D4.1 – DEMO IMPLEMENTATION PLANS

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Consortium of partners

PARTNER	COUNTRY
UNION INTERNATIONALE DES TRANSPORTS PUBLICS (UITP)	Belgium
FIT CONSULTING	Italy
OLTIS GROUP	Czech Republic
FSTECH	Italy
CEFRIEL	Italy
CERTH	Greece
EURNEX	Germany
EURECAT	Spain
POLIMI	Italy
UNIVERSITY OF NEWCASTLE UPON TYNE	United Kingdom
UNIFE	Belgium
UIC	France
UNIZA	Slovakia
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FV-Helsinki	Finland
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1. EXECUTIVE SUMMARY

The purpose of this deliverable is to plan the specific demonstration activities and to ensure that the relevant RIDE2RAIL solutions will be tested and for the benefit of local users and mobility services.

In line with the analysis of implementation plans, the following conclusions can be drawn:

- The process followed by demo responsible partners to draft implementation plans evidenced that the preparation has started at all demo sites, and all basic features of the demos (location, target areas, main stakeholders to be involved) are confirmed as they were indicated in the DoA. Changes and fine-tuning of action of the preparation phase will be possible during the forthcoming months, until the scheduled end of preparation phase (M24).
- Targets of the demonstrations have been set and new indicators have been proposed. However the final list of indicators and targets will be provided in D4.2. Some targets still have to be set, during the preparation phase and following specific preparatory actions, especially to face the impact of Covid-19 pandemic follow-up on demand and supply of public and share transport services.
- The implementation plans include a detailed assessments of risks. The most relevant are connected to (i) the schedule of the release of software and Travel Companion; (ii) the uncertain possibility to integrate RIDE2RAIL in existing/proprietary systems; (iii) data collection and data availability; (iv) the impact of Covid-19 pandemic; (v) the lack of participation or connection with local stakeholders; (vi) language barriers.

The above-mentioned conclusions suggest to leave the possibility to review each implementation plan until the end of the preparation phase.

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2. ABBREVIATIONS AND ACRONYMS

API	Application Programming Interface
CZ	Czech Republic
D	Deliverable
DoA	Description of Action
EU	European Union
FI	Finland
GHG	Greenhouse Gases
GR	Greece
ICT	Information and Communication Technology
IT	Italy
IP4	Innovation Programme 4
KPI	Key Performance Indicator
M	Month
N.A.	Not Available
OC	Open Call
POP	Population
PS	Parking Space
SP	Stated Preference
S2R	Shift2Rail
SW	Software
WP	Work Package

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3. BACKGROUND

3.1. Shift2Rail context

Shift2Rail is the first European rail initiative to seek focused research and innovation (R&I) and market-driven solutions by accelerating the integration of new and advanced technologies into innovative rail product solutions. Shift2Rail promotes the competitiveness of the European rail industry and meets changing EU transport needs. R&I carried out under this Horizon 2020 initiative develops the necessary technology to complete the Single European Railway Area (SERA).

The delivery of Shift2Rail is based around five Innovation Programmes (IPs); the focus of this report is IP4 – IT solutions for attractive rail services. In order to become a more attractive option, rail must respond to customer needs to support anytime, anywhere, door-to-door, intermodal journeys encompassing distinct modes of transportation. Rail must achieve interoperability with other transport modes and mobility services, with regions, cities and people engaged in social and economic activities, and with the key elements of the supply chains which can make rail products and services available to those people. In order to achieve this, rail needs to take due advantage of the increasing connectivity of people and objects, the availability of European Global Navigation Satellite Systems (GNSS)-based locations, the advances in cloud computing, big, linked and open data and the propagation of internet and social media. The step towards sharing data needs to be considered and progressively developed, in order to enable service developers to provide connected travellers with the services they need and expect.

3.2. RIDE2RAIL

A key aspect of delivering more attractive services is by delivering end-to-end (or first- and last-mile) travel services that enable rail as their core mode of mobility. This can be challenging in a rural environment, where connectivity to rail is problematic. It is also relevant in urban or peri-urban environments where there may be poorer provision of public transit.

Contributing to Shift2Rail's IP4, RIDE2RAIL's overall objective is to develop an innovative framework for intelligent mobility, facilitating the efficient combination of flexible (ride-sharing) and scheduled transport services (rail, bus, and other public transport services), thus enhancing the performance of the overall mobility system. RIDE2RAIL should, in particular, address the first and last mile problem by offering a wider range of transit options, while harnessing the capacity of single occupancy vehicles, along with existing, or future, demand responsive transit.

RIDE2RAIL aims to integrate multiple (public/private/social) data sets and existing transport platforms for promoting an effective ride sharing practice of citizens, making it a complementary transport mode that extends public transport networks.

