FiDEUS

FREIGHT INNOVATIVE DELIVERY OF GOODS IN EUROPEAN URBAN SPACES

CityHub: Press meeting during actual delivery operation on location at Limmerstrasse.

Targets & Motivation

Partnership among OEM, logistics operator & authority enables new city logistics

It was the original purpose of the Fideus project to develop new commercial truck technologies, that serve more efficient solutions for current city logistics problems. Several distinct technological vehicle areas were considered: low emmission propulsion, adapted containersystems, boarding kinematics, telematic support for driver and disponent, safety and automation systems. The project's concept is a partnership, that allows collaboration among vehicle manufacturers, logistics service providers and authorities is moved into the focus of the project.

This partnership is composed of the vehicle manufacturers Iveco, Renault and ECA, the logistics service providers DHL and TNT as well as the transport authorities of the cities resp. regions of Barcelona, Lyon and Hannover. Research and technology providers to the project are Mizar, Fraunhofer and University of Westminster.

For the City and the Region of Hannover the objectives of the project are focussed on the assessment of the potential of new vehicle and logistics concepts with respect to finding new solutions to problems arising from emission-, supply-, safety- and security-problems, which result from an increased demand on regional commercial transport volumes. In doing so, the work and results from past and ongoing projects are to be considered and are going to be extended by the Fideus specific vehicle technological aspect.

The agreed approach was started with the design of test scenarios, which are supported by all local partners mentioned above. From these scenarios specific requirements on vehicle technologies are derived, which are provided to those project components, which are concerned with vehicle development. Respective test vehicles were operated in a field test within a limited time frame. Those field trials, being operated in close respect to vehicle technology, logistic concept and transport policy, were subject to an impact analysis, that provided an estimation on the potential improvement in city logistics operation.

CONTENT

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SIXTH FRAMEWORK PROGRAMME

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Three test cases operated within the City of Hannover.

Real live experiment to assess the potentials in:

- savings of emissions
- gaining logistics efficiency
- improving safety in pedestrian zones

2nd LANE

2

Reduction of 2nd lane parking and its effects on traffic by implementing dedicated parking zones for delivery vans.

URBAN LIFE

3

An approach to minimize illegal delivery activity within low-traffic zone and emission saving through electronic micro carriers.

CITY HUB

4

A low-noise van in combination with an electronic micro carrier concept for delivery within large pedestrian zones.

Second lane parking reveals potentials in emission savings and traffic efficiency

A main arterial was selected for the second lane experiment (2 lanes each direction plus parking lane). The objective was to determine the impact of 2nd lane parking during delivery on traffic flow.

For this purpose a floating car with SatNav-euipment was measuring the movement profile of affected vehicles (see. fig.) while a delivery van is placed in 2nd lane. Further the daily profile of traffic density was assessed by means of countings of the traffic management centre (TMC) in Hannover, which provided the number of affected vehicles per stop-time of delivery van.

It was found that 89% of entire traffic moves within platoons, which are sensitive against small disturbances. The profiles of the floating cars are being analysed for 2nd-lane incidents. Normal and 2nd-lane profiles are then compared in terms of acceleration work, which leads to a specific average amount of accelleraton work per car caused by 2nd-lane-parking. We further assume, that 40% of a vehicle's work and fuel consumption can be accounted to actual acceleration (other components such as friction and propulsion losses are not considered). Respectively we assess accelleration work given as 40% of in the ECE consumption cycle. With a free parameter for total 2nd-lane stop time and the average car's ECE-fuel consumption, the additional fuel for 2nd lane parking is calculated. Since fuel consumption can also be related to CO_2 emission via standard equations for diesel/ gasoline. This model provides for analyzing 2nd-lane-impact according to number of parked vehicles, parking time and road type and allows for estimating the expected trade off for implementing loading zones for delivery vans.

Daily Averages	
1398	Vehc/h
45,33	Plat/h
80,03	s (Interval)
27,53	Vehc/Plat
1242,54	Vehc_Plat/h
20,71	Vehc_Plat/min
88,74	%
30,83	s (free)
39,36	s (occ.)

2nd Lane Parking

Measurement of accelleration work caused by 2nd lane parking and resulting increase of fuel consumption and related emissions.

Delivery situation Limmerstrasse: Street with entry limitation and surrounding delivery areas

Step-by-step delivery replacement with an electronic micro carrier

During the trial a set of different delivery aproaches were tested. A micro carrier was introduced step-by-step into the delivery process.

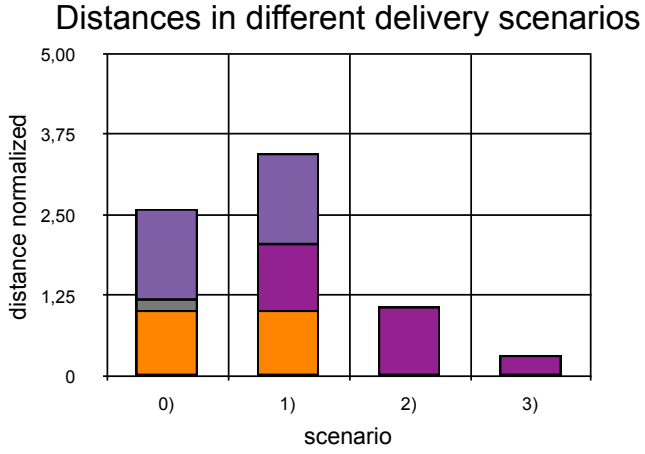
Standard operation (0) involved a 3.5to delivery van starting at the border of the delivery zone, working its way through the Limmer street and both adjacent delivery zones.

