

Project eCoBus

“electrified Cooperative Bus system”

Ass.-Prof. F. VITI, Dr. M. Rinaldi

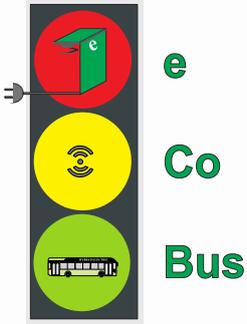
Project start - Jul 2017

Funding: FNR-CORE



Electrified Cooperative Bus System





Partners








With eCoBus the University of Luxembourg (Uni.lu) teamed up with the Luxembourg Institute of Science and Technology (LIST) to design and assess a *system approach* exploiting the potentials of the new Cooperative Intelligent Transportation Systems (C-ITS) paradigm to meet the requirements of the *next generation* Public Transport (PT) systems. The main research challenges are in formulating and solving complex multiobjective optimisation problems involving game-theoretical aspects. The proposed system will be tested and evaluated not only in extensive simulations but also in real-world controlled experiments supported by our PT industry partners—Volvo Buses and Sales-Lentz (PT operator).

The challenge is posed by different operational characteristics and constraints of e-buses, that they need to periodically re-charge batteries at *echarging* stations placed in selected stops and terminals. This brings additional complexity into PT operations and its cost dynamics. Since several PT operators share the same e-charging infrastructure and complex electricity pricing schemes are usually applied elements of competition and fairness need to be addressed.

Goal

Design a new real-time integrated approach to manage the public transport eco-system, which consists of control signals, (e-)buses, and e-bus charging infrastructure.

Objectives

- Improve service reliability through reducing headway variations, headways between vehicles near signals, and reducing the deviation between schedule and actual arrivals;
- Improve passenger utility by reducing stops at traffic signals, by minimising the waiting time of passengers at interchanges, and reduced crowding / bunching effects;
- Decrease energy consumption and emissions by adapting speeds near signals to avoid unnecessary stops and reduce instantaneous consumption and emissions;
- Facilitate cost-efficient and low-impact use of e-charging infrastructure by distributing charging in time and space according to (given) energy pricing schemes;
- Increase of PT service capacity with low or no impact on general traffic by reducing the number of calls for priority, and by reducing modification requests of phase plans.

