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URBAN INNOVATIVE ACTIONS

The Urban Lab of Europe !

The TMaaS project Journal N° 3

*Project led by the **City of Ghent***

URBAN MOBILITY

TMaaS
Traffic Management as a Service

European Union
European Regional Development Fund

Région Hauts-de-France

The TMaaS project

In order to reduce the levels of congestion and support the modal shift in the city of Ghent, the **TMaaS** project seeks to harmonise mobility between different transport modes as well as inform the citizens of sustainable alternatives to move around the city. The project will create a traffic management system that will crowdsourcing information from citizen that will match with the true needs of the urban authority. It will organise traffic management as a service using a central cloud platform without investing in expensive hardware.

The traffic management system will gather data that goes beyond information on private vehicles on the roads. It will collect, process and centralise real-time information about public transport, social media messages, weather data, traffic light status, etc. The platform will be configured to the needs of the city and local mobility practices. Personalised information will also be provided to each citizen depending on their specific user needs recommending the most sustainable and time-efficient way to travel. Citizens will be able to interact with the platform by feeding back to the management control centre as they are best placed to shape the mobility culture in their communities.

Partnership

- City of Ghent
- WAYLAY NV - software company
- Be-Mobile Tech NV - private company
- De Staatse Ruiter- private company
- Ghent University
- KU Leuven - education and research institute
- European Passenger's Federation
- TomTom Location Technology Germany GmbH - private company
- TomTom Belgium nv - private company

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1. EXECUTIVE SUMMARY

During the period from March 2019 until August 2020, the TMaaS project partnership has advanced on all planned activities, successfully also dealing with the uninterrupted project execution within the pandemic crisis situation both at the technical, as well as the management level of the project.

This third edition of the TMaaS Journal aims to provide interested readers with information concerning recent major achievements, main results and planned activities for the project during the next period.

During the period covered by the current 3rd Journal of TMaaS, the project partners have managed to achieve significant accomplishments in the following:

Launch of LINK.Gent

Following a thorough and extended and initial development phase, LINK.Gent, the innovative TMaaS platform for multimodal traffic management, has been launched for selected users. Focus has been placed on usability and user-friendliness of all provided services, both for the citizens of Ghent, as well as for the city's Traffic Management Centre.

TMaaS Replicator City Program

The TMaaS Replicator City Program has been successfully executed, with three cities being selected for utilizing TMaaS technologies and services, following an Open Call to interested cities worldwide and the evaluation of the applications. The three cities that have been selected to deploy and test the TMaaS solutions are: Southwark (London, United Kingdom), Antwerp (Belgium) and Duran (Ecuador).

Targeted promotional and dissemination activities

TMaaS partners have placed particular focus on the wide, yet targeted dissemination of the project's objectives, main findings and results, through participation in related national and international events and fora. Furthermore, the City of Ghent won the Belfius Smart Belgium Award 2018 in the category 'Smart Cities with a population of more than 30,000 for the TMaaS project.

Successfully meeting key challenges

Concerning the eight key challenges of the project, TMaaS has performed exceptionally well in all of them. The related progress is included in the respective section of this journal.

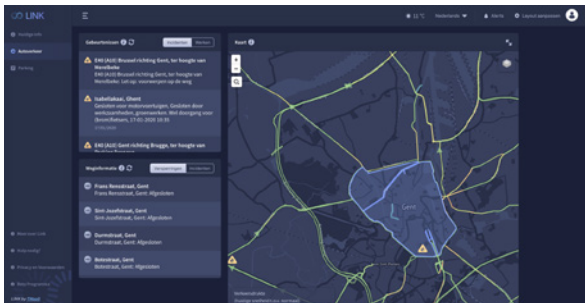
What to expect next

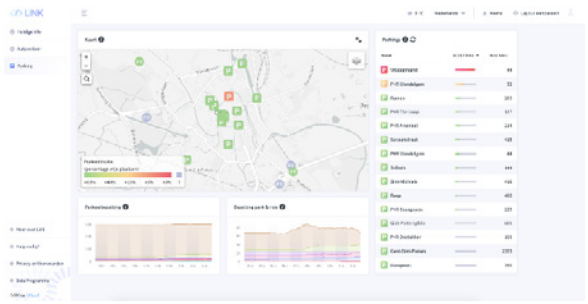
As the project approaches its final stages, all TMaaS partners are actively working towards the accomplishment of all project's ambitious goals, mostly related to increased user base for the developed services, further promotion and dissemination of the key findings and results, conclusion of the TMaaS Replicator City Program, quantification of expected impacts of the TMaaS project, user experience evaluation and finally the preparation of the project's final virtual conference.

