



URBANIZED

MODULAR AND FLEXIBLE SOLUTIONS FOR URBAN-SIZED
ZERO-EMISSIONS LAST-MILE DELIVERY & SERVICES VEHICLES

ISSUE 2
October 2022

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Welcome to the 2nd URBANIZED newsletter!

The URBANIZED project has continued its steady progress during the year 2022, with important targets met, landmarks passed, and partnerships enjoyed. The second issue of the project newsletter will ensure readers are up to date with recent developments while allowing partners to showcase the hard work undertaken across recent months.

We hope you enjoy the read. Don't forget to visit the URBANIZED website, [LinkedIn](#) and [Twitter](#) to stay up to date with the project as it progresses into the third and final year.

Update from Project Partners

Victor Desmots and Salvador Ruiz of **IDIADA** provide an update on the URBANIZED project.



The Urbanized project is now halfway through, and results are increasingly appreciable.

During the opening months, the key performance indicators (KPIs) and design specifications of the vehicle were created. The mission profiles of the two end users (BPost and Coffee Island) were also defined and analysed, to ensure that the vehicle requirements meet their expectations.

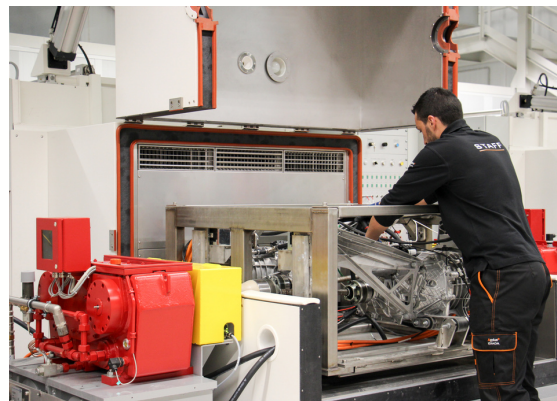
Once the vehicle requirements were defined, the different systems and components were sized. It can be highlighted that the new 48V GaN-based inverter and its heatsink, the first design concept for the e-Axle Drive, including e-motor and reducer, have been sketched and sized to meet the various KPIs.

The vehicle itself has also been developed in a modular manner to maximise the flexibility of the cargo modules. The chassis has been upgraded to meet the target of 4 stars Euro NCAP rating. The methodology used to meet the passive safety criteria is based on virtual simulation.

Regarding energy efficiency, an Energy Management System (EMS) is being developed. The initial tasks were focused on the architecture, interface, and functionalities to be included. The main functionalities are considered Eco-Charging and Eco-Routing. The objective of Eco-Charging functionality is to minimise the operational cost of the fleet of vehicles, while the objective of the Eco-Routing functionality is to produce the optimal sequence of actions the vehicles should take to serve their missions.

With the concept of the vehicle and components completed and the details designed, we have now advanced to the prototyping phase.

We look forward to updating you again in the next URBANIZED newsletter. To stay up to date with the latest project developments until then, please follow us on [LinkedIn](#) and [Twitter](#).



URBANIZED General Assembly 2022



Say Cheese!

Consortium members stop for a photo during the third URBANIZED General Assembly.

The third URBANIZED General Assembly took place on the 14th and 15th July 2022, with partners able to attend both in-person and online.

For the technical meeting on the 14th of July, the objective was to take advantage of the presence of the partners at IDIADA's headquarters to make progress on the various technical points of the project.

The aim of the General Assembly on the 15th of July was to take a review of the progress of the project at the halfway stage (month 18 of 36) and to discuss the active WPs.

General project status was presented with the submission of the first amendment approved by CINEA. A review of project risks was also carried out in order to prepare for the mid-term review meeting.

The status of the design of the new E-machine, Gearbox & Inverter is almost finished as well as the vehicle design.

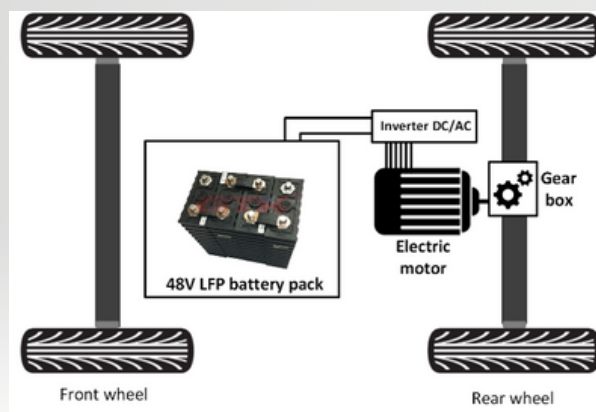
Overall, the event was a great success! Not only were consortium members able to come together for the first time in person, but valuable updates and partnerships highlighted the enthusiasm and eagerness to succeed amongst the group, key factors of this project!



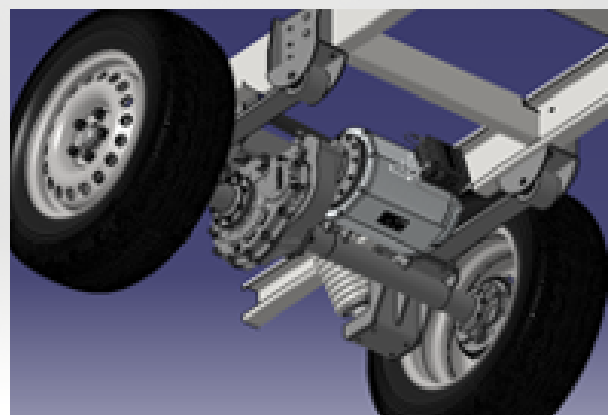
Electric Drivetrain Optimisation

Dr. Ir. Duong Tran, Senior Researcher, VUB

In this project, the drivetrain topology is based on a rear-drive configuration that includes a single PMSM EM (multi-phase motor) at the rear-axle, gearbox (GB) 1-fixed ratio, 48VLFP battery. The sizes of drivetrain components are dependent on the transport mission profiles or driving cycles that the vehicle is assigned to work for. Due to the nature of the expected routes (frequent stops for parcel/product deliveries), a standard drive cycle (e.g., WLTP, SORT) could not accurately capture the expected driving behavior.