The objectives of the RIDE2RAIL project are:

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- To develop an innovative framework for intelligent mobility, facilitating efficient combination of flexible and scheduled transport services, integrating real-time information about public transport and ride sharing
- To create a tool that facilitates the comparison and the choice between multiple options/services classified by a set of criteria, for example environmental, travel time, comfort, cost
- To encourage carpooling (and ride sharing acceptance) as complementary for public transport
- To enhance the performance of the overall mobility system, reducing road congestion and environmental impact, reinforcing the mobility offer in rural and low-demand areas
- To combine travel offer classifications and software components, integrating them into existing collective and on-demand transport services
- To induct the access to high-capacity services thanks to easy-to-use multimodal and integrated travel planning, booking, ticketing and payment features
- To design, develop and test in four real demonstrators a set of software components for the IP4 ecosystem, including an advanced Travel Companion and the crowd-based Transport Service Provider
- To produce recommendations for replicability

3.3. Work Package 4 context

Work Package 4 of RIDE2RAIL will implement demonstrations of the RIDE2RAIL solution in four locations – Padua, Italy; Athens, Greece; Brno, Czech Republic; Helsinki, Finland. A critical aspect of these demonstrations is to understand their performance against the aims of the project, and in terms of supporting sustainability actions in these locations. It is therefore necessary to specify targets for the expected performance of the RIDE2RAIL deployment in these locations. These targets are specified as Key Performance Indicators (KPIs). Specifying a complete set of KPIs in a methodical manner allows a full understanding of the impact of RIDE2RAIL, and to define a set of mitigating actions should KPIs not be met during the course of the project. Ultimately, the KPIs will be used to inform the impact analysis for RIDE2RAIL (as calculated in WP5). These impact areas are;

1. increase the number of multi-occupancy vehicle trips, as opposed to single occupancy-vehicle trips
2. increase access to public transit for users in a rural and/or suburban setting
3. contribute to minimising emissions

The present document constitutes the Deliverable D4.1 “Demo implementation plans” in the framework of the WP4, task 4.1.

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4. OBJECTIVES

The present deliverable, D4.1 "Demo implementation plans", opens RIDE2RAIL activity of WP4. The aim of this document is the definition of implementation plans for the 4 sites involved in the demonstrations, which have the purpose to demonstrate RIDE2RAIL functionalities in a real-life environment. The four RIDE2RAIL demos are the following:

1. Padua
2. Brno
3. Athens
4. Helsinki

The demo implementation plans for the different demonstrators will be coordinated centrally at WP level and developed by local demonstration cluster groups with technical and operation partners involved. The local implementation plans are closely aligned with the results achieved in WP3 and the overall technical work plan and milestones.

Every plan is subdivided into four main sections:

1. **Activities and Stakeholder**: describing the list of activities required to run the demonstration,and the equivalent responsible. It includes the technical and organizational deployment tasks needed for the demonstration execution with the related RIDE2RAIL solutions and services and sets up a time line for the preparation and execution of the demonstration;
2. **User engagement.** The preparation of demonstration phase involves also the collaboration with local stakeholders, also through at least one local event per demo, for the engagement of the most appropriate users for the demo site.
3. **Demand and targets**: describing the potential demand and the target for the expected performance of the project deployment in the demo locations. The targets are specified as specific Key Performance Indicators (KPIs). The use of a proper complete set of KPIs in a methodical manner allows a full understanding of the impact of RIDE2RAIL. Ultimately, the identification of targets and KPIs will be used to carry out the impact analysis of RIDE2RAIL project (in WP5);
4. **Potential Risks**: identifying and assessing the potential of technical, legal, behavioural and organizational risks that may hinder the smooth implementation and execution of each demo. The identification of the complete set of KPIs allows to define a set of mitigating actions in case of the planned values could not be met during the course of the project.

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5. Demonstration sites snapshot

The chapter provides a brief presentation of each RIDE2RAIL demo by the description of the respective local situation and characteristics..

After the introductory snapshots per demo, all provided data and features are summarized in a general table splitted in:

- city or area analyzed;
- main features of the transport system;
- local environmental challenge;
- barriers to the use of public transport and ride sharing;
- partners and stakeholders involved;
- trip storytelling.

This background information will be used for further design and implementation of tests in the respective sites through a structured site-based transport data collection and stakeholders engagement.

5.1. Padua (IT)

The demo area is a 20 Km radius surrounding the urban center of Padua (Italy). The demo reflects the bi-folded purpose of the project, encompassing both the provision of a Travel Expert Service, able to support customers in any stage of the multimodal trip through a Travel Companion, and a crowd-based Travel Service Provider that aims to increase the train occupancy rate considering in particular non-peaking time scenarios. The demo will involve urban and regional mobility service providers in Veneto, both by rail, road and bus, as well as shared mobility options such as ride sharing in a multi-modal journey context, to complete the offer and adds flexibility and comfort to the trip and finally support a CO2 reduction. It represents a sustainable option that can be perceived as a continuation of the trip and an extended service in particular for the wide number of commuters that daily reach Padua from suburbs and rural areas with Public Transport. The enhanced Travel Companion should cover the consistent market demand for ride sharing, and any other sharing mobility services formed by workers and students interested in (i) reducing their transport expense leaving the private transport modality for the public one; (ii) decreasing their environment impact opting for eco-sustainable modalities of shared transport as ride sharing; (iii) easily access to the city center also in crowded period as for example during specific event.