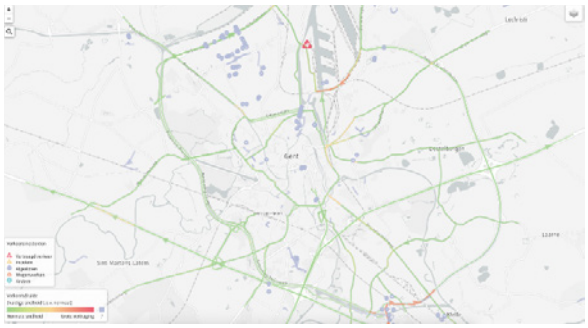
2. PROGRESS TO DATE

2.1. Launch of LINK.Gent

The TMaaS partnership has placed the majority of its efforts in successfully developing **LINK.Gent**, the innovative TMaaS mobility platform for multimodal traffic monitoring and management. LINK.gent was launched on April 1st, 2020 to an "inner circle" of City of Ghent teams.







User experience is key

A collaborative approach involving an iterative approach between the project team and the different types of LINK.Gent end users has been followed. Initially, this approach included the active participation in testing of the developed platform by representatives of the City of Ghent as well as by other cities' representatives. TMaaS has organized webinars and online surveys targeted to the above-mentioned target groups and asked for constructive comments and feedback, in relation to the developed platform's functionalities, usability, user-friendliness and overall appearance.

Two LINK.Gent interfaces

LINK.Gent has two main interfaces: one targeting to the citizens and daily travelers in the City of Ghent and one targeting the city's traffic managers, each of which aims to serve different needs.

Attention to details

The TMaaS development team of LINK.Gent has not neglected to pay attention to details that matter and make the platform attractive and user-friendly. The branding of LINK.Gent involved Wim Vandersleyen, responsible for the TMaaS visual identity: *"TMaaS wanted to make use of the infinity sign, which symbolises, among other things, the growth of the concept with the future in mind. I thought it would be a good idea to add it to the symbol that appears on the screen when an Apple Mac computer is processing, namely the rotating bar symbol."* Wim also chose the appropriate fonts, colors and contrasts, aiming to produce a simple yet strong image and logo for LINK.Gent.

How does LINK.Gent work?

Interested users from the City of Ghent can create an account for free at https://link.tmaas.eu, in order to gain access to the platform's services for citizens. The platform provides the following services through the LINK.Gent dashboard:

- retrieve current traffic conditions in the City of Ghent
- retrieve information about the Low Emissions Zone in the City of Ghent
- retrieve current information about train departures from the train stations of Ghent, including information about boarding platforms' numbers and possible delays
- retrieve information about the location of the Park & Ride shuttle bus service from Watersportbaan and Weba/Decathlon to Ghent's city center
- adjust the Dashboard visual interface, according to own preferences

Access to TMaaS data by third parties

Furthermore, the TMaaS platform provides the ability to interested third parties to connect programmatically. Utilizing application programing interfaces (APIs) developed by the project team, it is possible for anyone interested to retrieve data used by the TMaaS platform. Open data are available through a dedicated API for free, while proprietary data is also accessible through a different API, which however requires a prior agreement with the TMaaS consortium. Detailed documentation for utilizing the TMaaS APIs is available at https://drive.tmaas.eu/downloads.