In (1) a micro carrier was transported to a City Hub and used for delivery in the low-traffic zone Limmer street. The surrounding areas are still being served by a standard truck. This scenario of course delivers unpleasing results, since an extra van had to bring the containers for the micro carrier to the test site and therefore generates unwanted traffic.

The only logical solution has been tested in (2): The micro carrier is stationary at the CityHub and just receives preloaded containers delivered directly to the hub by a standard 3.5to truck. This situation already creates a significant decrease (about 45% of the standard situation) in truck kilometers and related emissions. It also completely eliminates illegal entries into the low-traffic zone Limmer street.

Situation (3) serves as a theoretical test for gaining even more emission savings: The CityHub deliveries are now being carried out by a much larger truck, e.g. a 12to delivery truck. The delivery zone for the micro carrier would accordingly be enlarged. Standard truck kilometers within the city would be down to about 15% compared to the standard delivery.

For this concept to work, certain steps will have to be taken in the future: A thourough assessment of the economical impact of pre-processing and special handling of delivery items for the micro carrier needs to be done. Since the CityHub would be the central element of such delivery scenarios, further investigations in terms of economical and logistical possibilities for the creation of such CityHubs within inner urban delivery zones need to be evaluated.

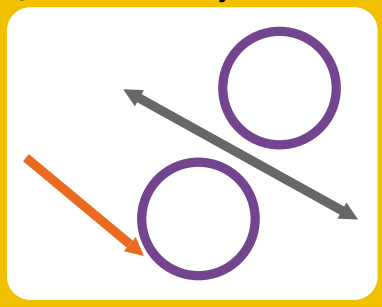


Urban Life

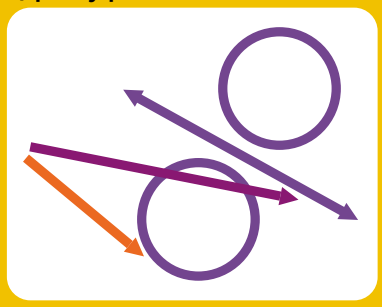
This scenario aims to decrease emissions from delivery trucks through modification of the delivery logistics. An electical micro carrier (µCUV) equipped with container trailers operates from a Fideus City Hub where it loads city containers brought in by a standard truck. The µCUV can safely enter a special low-traffic zone at any time and replaces the use of a standard truck in the traffic reduced zones.

Aspects of the trial were both emission savings and traffic safety in the delivery zones.

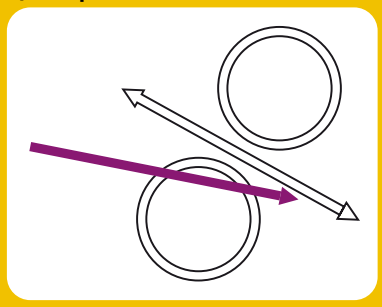
0) standard delivery



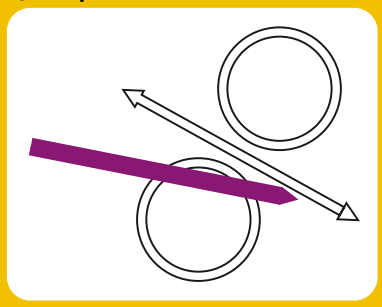
1) partly µCUV use



2) full µCUV use / 3.5t to hub



3) full µCUV use / 12t to hub

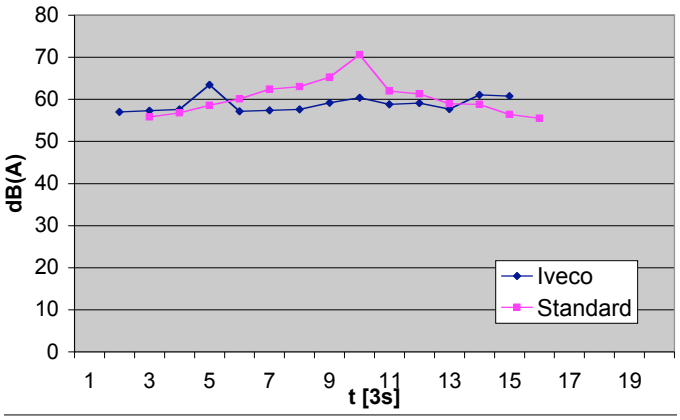


City Hub

Inner urban delivery in pedestrian zone with micro carrier and FiDEUS truck

Delivery in pedestrian zones is restricted in terms of access times and space. As a result, delivery trucks regularely exceed those limits in order to serve their customers. The emission reduced FiDEUS van serves directly towards customers in the pedestrian zone during legal access times and continues service by feeding small city-containers towards the MicroCarrier for further distribution.

The scenario CityHub involved both operations and thus extended DHL service times while reducing negative impact of delivery operations in pedestrian zones. Thus, no illegal entries into the zone were required. Additionally the IVECO experimental prototype van operated in this scenario showed signifcant noise-reduction (7db/A avg. - see fig.) It was also equipped with traffic safety features such as rear info panel and blind spot monitoring.



Noise immisson of FiDEUS prototype vs. standard truck

partners

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