FSTechnology, company owned by the Ferrovie dello Stato Italiane Group that is dedicated to technology and innovation, is one of the partner involved in the demo.Through commercial applications, as App Trenitalia and Viaggiatreno, and data managed by NUGO App, it can easily manage an integrated commercial platform for electronic ticketing, booking, infomobility.

Hence, FSTechnology shall test with its Travel Planning Application and Commercial Integrated Platform impact and commercial potentialities of the implementation of an intermodality train-ridesharing to reach city center of Padua coming from suburban, rural and industrialized areas around Padua.

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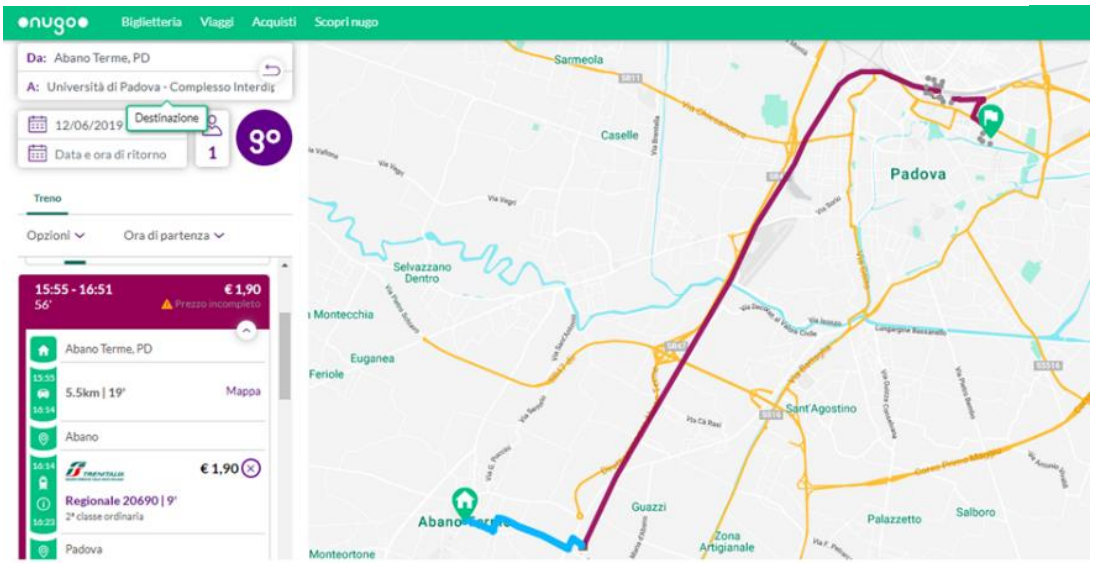

Figure 1: travel proposal by Nugo App

5.2. Brno (CZ)

Railway is the backbone of the transport network in the South Moravian region.There are various local hubs used by daily commuters while traveling to work in the city of Brno (CZ). The goal of the demo is to encourage rail commuters from suburbs to city of Brno to share the capacity of their cars with other travellers. They often travel by their own private cars from their homes to the closest local transport hub, where they transfer to any of the public transport means. Certainly, most of these commuters travel alone, each in a separate car. One of the specific challenges of the project is to encourage such lonely car drivers to share the capacity of their cars with other travellers.

Figure 2 Moravia region

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Thanks to the cooperation with KORDIS, confirmed also in writing through the Letter of Support, we assume the demonstration within the territory of the whole South Moravian region.

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5.3. Athens (GR)

The objectives of the demo are: a) to examine and provide input on smart multimodal integration for the PT-rideshare mode, whereas ridesharing works as a complement to PT (i.e. feeding it) for the first/last mile part of a journey, thus increasing both car occupancies and urban rail ridership, when linking low- and high-density areas of Attica b) to serve as test sites for the platform assessment taking into account new forms of shared mobility, c) to evaluate an innovative concept of multimodality, such as that enabled by making ride-sharing solutions available at parkings.

The demo area will be the 20km-long air-rail corridor between Athens Airport – Doukissis Plakentias (metro station & P+R), along AttikiOdos toll road. The metro and suburban rail serves also 3 intermediate stations in Eastern Attica: Pallini, Kantza, Koropi. Two test sites are foreseen: 1. Paid P+R with 500 parking spaces (PS) at the urban gate Doukissis Plakentias (0,5€/hour up to max. 6€/12-24 hours) about 12kms from the city centre Syntagma place, 2. Free municipal P+R with 300 PS at the extra-urban Koropi station, 13kms south of D. Plakentias station. 50 ridesharing lots will be allocated for the project's scope in each site.

