SPINE
Smart Public transport Initiatives for climate-Neutral cities in Europe

Smart Traffic Management

About

The Smart Traffic Management (STM) measure, developed by Yunex Traffic, is a data-driven solution for public transport (PT) analytics, enabling a detailed assessment of corridor-level performance and signal coordination. Heterogeneous data sources (signal control logs, PT trajectory data from GTFS/GPS, detector data and simulation outputs) are integrated into a common data model, enabling:

- Intersection-level PT trigger monitoring
- PT travel time and delay analysis
- Green Wave analysis using time-distance diagrams

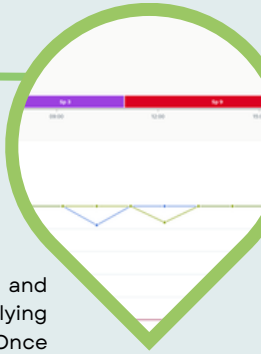
The STM is designed primarily for offline analytics, supporting operational performance assessment, even in cities with incomplete real-world data by leveraging simulation-based inputs.

Key Features

- Unified, data-driven analytics across heterogeneous sources
- Corridor- and intersection-level insight for public transport
- Evidence-based decision support

Who will use it:

The STM solution is intended for traffic management authorities and traffic engineers, public transport operators seeking improved reliability and punctuality, urban mobility planners and policy makers evaluating PT priority measures.



What could be the impact?

Using the Green Wave analysis, potential misalignments between public transport trajectories and traffic signal coordination can be clearly identified. By analysing these deviations in detail, underlying issues related to detection technologies, data quality or signal timing logic can be uncovered. Once such misalignments are detected and understood, targeted measures can be addressed to reduce public transport delays at critical intersections and to improve travel time reliability along strategic corridors. By smoothing vehicle progression and limiting stop-and-go operation, these measures also support emissions reduction. Importantly, when priority strategies are precisely targeted, they can be implemented without causing negative impacts on general traffic conditions.

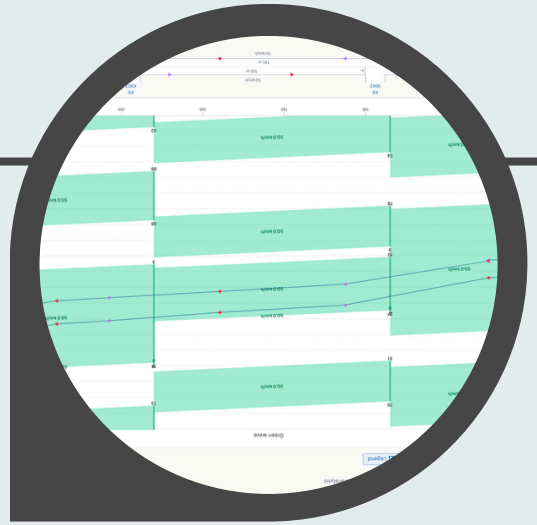
Development & testing in SPINE:

Within SPINE, the STM solution was developed as a modular, city-agnostic system based on a common internal data model. It was validated in cities with different data maturity levels, including Antwerp using real signal and public transport data, Valladolid using GTFS and fixed-time signal plans enhanced by geofencing and GPS validation, and Bologna and Las Palmas using calibrated Aimsun microscopic simulations where real data was incomplete. Systematic cross-checking of real, GTFS-/GPS-derived and simulation-based inputs ensured robust and reproducible results.

Can it be transferred?

The solution is transferable to new cities, given that the following data sources are available:

- Intersection topologies,
- Signal control data (e.g. OCIT, fixed-time plans, logs),
- Public transport trajectories (telegram messages, GTFS, GPS etc.)



What's next:

Scaling STM to additional corridors and cities, including Twinning Cities.