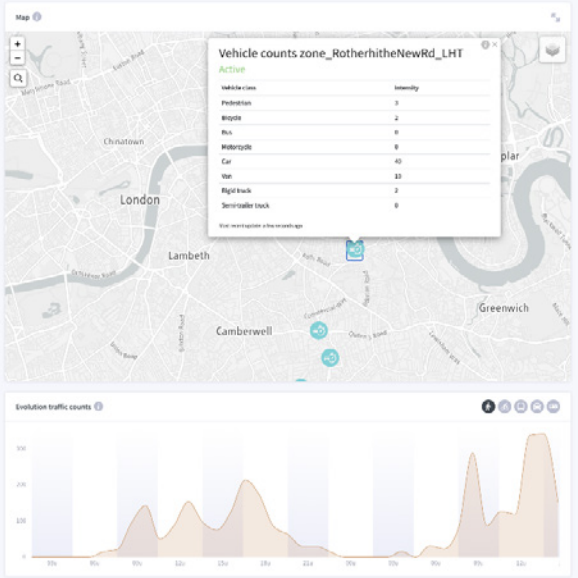
2.2. TMaaS Replicator City Program

The transferability and potentials for replication of the developed TMaaS solutions comprise a cornerstone of the project's objectives and activities. The **TMaaS Replicator City Program** is a project activity, which aims to assist project-external cities in adopting the TMaaS solutions, coupled with knowledge and experiences sharing provided by the TMaaS project partners.

Following a successful announcement of an Open Call to any interested cities worldwide during February 2019 and the subsequent promotion of the TMaaS Replicator City Program by the partnership through a dedicated online webinar, social media advertisements and related news on the project's website, six applications have been received by an equal number of cities. The three cities that were finally selected to work hands-on with the TMaaS team and the developed solutions are Southwark (London, United Kingdom), Antwerp (Belgium) and Duran (Ecuador).

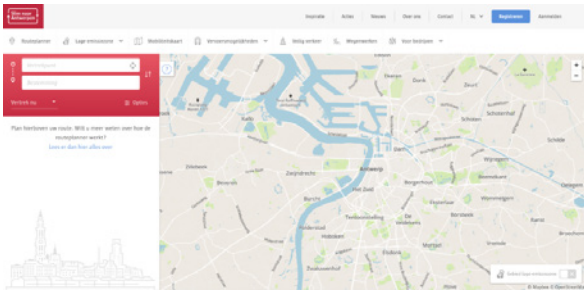
Southwark: TMaaS Dashboard for traffic managers

The TMaaS replication activities in the London Borough of Southwark, United Kingdom, focus on TMaaS solutions that provide traffic managers with the ability to exploit multi-source data for real-time traffic monitoring and management purposes. The TMaaS dashboard is deployed for this reason, as well as for mapping the alternative transport options and modes in the selected part of the Borough.



Antwerp: Connecting Slim naar Antwerpen to TMaaS

The TMaaS replication activities in the city of Antwerp, Belgium, focus on the creation of integrated interfaces between Antwerp's existing routeplanning service, the Slim Naar Antwerpen routeplanner, with the TMaaS alternative routes calculator.



Duran: Improved public transport fleet management with TMaaS

The TMaaS replication activities in the city of Duran, Ecuador, focus on improved monitoring of the newly designed public transportation system of the city, by utilizing GPS technologies for tracking vehicles of the public transport bus fleet. The location of public transport buses is visualized on a map of TMaaS, assisting thus the city towards the optimization of the public transport system's operations.

2.3. Promotional and dissemination activities

Representatives of the TMaaS partnership have presented the project's activities, findings and results to several events and fora, directly related to the theme of the project.

March 2019 - Announcement of the TMaaS City Replicator Program: In collaboration with Eurocities, the TMaaS partnership organized a webinar on the 25th of March 2019, to present the TMaaS Replicator City Programme and to highlight the opportunities offered by the project to cities seeking to increase their data-driven solutions knowledge and skills. Interested cities were able to ask questions to the TMaaS partners' representatives.

April 2019 - City of Ghent wins the Belfius Smart Belgium Award 2018 with TMaaS: On the 24th of April 2019 in Brussels, the City of Ghent won the Belfius Smart Belgium Award 2018 in the category 'Smart Cities with a population of more than 30,000 for the TMaaS project. The Smart Belgium Awards 2018 offered rewards in eight domains dedicated to preparing societies for the future: Circular Economy, Smart City Services, Education, Energy, Environment, Health and Prevention, Mobility and Urban Development. More than 150 organizations submitted their 'smart' projects at the end of 2018. A professional jury chose 50 out of these and they were invited to present their projects to the jury.