Stated Preference (SP) experiment will involve i.a.250 solo parkers and bus feeder users at both test sites to assess ridesharing acceptance as access/egress mode to rail. The survey, to be conducted with the support of a specialized provider in Greece, aims to identify the users that use park & ride, their preferences and their behaviors/new mobility patterns. Main segmentation by trip purpose: 1. Potential riding commuters matched to driving commuters, 2. Potential occasional riders matched to all drivers (commuting and occasional). Other segments refer to income, age, gender (drivers & riders), employment status, worktime flexibility (riders). Generalised cost (GC) to be shared by ride-mates refers to fuel, parking, toll costs as well as to value of time including driver's detour time and rider's waiting time. The experiment is conducted separately for ride offers and ride seekers.

Volunteers for the ultimate demo to test the RIDE2RAIL Travel Companion platform maybe recruited among the SP participants. Screening of SP sample for possible O-D pairings.

5.4. Helsinki (FI)

The Helsinki demo aims to demonstrate the Ride2Rail functionalities in a real-life environment. The focus is on improving access to rail, in particular metro, for the first and last mile. It aims to cater to the mobility needs of people in Helsinki's most Eastern neighborhood Vuosaari, who are not served sufficiently by the current bus lines. The demo will focus on on-demand services, taking into account new forms of shared mobility and evaluating innovative concepts of multimodality, such as the use of automated vehicles (Robobus).

Vuosaari is one of the fastest-growing areas in Helsinki. The number of inhabitants has been increasing rapidly since early 1990s and it continues to grow as new residential areas are being built. As of 2017, the population was 38.155. The Vuosaari district covers a large area of 17.07 km² and is geographically the largest district in the city of Helsinki. It has several

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lowly populated areas. The district does not have any train stations, but it is served by two metro stations: Rastila and Vuosaari. The metro was used by 67.5 million passengers in 2017 (Helsinki, overall). The metro stations are served by at least 5 regular bus lines.

In addition, in the demo area of Vuosaari, seven so-called "Neighborhood routes" are operated with minibuses that can, in addition to designated bus stops, stop anywhere along the route, within traffic regulations. These service routes are designed to serve, in particular, the elderly and mobility impaired people. The routes have been tailored to accommodate the needs of these special need groups, but they can be used by anyone. The routes are operated with low-floor minibuses. Neighborhood routes mainly operate Monday to Friday during the daytime. They accept the same tickets as other public transport services.

The demo will contain two parts, which both aim at reducing single-occupant private car trips. Forum Virium Helsinki is the demo leader, closely supported by Metropolia University of Applied Science:

- Testing the use of an automated shuttle bus in more rural areas, as part of a multi-modal last-mile journey, integrated in relevant travel planning applications

- Testing the RIDE2RAIL ridesharing platform, as much as possible integrated with existing

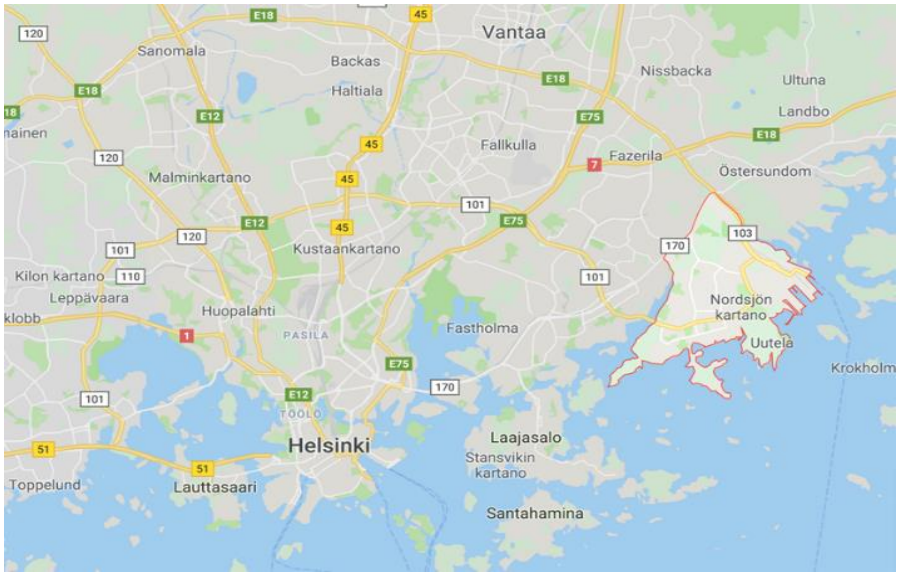

Figure 3 Helsinki demo area

mobility

In Table 1 the main features and common drivers of the demos are reported. The table shows – besides the peculiarities of each demo roll-out, target area and environmental challenge – how the panel of RIDE2RAIL demos addresses the multi-faceted challenge of attracting passengers and trips to shared transport service (and ultimately public transport), also proposing different trip storytellings with the aim of representing the target users benefitting from RIDE2RAIL functionalities.