Rear-drive-e-drivetrain block diagram



Rear-drive axle and e-motor integration

In the simulation study, a mission profile generation (MPG) tool has been developed to create the vehicle driving cycles used typically in two use-cases (UCs) for the urban vehicles. UC1 is the HoReCa and on-demand emergency services and UC2 is the last-mile delivery of retail, courier, and post. In this pre-sizing design phase, two of the most challenging driving cycles (maximum speed 70km/h) have been selected for vehicle simulation and optimisation.

In the URBANIZED project, an optimisation framework has been proposed to determine the optimal sizing of e-motor and battery for a 48V e-drivetrain utilised in urban vehicles. A forward-facing and scalable simulation model in Matlab/Simulink has been developed to evaluate virtually vehicle performances such as battery energy consumption and drivetrain cost, which are the considered objective functions to be minimised.

The evolutionary-based NSGA-II algorithm has been employed to solve the multi-objective functions considering different driving cycles representing the HoReCa, on-demand emergency services and last-mile delivery of retail, courier, and post. The simulation and optimisation results showed that compared to the baseline vehicle, the optimised e-motor would need higher power (up to 35kW), to cover the gradeability and acceleration requirements for the vehicle. Also, the energy consumption kWh/km of the optimised drivetrain can be reduced by 3.5% when compared to the baseline vehicle.

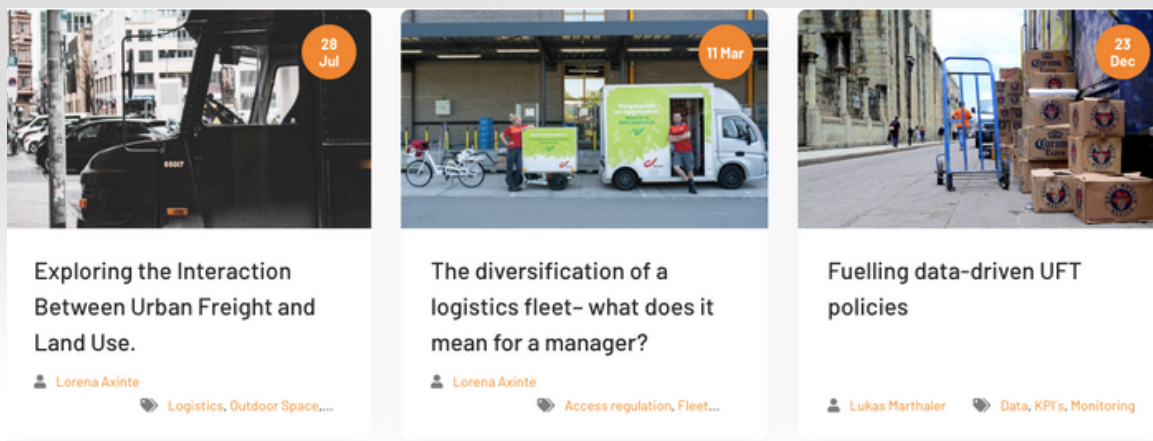
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URBANIZED Observatory Overview

Lukas Marthaler, Innovation Consultant, Bax & Company

Throughout the first year since launching in 2021, the URBANIZED Observatory has proven to be a useful source of knowledge and a one-stop-shop for Urban Freight Transport related events and tools. This body of knowledge provides relevant context to the technological developments of the project. The URBANIZED consortium believes that technological development should go hand in hand with society and business, especially in the ever-changing context of urban logistics.



Within the observatory you will find relevant tools, events, publications and research articles related to urban freight transport. Furthermore, consultants from project partner Bax & Company have published four articles on a diverse range of topics.

Titles of the insight articles and quantitative reports so far include:

- **"Exploring the interaction between urban freight and land use."**
- **"The diversification of a logistics fleet - what does it mean for a manager?"**
- **"Fueling data driven UFT policies."**
- **"Key trends in the urban transport of goods - a data collection."**

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URBANIZED at the Conference on Sustainability Innovation 2022

On 27th September 2022, Emilia Romero represented the URBANIZED project at the Conference for Sustainability Innovation 2022 in Catania, Italy.

During the session, Emilia outlined key aspects of URBANIZED, including the project aims, vehicle specifications, progress to date and upcoming targets.

Also discussed were the two key use cases identified for the URBANIZED vehicle: BPost and Coffee Island. Emilia provided some background information on the two companies, and outlined how the vehicle was relevant and could be used to aid operations.



The main focus of the session was related to the goal of future proofing cities through sustainable last-mile delivery, by solving the trade-offs between “one size fits all” and “design for purpose” in the design of adaptable and modular all electric Light Commercial Vehicles (LCVs).

Vehicle improvements are intended to:

- **Reduce the production cost of electric vehicles.**
- **Optimise fleets by reducing the number of vehicles.**
- **Improve the overall vehicle energy efficiency.**
- **Increase the safety of small electric vehicles and ensure that this is perceived by the end user.**

Following the conference, Emilia reflected that it allowed for various projects to share best practices and encouraged engaging discussions around similarities and differences between them. What was also striking was the intention to reduce production costs of the vehicles by so much.



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