

# AV PILOT DEVELOPMENT WORKSHOP FOR THE PAV PROJECT

<b>To:</b>	PAV Consortium
<b>From:</b>	Forum Virium Helsinki (FABULOS), AVENUE project, City of Bremen (ART Forum),
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## Introduction

A digital workshop has been organized for the PAV consortium with representatives from the other European projects including the FABULOS project (Renske Martijnse-Hartikka, Ulla Tikkanen), the AVENUE project (Dimitri Konstantas) and the ART-FORUM project (Torben Quickert).

The PAV project stands for Planning for Autonomous Vehicles. It is an Interreg North Sea project which aims to stimulate the up-take of electric, shared autonomous vehicles (AV) by developing green transport and spatial planning strategies that incorporate AVs.

In this particular workshop, we discussed and learned from experience from these other European projects which have already developed pilot projects. We would like to thank our speakers thanks to whom we gathered many relevant technical and operational information and tips on the reality of such project. Here are the main insights from our discussion.

## Insights from the discussion

### Preparation activities

#### Regulatory approval

The transportation authorities have to issue a license for both the vehicle and the site. Regarding the vehicle there are 4 different scenarios:

- 1. You use a vehicle that already has been approved (and used) by another national transport authority: you still need your own national authority to approve the vehicle.*
- 2. You purchase/lease a vehicle that already has been approved by your national authority: You still need to get the vehicle approved by your regulatory authority as the companies don't yet have a standardized production line. This process might go easier than the first scenario as the national authority is already experienced with the vehicle.*
- 3. You use a vehicle that already has been approved (and used) by you own national transport authority: You can most probably use the vehicle without extra regulatory approval, however check whether the vehicle hasn't made any subtle changes in the meantime such as software updates.*

Furthermore, you might have an approved vehicle with approved software, but **if you choose a route that is not considered safe enough by the authorities**, pilot permission might be denied or be a long & difficult process after all.

- 4. You use a vehicle of which the model hasn't been approved by any transport authority: This typically leads to a longer approval process with higher risks of not obtaining the required license. On a positive note, choosing a less established operator and choosing a vehicle that has not been approved yet may bring cities services and technology that go beyond the state of the art. New players may also show more flexibility towards the wishes and needs of the cities.*

The difficulty of obtaining the required approval depends very much on the specific country. Some countries

have very restrictive measures, especially on speed; for example, in Germany, it is not possible to go over 18km/h with an autonomous vehicle.

Please bear in mind that the regulatory approval can take a long progress sometimes, even though signals are positive (e.g. paperwork, vehicle test, site...etc). The pilot in Helmond has been working for more than a year now with the Dutch transport authority in order to get an approval.

As a general rule, it is very valuable / highly recommended to make contact with a city that has gone through the process in your country or hire external expertise for support.

### Training

Additional training was given to emergency services in case of accident, for them to understand the vehicle (how to stop the vehicle, getting the people out, is the vehicle still connected, where is the battery...etc). The Fabulous project has a questionnaire for such training.

## **Operations**

### Speed

The average speed in the Helsinki pilot was 20-25km/h with a peak speed at 28km/h on a road which was limited at 40km/h. It is interesting to see how other road users act with an autonomous shuttle; as it is going slowly, it can disturb the traffic, some other vehicles would overtake it.

Faster doesn't mean not safe, AV's more in line with other traffic is actually safer.

### Integration with public transportation

The Fabulos project shows how the pilots can be used in a systematic way to be apart of the wider public transport.

It has been relatively easy in some pilots. In Norway, there has been some complications with the public transport route transport who was quite conservative and wanted fixed timetable with a specific data format. The route planner normally received information from public transport operator, and if you are a company like Navya, you are not considered at such; therefore they don't accept data from organisations outside their own model. **It is important to involve the transport operator from the beginning.**

The safety operator needs in some countries to be a legally trained bus driver. It also depends on the number of passengers it can take (this can be negotiated with your own authority). Such vehicles have no official categorization yet; the vehicles have test licenses.

### Mix-traffic

Dedicated lanes are much easier. In Fabulous, the pilot aimed at trying the shuttles in mixed traffic where shuttles would drive through roundabouts, traffic lights, bicycle turns... it worked quite well but again the low speed might hindering other traffic.

## **Technical requirements**

### Issues

There was no problem with the stability of the vehicle in the corners, but there were a few difficulties with the positioning of the vehicle in some narrow streets where the localization was not very precise.

There were no emergency stops or hard braking in the pilots from the FABULOS project.

### Additional infrastructure

There is a need for some vehicles to add some landmarks (e.g wooden signs) on the route every 50 meters for the vehicle to position. The market leader Navya is for example not the technical leader and needs these landmarks while some other vehicles don't.

### **Storage and charging**

It can be trickier than expected. First of all, the vehicle is quite high, so it is important to make sure the garage is high enough for the vehicle (2.8m minimum) and the ramp is not too steep. If there is no indoor garage infrastructure nearby the pilot, it is possible to have a temporary tent. Furthermore, a ramp can actually consumer quite some energy from the battery, so make sure to take this into account too.

To charge a vehicle, it is usually done at night at the garage. However, it might be needed to actually charge the vehicle during the lunch break; if so, there should be an extra charging point, preferably fast, at the pilot site, so that there is no need to go back to the garage.

### **User acceptance**

Before covid, participants were asked to fill in a paper form. With covid, participants were asked to fill in a digital form; QR codes were available in the vehicle and at bus stops. Delegations that were visiting the pilot were also asked to fill this form. Such acceptance can be biased as the people trying the vehicle often came for the site with a particular motivation.

Furthermore, it would be interesting to also ask the neighboring to fill in this form to understand whether or not they would try this experiment.