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	Padua	Brno	Athens	Helsinki
City or area	Padua urban and suburban areas and extra urban/rural areas, Rovigo urban Area and Rovigo Province within Veneto Region. Total pop. **638,000**	Brno and South Moravian Region (pop. **1.2 Million**)	Attica Region – Metropolitan Athens Area, incl. urban (Athens-high urban density), suburban (Northern Attica) and extra-urban/rural areas (Eastern Attica). Pop. **4.1 Million**	Greater Helsinki Metropolitan Area (pop. **1,268 Million**)
Main features of the transport system	Padua area is serviced by Train, Bus, Tram operated by Trenitalia, Busitalia Veneto (FSI Group) and other operators. Main regional train stations: Padova Campo di Marte, Interporto and Ponte di Brenta. Trenitalia operates in Veneto region with a train fleet of 177 units serving 167.682 passengers per day with local and regional trains. In particular, the Padova-Venezia Mestre Line provides mobility to 32.000 commuters per day. Busitalia Veneto operates 640 buses and 16 trams covering 25 million km/year. Busitalia offers also the innovative Night Bus service, that allows on demand night mobility services booked through the use of a specific Door2Door Application. In this transportation framework, Trenitalia and Busitalia Veneto manage a seamless public transport aiming at improving the customers offering. Private cars are the main competitors	Brno has the largest trolleybus network in Europe consisting of 140 vehicles that cover 94 km routes, 45 million passengers a year.	The region is serviced by 5 PT modes: metro, bus, trolley-bus, tram and suburban railway. Athens Metro: 62 km-long, radial structure; connecting major urban gates. The extra-urban area is served by interurban buses KTEL terminating at the periphery of the urban area. The car occupancy for commuting in Athens amounts to 1.1. Thus ridesharing with 2+ car occupancy would contribute to road and parking decongestion.	A very complete panel of services: - 11 tram routes (128 vehicles) -2 metro routes (47 vehicles), running from West to East and vice versa -290 commuter bus routes (1457 vehicles) -2 ferry lines -14 commuter train routes (117 vehicles) -Shared city bike service (2550 bikes in total) - Shared e-scooter service No commercial carpooling / ridesharing companies in Helsinki

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	Padua	Brno	Athens	Helsinki
Environmental challenge	Padua is in Po Valley area, one of the most polluted in Europe. Padua signed the "Covenant of Mayors" agreement, targeting a reduction of CO2 emission by 2030 by 40%.	n.a.	- Reduce GHG emissions/ energy consumption through ridesharing & metro use - Reduce traffic and parking congestion in CBD areas through ridesharing & metro use	One fifth of Helsinki's emissions comes from traffic. The City's ambitious goal is to reduce traffic emissions by 69% from the 2005 level by 2035 (-60% from the level of 2015: 363 kt CO2e). One key requirement for reaching this goal is that people reduce their kilometres travelled by car and choose low-emission methods of transport.
Barriers to the use of PT and ridesharing	Main potential barriers, to be investigated further during the project are: - The costs of Ride Sharing services for the passengers; - Lack of car sharing services available (e.g. 1,19 car sharing vehicles available in Padua per 1000 inhabitants) - Difficulties in/unfamiliarity with online reservations platforms of Ride Sharing - Massive use of bike (between 150.000 and 160.000 bike trips per day, i.e. 20% of daily total trips), which covers a significant segment of potential demand already..	Ride sharing services are quite new and not widely used in the Czech Republic. Thanks to public transport subsidies, every village, even in a rural area, is served by public transport. Therefore, integration of private transport into a public transport ecosystem is not supported by the regional government, as it is considered a competitive travel mode. However, the level of available public transport services is not always sufficient during the day, so rural residents must use their private cars for daily commuting in some cases.	Main potential barriers, to be investigate further during the project are: - time divergence, worktime rigidity & tight traveltime budget, detour intolerance of driver, walk-time-to-meeting-point intolerance of rider - privacy & security concerns, - opposite gender of ride-mates, - less than critical mass of offers & demands for O-D pairings, - oversaturated P+R hubs, - low tech-savvy population & platform inconvenience,	In the Finnish Transport Agency's (FTA) study of travel chains from 2018, it was highlighted that multi-phase planning and challenges of buying a ticket are the most hindering factors of the trip. Information is often fragmented, and passengers do not often have a clear understanding or enough information how public transportation works (especially if they are heading to an unfamiliar city). The lack of proper information seems to be one of the biggest factors causing stress for passengers.

