and quality of life. These are linked to enhanced travel efficiency and comfort (and the derived impact on health).

They also have positive impact on business, by accelerating the development and time to market of new mobility services, as well as their integration into MaaS-type services

Cooperation and interoperability between IoT platforms from different suppliers is a key factor to accelerate the deployment of such services, as it reduces costs while solving the vendor locking issue. AUTOPILOT has brought stakeholders from all customer segments to work together, thus enabling advances for interoperability.

In all pilot sites tests, users have evaluated these new technologies and services. They have high expectations on the usefulness of the services for their travels in the future, such as easier trip planning and increased driving comfort. They also trust the systems to be safe in traffic, as supported by the technical evaluations. Another important observation is that users, being a passenger and without a driver, highly value information on vehicle operations and hazard warnings in order to trust the system.

Plus d'informations :

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