May 2019 - TMaaS webinar for cities: On the 28th of May 2019, the TMaaS partners held an online webinar targeted to cities that are interested in the project, its activities and its results for improved urban mobility and innovative traffic management. TMaaS experts, representing various partners of the project, presented to the interested participants information about the overall concept of Traffic Management as a Service, data integration aspects, the use of proprietary data sources for operational traffic management and finally about data visualization aspects. Participants were able to interact with the TMaaS project experts and get feedback to the questions they posed.

October 2019 - TMaaS presentation at the 2019 ITS World Congress in Singapore: Prof. Ivana Semanjski from the University of Gent, presented the TMaaS project during the 2019 ITS World Congress in Singapore. Her presentation included the overall framework of the Traffic Management as a Service concept, aiming to improve urban mobility at small and medium-sized cities.

May 2020 – LINK.Gent webinar for cities: A dedicated webinar for cities that are interested in the solutions developed by the TMaaS project and particularly the LINK.Gent platform took place on the 14th of May 2020. Participating cities were able to get information about the TMaaS concept, the progress made with the replicator cities of the project, as well as to learn how the LINK.Gent platform operates and which advantages are associated with its use by interested cities.

June 2020 - Future ideation workshop: Citizens of the City of Ghent were invited to participate in a collaborative online workshop of the TMaaS project, aiming to develop innovative and creative ideas that could shape the future urban mobility landscape of the city.

3. KEY CHALLENGES

TMaaS has successfully worked on the progress of the project's eight implementation challenges. Following the related progress reported in the previous two journals of TMaaS, the status for each one of the implementation challenges is re-visited and the progress made during the last project period is reported hereafter. The objective is to assist other or future UIA projects that face similar challenges on the way followed by TMaaS to face and overcome the mentioned challenges. The following table provides an updated status for each one of the project's eight implementation challenges.

Key implementation challenges tracker for the TMaaS project (status as of September 2020)

Challenge	Status	Notes
Leadership for implementation	**Low**	TMaaS has successfully managed to maintain high levels of political support, as in the previous years of the project's implementation. The City of Ghent has kept on showing exceptional commitment and continuous support to the TMaaS project, even during the recent challenging period of the Covid-19 pandemic. As TMaaS has placed significant efforts during the design period, the developed technological solutions are adopted and operationally used by the Traffic Management Centre of the City of Ghent. Furthermore, as TMaaS has followed a user-centric approach, the provided TMaaS services are expected to significantly benefit the daily travelling of the citizens of Ghent, which further strengthens the commitment of the city for a successful project implementation.
Public procurement	**Low**	Public procurement related issues have not affected the TMaaS project implementation at any stage, despite the innovative nature of the project itself. The majority of all innovative technological developments needed for the project have been executed by the project partners themselves. No delays or other public procurement related challenges have been faced, that might affect the execution of the project as planned.
Integrated cross-departmental work	**Low**	Cross-departmental work has been successfully achieved, through the close collaboration of and focused liaison with related departments of the City of Ghent for the development and testing of Link.Ghent. Related departments have been engaged, to support the project's activities and execution in a harmonized way with the TMaaS partnership.

Challenge	Status	Notes
Participative approach	**Low**	Despite the recent pandemic related challenges that significantly affected work and daily activities, the strong focus of the TMaaS project on adopting and maintaining a participative approach has further continued with success. TMaaS has utilized all available electronic means for maintaining the engagement of citizens, cities and stakeholders. The participative approach of TMaaS has included activities at the level of the City of Ghent, as well as at the level of cities that have been participating in the TMaaS Replicator City Program. Following the successful participatory approach followed at the design stages of the project, TMaaS has engaged citizens and cities in understanding the use and benefits of the developed solutions and services, as well as in exploring new innovative ways for their integration in the future, sustainable urban mobility of the city.
Monitoring & Evaluation	**High**	Monitoring and evaluation comprise key challenges for most projects that aim to deploy innovative technology-based solutions under real-life conditions. The importance as well as the challenges associated with monitoring and reliable estimation of the impacts of the TMaaS project have been recognized by the partnership early on. For this reason, categories of impacts have been defined, which are associated with Key Performance Indicators as well as concrete ways for their quantification wherever possible. The impact categories will cover aspects related to the digitalization of traffic management, data and information exchange, awareness of mobility options, open data and outreach to the public/citizens. Various means for collecting the necessary data are being defined, including purely data-based analyses, surveys and qualitative methods. The approach that will be followed aims to provide a clear and valid picture of the achieved impacts by the end of the TMaaS project, compared to the situation before the implementation of the project's solutions.
Financial sustainability	**High**	Financial sustainability is directly translated and related to the potential uptake of the project's final achievements and solutions into the daily operations and business of both the public and private sector partners of TMaaS. Despite the recent challenges associated with pandemic related travel restrictions, reduced demand and adapted supply for transportation, coupled with the need for new collaborative business models that capture the needs and benefits of all related stakeholders from an eco-systemic point of view, the overall TMaaS approach for direct engagement of the necessary public and private sector partners into the project proves to be the correct way to move forward. Collaboration between public sector entities as well as private sector companies will increase the financial sustainability of the developed solutions, ensuring the continuity of the developed solutions after the end of the project.