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	Padua	Brno	Athens	Helsinki
Partners and stakeholders involved	FST, CEF Companies within FSI Group, i.e. Busitalia Veneto (bus operator). Trenitalia and NUGO, the application for shared mobility that provides planning, information, one-stop-shop services through a network of strategic agreements with local TSPs.	OLTIS, UNIZA Support (LoS) from KORDIS, responsible for the Integrated Public Transport in the South Moravian Region	CERTH, AMETRO Collaboration agreement envisaged with OASA (Local Transport Authority), POLIS PARK (parking operator) and municipalities of Agia Paraskevi, Penteli, Vrilissia, Paiania, Pallini and Koropi, if willing to cooperate.	FVH, METROPOLIA - HSL (public transport authority) and HKL (Helsinki City Transport; metro operator), committed to provide access to data and the APIs required for demonstration - City of Helsinki Transportation department - Traficom (national transport agency, with regard to legal aspects) - External parties potentially involved are ViaVan and Kyyti (private shared mobility operators)
Trip storytelling	Carlo is a student living about 20 Km far from the center of Padua. He commutes daily from Abano Terme to Padua: private car trip from home to the railway station of Abano Terme (5,5 Km) + public railway transport to Padua. He needs to improve his travel experience in terms of customer care, flexibility and price considering extra-urban and city-to-city connections.He needs also to go shopping and reach his friends in Padua during the week using the train in off-peak time and in weekends	Veronika is a commuter living in a rural area of South Moravian Region. She commutes to Brno by train from the local hub nearest her hometown. She would be available to share her car to save money and leave some days the car free to her family during the day.	Marietta is an employee living in Koropi. She commutes daily from Koropi to Zografou. She needs to go shopping after work. On her return trip to home, she looks for a bus ride to reach Evangelismos metro station. After shopping in the vicinity, rides on the metro to Doukissis Plakentias station in the late evening when bus service level is low. Thanks to the Travel Companion, she uses a carpool driver to reach home.	Pekka is an employee commuting daily from the suburban neighborhood in the eastern Vuosaari district to Helsinki, mainly by metro. Due to the remoteness of the nearest bus station, Pekka takes his car to the metro station. He uses to drive alone. Now, he walks to the robot shuttle stop and takes a shared and automated ride to the metro station. On evenings, after coming from the gym, when the robot bus does no longer operate, he uses the Travel Companion to find a shared ride to home.

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	Padua	Brno	Athens	Helsinki
Main expectations from RIDE2RAIl	Offering a seamless experience of multimodal travel is the key to promote the modal shift towards public and shared mobility and promote sustainable mobility. Thanks to the Travel Companion, Ensuring customers' need to feel in control of their own trip and public transport needs to be perceived as easy and flexible as possible. The availability of services at your fingertips and when they are needed is relevant for urban mobility as well as for extra-urban and city-to-city connections.	The national journey planner IDOS, winner of the 1st Smart Mobility Challenge organized by the European Commission in 2012, constantly belongs among top 5 most popular webservices in the Czech Republic. Thanks to the modules expected to be developed within the project, it could introduce a completely new approach in the field of searching for the combined intermodal transport connections in several different mutually linked timetables, uniquely extended by the offer of the virtual crowd-based TSP. This would contribute to the seamless travel experience of public transport customers in the referred region.	- Interconnecting carpooling and urban rail - Optimising the designation of carpooling lots in P+R hubs. - Capturing short-distance journeys to carpooling - Tackling low bus feeder service level to the P+R hubs in Attica region, thus increasing the carpooling propensity - Exploiting RIDE2RAIL methodologies and the platform will be utilized by low density municipalities in the future for developing new mobility services and for running associated scenarios that will increase metro system ridership and carpooling as access/egress mode.	- Improved connection with rural or peri-urban areas through ride-sharing and shared automated services. -Better access to rail and public-transport as part of a multi-modal travel experience -Reduced barriers to the use of shared modes of transport -Profiling of both travellers and potential ride-sharing service providers to collect their preferences related to mobility in general and shared modes in particular -Develop, test and evaluate crowd-based travel services for the first time in Helsinki

Table 1 Demo site features

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6. GUIDELINES FOR IMPLEMENTATION PLANS

This section provides guidelines followed by responsible partners to draft implementation plans of each demonstration. Implementation plans include relevant data of each demo, such as:

- activities required to run all demo phases;
- local stakeholders involved, strategy for stakeholders' involvement, and roles in the demo activities;
- risks and risk management for all the demo phases;
- potential demand and targets, with corresponding indicators.

6.1 Section 1: Activities and Stakeholders

This section defines the guidelines to be followed for the definition of the activities and the identification of stakeholders, necessary for the execution of the demo.

Each demo consists of the following four phases[1]:

Demo preparation (M6-24)

This phase is aimed at planning and providing a checklist of all technical and organisational activities needed for deploying the demonstration execution.The preparation of the implementation plan (D4.1) starts the demo preparation phase, and shall include the timeline for the preparation and execution of the demonstration. The preparation will identify the collaboration with local stakeholders also through at least one local engagement event per demo.

