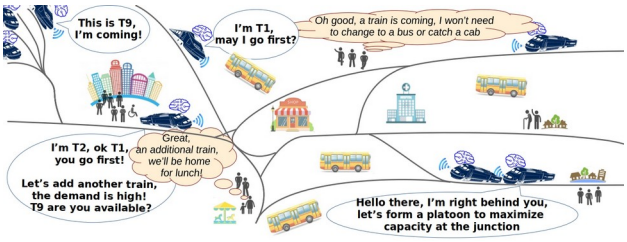
# SORTEDmobility

## Self-Organized Rail Traffic for the Evolution of Decentralized MOBILITY

**SORTEDMOBILITY** proposes a holistic approach for self-organizing management of public transport operations in urban and interurban areas, specifically focusing on rail transport as a mobility backbone.

It is funded under the Horizon 2020 ERA-NET Cofund scheme, under grant agreement N° 875022 (06/2021-05/2023).




### Operational Principles and KPIs

[Rémy Chevrier, SNCF, remy.chevrier@sncf.fr]

One of the major goals of the project is to define the operational principles which will drive self-organizing railway operations, and the KPIs appropriate for the system assessment. These **operational principles** will be considered when developing demand and mobility models, and will be at the basis of the optimization algorithms and the simulation models used to define the decentralized traffic management strategy. The **KPIs** will be integrated in the mobility models and will be the criteria for algorithm optimization and assessment.

### Mobility Demand Modeling

[Carlos Lima Azevedo, DTU, climaz@dtu.dk]

Within the project, we consider two demand modeling threads. The first develops offline models at the **individual traveler** level of daily activity and mobility decisions under current and highly dynamic/self-organized rail operations. The second research thread develops online aggregated and short-term **demand prediction** models for origin-destination matrices based on historical and simulated data to be integrated directly within the self-organizing traffic management algorithms. The SimMobility simulator will be used to produce part of these data.

### Algorithms for Self-Organizing Railway Operations

[Vito Trianni, ISTC-CNR, vito.trianni@istc.cnr.it]

The algorithms for self-organizing railway operations will allow trains to autonomously solve possible conflicts and adapt to a changing demand, minimising delays and maximising user satisfaction. Each train will respect the system-specific constraints while proposing a solution that fits its own requirements. Given that individual solutions computed by different trains may substantially differ as they are computed to maximise the individual utility, a **consensus** phase is required among neighbouring trains to select the most suitable solutions that compromises between the needs of multiple actors, including users, train operators and infrastructure managers.

### Simulation platform

[Egidio Quaglietta, TU Delft, e.quaglietta@tudelft.nl]

For testing and assessment of the self-organized algorithms, an integrated and flexible software environment must be defined and developed. A web-based software interface will be developed to enable a real-time communication among the self-organising traffic management algorithms, the demand models and the **microscopic rail traffic simulator** EGTRAIN which is here considered as a virtual emulator of realistic railway operations.

### Case Studies and Impact Assessment

[Paola Pellegrini, univEiffel, paola.pellegrini@univ-eiffel.fr]

The impact of self-organizing operations and demand models will be assessed on three case studies with very different characteristics: the **Copenhagen** urban network in Denmark, with its star-shaped infrastructure and its high frequency service [Fabrizio Cerreto, Banedanmark, fceo@bane.dk]; the **Padua-Venice** line in Italy, with its mixed traffic, including both freight and passenger (conventional and high speed) services [Fabrizio Tavano, RFI, f.tavano@rfi.it]; the **Guingamp-Paimpol** line in France, with its low demand and its critical role of mobility enabler in rural areas [Rémy Chevrier, SNCF, remy.chevrier@sncf.fr]. The performance of self-organizing traffic will be compared to the one of more a classic system, managed centrally by the RECIFE-MILP algorithm. The assessment will lead to guidelines and recommendations.

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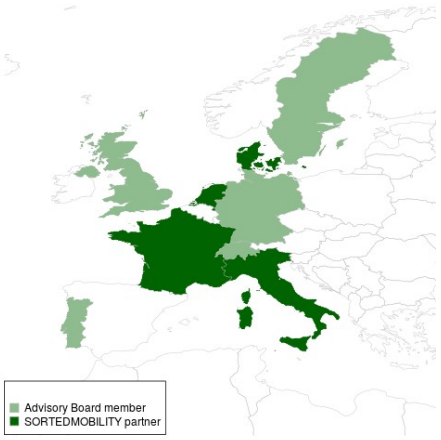


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### SORTEDMOBILITY partners

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