Challenge	Status	Notes
Communication	Medium	TMaaS has placed efforts in developing clear communication messages to citizens and cities, concerning the project's activities and the benefits that will arise from the operational implementation of the TMaaS solutions. A balanced mix of clear and targeted contents together with contemporary aesthetics is used, in order to capture the interest and the attention of the targeted audience, as well as to ensure that the perceived quality of the achieved project results is indeed at the required levels for both traveling citizens as well as public city authorities. Communications management, branding and technical excellence have been combined, in order to communicate trustworthy and high-quality contents and information associated with the various activities of the project. It is worth mentioning that the TMaaS partnership has managed to execute most communication activities as planned, despite the pandemic related challenges faced during the last year, utilizing all electronic means available. Concrete communication and dissemination activities performed during the last period are described in the respective section of this journal.
Upscaling	High	In previous journals of the TMaaS project the importance of risks associated with vendor lock-in and interoperability have as well as the direct association between upscaling of the project's solutions with financial sustainability and communication have been captured and highlighted. The final developed business models will assess and define the optimal scenarios for the upscaling of the final developed solutions, as well as the levels of openness and extent to which other service and data providers can couple their solutions with TMaaS. The objective is to create solutions that will be able to be replicated easily by other cities, beyond those that participate in the TMaaS Replicator City Program. As urban mobility is a topic of continuous and growing interest, targeting to tackle daily challenges of cities worldwide, it is the intention of TMaaS to be able to provide its developed solutions for the benefit of all interested parties.

4. THE MAIN BUILDING BLOCKS OF TMAAS

The TMaaS platform follows a modular approach, with the ability to provide tailored services to individual deployments and needs. Each city (Ghent, Duran, Southwark, Antwerp) uses its own dashboard and modules, depending on the local needs and requirements. The solutions offered through the dashboard are based on the modules that are part of the underlying system. They were designed by the various data providers, developers and government authorities involved in the TMaaS project. Each main building block (module) is presented hereafter, while a complete overview can be found on the project's website: www.TMaaS.eu.

The Dashboard

The TMaaS Dashboard, and its various modules, provide access to all mobility data of a city through a single location, allowing the provision of the complete mobility picture of a city and support for smarter decisions making. Most TMaaS solutions are data driven and can be configured using the locally available data.

TMaaS Traffic Information

TMaaS Traffic Information shows the common operational picture of real-time traffic events (incidents, accidents, roadworks, etc.) based on data provided by parties within and outside the TMaaS partnership (TomTom, Be-Mobile, Waze).

TMaaS Trigger Activator

TMaaS continuously monitors traffic conditions and user preferences. Whenever the combination of traffic information and user preferences requires a calculation of alternative routes and means of transport, the TMaaS engine sends a trigger to the 'Alternatives Calculator' to request useful travel alternatives for this user.

TMaaS Alternatives Calculator

The multimodal route planning function in the Alternatives Calculator combines different modes of transport for one single journey. The TMaaS Alternatives Calculator calculates relevant travel alternatives for drivers, users of public transport (allowing for timetables and location of public transport points), pedestrians and cyclists, based on real-time traffic conditions. When determining suitable travel alternatives, user preferences are accounted for.