Demo implementation (M25-30)

Within this task the RIDE2RAIL components will be technically set up in the demonstrators. The related software tools will be customised and integrated in the local services (when needed). Corresponding frontends such as smartphone apps, displays and tools for the planning concepts will be deployed. To ensure a highly accessible and performing demonstration, the system infrastructure and software integration will be tested when needed.

Demo execution (M30-36)

Following the indications of the implementation plans, the demonstrations will be executed in the demo sites and the RIDE2RAIL Crowd-based TSP and Travel Companion enhancements will be operated. The demonstration will be executed in a 8-months period

[1] Timelines amended as per the Grant Agreement Amendment currently under approval

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covering different and increasing levels of end user involvement (e.g. friendly user test, end user tests).

Demo monitoring (M6-36)

The demo monitoring will be prepared in close cooperation with Task 5.1, that will propose KPIs performance indicators and targets to be validated in the present task through interaction between WP5 leader and demo responsible partners. Targets and baseline values will form the base for an integrated framework of KPIs allowing for cross-site comparison and assessment. Demo monitoring will consist of the following phases, common to all demos:

- Indicators and KPI validation, for each demo (M12)
- Definition of monitoring tools (questionnaires, reporting and data collection templates, etc.) and provision of a monitoring manual with instructions about features and variables to be monitored (M24)
- Monitoring report, conclusions and lessons learnt (M36)

Actions (see examples in table 2) connected to each demo phase have been identified as clustered in the following table, indicating partners and other stakeholders involved:

Phase	Actions	Timeframe	Responsible partner	Other stakeholders involved
1. Preparation	1.1 Stakeholders involvement 1.2 Preparatory meetings ...			
2. Implementation	2.1 software integration ...			
3. Execution	3.1 ...			
4. Monitoring	4.1 Data collection ...			

Table 2: Demo phases, actions and stakeholders involved

6.2 Section 2: User Engagement

Each demo preparation will undertake a specific set of actions for the engagement of users. Engagement strategies are crucial actions necessary to ensure a fruitful execution of RIDE2RAIL pilots at each demo site. User engagement plans will be prepared during the preparation phase of the demos. This section reports user engagement actions already prepared or under preparation by each demo responsible partner, together with significant actions planned to ensure the involvement of relevant technical and local public transport stakeholders.

6.1.1.Padua (IT)

The following user and stakeholder engagement activities are planned or have been undertaken at Padua demo site:

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- Busitalia: round tables to identify and ensure the availability of data necessary for test concept and future implementation;
- NUGO: meetings to clarify the possibility to use the journey planner.
- Trenitalia: meetings to clarify the possibility to access data and to confirm the involvement as direct project stakeholder.
- Testers: involvement of three categories of testers in cooperation with Cà Foscari University of Venice: students, workers managed by the mobility managers of the University, transport professionals.
  For their involvement a specific testers engagement plan has been drafted, including:
  - Proposal for incentives
  - KPIs
  - Testers group breakdown
  - Stakeholders – testers engagement in surveys
  - Greographical area
  - Timeline
  - Risks for engagement

6.1.2. Athens (GR)

Engagement actions to develop at Athens demo site:

- Preparation of dedicated letters to Municipalities involved in the project demo: Koropi, Agia, Paraskevi, Penteli, Vrilissia, Pallini, Paiania. Letters will also be used to invite municipalities to virtual and/or physical meetings (if possible) by the end of June 2021.
- Translation of the project presentation brochure and creation of municipality-friendly presentation of actions to carry out with them.
- Stated Preference (SP) experiment that involves solo parkers and bus feeder users in all test sites to assess ridesharing acceptance as access/egress mode to rail. The survey will be conducted with the support of a specialized provider in Greece.

6.1.1.Helsinki (FI)

Engagement actions to be developed at Helsinki demo site:

- Engagement and negotiations with local public transport authority and national transport regulation authorities.
- Identification of pilot area requirements and arrangements of the infrastructure with related sakeholders.
- Technology providers engagement and the procurement of the automated shuttle.

6.3 Section 3: Demand targets

The main purpose of this section is setting the target of each demo, i.e. the users involved in the demo, the infrastructure and vehicles involved, and the main results expected from the each demonstration.

Targets have been set starting from the potential demand indicated by partners in the project Application (DoA). Such data have been reported in the corresponding tables. The objective of this section of the implementation plan is to fine-tune data on potential demand

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and convert them into target values, to set the scope of each demo (e.g., the number of passengers involved and using RIDE2RAIL solutions, the number of trips surveyed, the number of trips attracted to rail or multimodal solutions).

Target values(see examples in table 3) connected to each relevant indicator have been identified by partners responsible for each demo, as in the following table.

It has to be reminded that the final definition of indicators and target will be provided in D4.2.