TMaaS Map Viewer

The TMaaS Map Viewer allows to view maps and zooming in on map details. Users can see map details, switch layers on and off and zoom in on details. They can also view additional

pieces of information about different elements on the map, such as the description and the update rate of the data and a link to more detailed information. Users can find locations by entering the addresses in the 'find location' box. The TMaaS Map Viewer can be used as a stand-alone feature or can be integrated into the TMaaS Dashboard.

TMaaS Fleet Viewer

The TMaaS Fleet Viewer tracks the real-time position of public transport vehicles, shuttle buses, etc. The module visualises moving vehicles on a map, using data generated by in-vehicle GPS trackers.

TMaaS Route Monitor

Operators can monitor multiple road segments over longer (indefinite) periods of time, including also historical analyses.

TMaaS Notifier

This service, that is powered by the TMaaS Trigger Activator and the multimodal TMaaS Alternatives Calculator, acts as a pre-trip alert system to make journeys through the city smarter and faster. Alerts are sent to users by email, text or in-browser notifications and are tailored to the users' own personal travel preferences. Additionally, in the event of rare incidents that have a significant impact on mobility, general alerts can be published to all users at once.

How does this work? Users create a personal profile in the platform and enter their daily points of departure and destination in or around the city as well as their preferred means of transport (car, bike, public transport, etc.). Citizens can select how they want to receive future alerts (e.g. SMS, email or in-browser), the days they would like to receive messages and in which time slots they want to be alerted. The notifier is primarily designed as a pre-journey alert, as the system is not capable of knowing the exact location of the user (no tracking of users). Users can create new routes at any time, add or delete trips and switch notifications on and off.

TMaaS Data Editor

When operators receive information on traffic events from citizens through the two-way communication channel or from other sources, they should be able to insert this information into the dashboard. (Planned) road works or road closures and corresponding detours can also be inserted into the Dashboard. It can be entered into the TMaaS platform as a new data source, so that other system components (e.g. route planner, notifier, real-time traffic events, etc.) can utilize this information as well.

5. WHAT TO EXPECT NEXT

All TMaaS partners will remain fully engaged with their activities within the project during the next months. Some of the main activities to be taking place over the next period include:

Increase the use of the LINK.Gent dashboard by citizens of the City of Ghent

Further promotion and engagement activities will be taking place by the project partners, in order to increase the number of users of the TMaaS Dashboard.

Conclusion of the TMaaS Replicator City Program

The already successful TMaaS Replicator City Program will approach its end within the framework of the project, while TMaaS partners will keep investigating replication capabilities of the developed solutions in cities beyond the consortium.

Quantification of expected impacts of the TMaaS project

TMaaS partners will be working on the implementation of the impact assessment and evaluation methodology, in order to conclude to valid quantitative and qualitative for the deployment of the TMaaS solutions under operational conditions.

Short- and long-term user experience evaluation

TMaaS plans three tests for the evaluation of the users' experience. The three tests will cover six categories for research: Notifications (timing, content, etc.); Adoption potential for the individual users (will users keep on using the TMaaS services?); User statistics (which modules and functionalities are used, how many times, etc.); Overall user satisfaction of the dashboard and the notifications; Perceived information quality (quality of the information on the dashboard, quality of the information of the notifications and as a result also the proposed alternatives); Integration in the daily travel behaviour.

Following an open procedure for participating in the user experience test, 40 users will be selected to take part in the user experience evaluation, while actual tests will be running during October and November 2020.

Preparation of the final project event and final dissemination activities

As the project goes towards its final stage, the TMaaS partners will be preparing the final project dissemination activities as well as the final project event. The final event will have the form of a virtual conference, during January 2021. More information will be provided on the project website: www.TMaaS.eu.

Urban Innovative Actions (UIA) is an Initiative of the European Union that provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges. Based on article 8 of ERDF, the Initiative has a total ERDF budget of EUR 372 million for 2014-2020.

UIA projects will produce a wealth of knowledge stemming from the implementation of the innovative solutions for sustainable urban development that are of interest for city practitioners and stakeholders across the EU. This journal is a paper written by a UIA Expert that captures and disseminates the lessons learnt from the project implementation and the good practices identified. The journals will be structured around the main challenges of implementation identified and faced at local level by UIA projects. They will be published on a regular basis on the UIA website.

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