Indicator	Potential demand	Target
Passenger*Year	80,000 Passenger Trips	7,000 Passenger Trips
N° of parkings reserved for car pooling	2000 parking lots	125 parking lots

Table 3 Demand target - examples

6.4 Section 4: Potential Risks

The scope of this section is to identify a list of risk factors that may occur during each demo phase indicated in 6.1.Partners responsible for each demoshould provide a short description of each risk, and assess the following factors associated to each risk:

- S=Severity
- O=Occurence
- ND=Non-Detectabilty
- I=Irrecoverable

These factors are fundamental for the calculation of the value to be associated with each identified risk. The scale of values to be associated with the parameters is shown in the following table:

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Figure 4 Scale of factor values

A value ranging within a 1-10 scale have been assigned to each risk factor for each demo. The higher is the value assigned, the higher is the relevance of the risk, as perceived by the responsible of the demonstration.

The Risk Priority Number (for each risk category) have been calculated by the following equation:

$$RPN = S \times O \times \frac{ND+I}{2}$$

where:

- S=Severity
- O=Occurence
- ND= Non-Detectabilty
- I=Irrecoverability

Examples of risks, connected phase, values of factors (S-O-ND-I), risk priority number and mitigation strategy connected are reported in the following table.

Risk	Phase	S	O	ND	I	Risk Priority Number	Actions to be taken
Accuracy and level of update of the data is not sufficient		3	3	4	3	31,5	Collect updated data from transport providers and timely update them
Algorithm accuracy is not sufficient		10	8	3	4	280	Increasing failure detection speed and probability

Table 4 Risk analysis

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7. IMPLEMENTATION PLAN: PADUA

The demo has the purpose to demonstrate RIDE2RAIL functionalities in a real-life environment, a 20 Km area surrounding the city of Padua (Italy) with regular commuter flows from/to suburban and rural areas. An application with a Travel Companion and the Crowd-based TSP will be made available to a group of persons from diverse targets. RIDE2RAIL features could be integrated with the existing travel planning application (NUGO) provided by Trenitalia. This will allow users to receive recommendations to improve their mobility experience in all trip related phases, as well as the organization of dedicated services (such as ride sharing, bus shuttles on demand peaks). The demo will involve urban and regional (rail and bus) mobility service providers in Veneto Region, as well as shared mobility options such as ride sharing in a multi-modal journey context. Target users will be commuter workers and students.

The following table reports actions and stakeholders connected to each phase of the demo. It must be filled in by the partners according to the indications provided in Section 6.1.

Phase	Actions	Timeframe	Responsible partner	Other stakeholders involved
1. Preparation	1.1 Preparatory meetings to analyze and understand RIDE2RAIL architecture that will interact with Demo Environment 1.2 Analysis of specifications of RIDE2RAIL Architecture, on the base of 1.1 1.3 Planning by of specific meetings to support Demo integration in the implementation stage to guide the activity from functional and technical point of view 1.4 Stakeholders involvement (e.g. BusItalia, Nugo, Trenitalia) 1.5 Definition of Testers Engagement Plan on the base of first responses on the dissemination channel involved in D2.1 and D2.2 Survey	1.1 M6-M9 1.2 M9-M24 1.3 M6-M24 1.4 M6-M24 1.5 M6-M9	FST with the collaboration of CEFRIEL, POLIMI, EURECAT	BusItalia Nugo Trenitalia Testers
2. Implementation	2.1 Software integration of Demo Testing with RIDE2RAIL Architecture 2.2 Meetings/Webinars to support Demo integration with RIDE2RAIL Architecture on the base of 1.3 2.3 Monitoring of technology integration during the implementation phase 2.4 Intial Engagement activities of testers considering plan defined in 1.5	2.1 M25-30 2.2 M25-30 2.3 M25-30 2.4 M25-30	FST with the collaboration of CEFRIEL, POLIMI, EURECAT	BusItalia Nugo Trenitalia Testers
3. Execution	3.1 Execution of DemoTesting with real passengers involved in the intermodal journey with testers involved through the activities started in 2.4 3.2 Collection of Data Testing 3.3 Monitoring of the Execution of the Demo	3.1 M31-36 3.2 M31-36 3.3 M31-36 3.4 M31-36	FST with Collaboration of EURECAT	BusItalia Nugo Trenitalia Testers

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	3.4 Monitoring of technology integration during the execution phase			
4. Monitoring	4.1 Production of Demo Testing outcomes (e.g. reports) 4.2 Demo performance measurement 4.3 Performance KPIs show off	4.1 M36 4.2 M31-36 4.3 M36	FST with the collaboration of FIT and UNEW	BusItalia Nugo Trenitalia Testers

Table 5 Activities and stakeholders for Padua demo

The target values of the relevant indicators of the demonstration have been set and described in the following table. As reminded in Chaper 6, the target value of each indicator represents the scope of the demo, e.g. the number of passengers involved and using RIDE2RAIL solutions, the number of trips surveyed, the number of trips attracted to rail or multimodal solutions, etc. The following table reports the potential demand for the demo, as assessed in RIDE2RAIL DoA, and the newly assessed targets for the same indicators and for new ones.

The final list of indicators and targets will be provided in D4.2.

Indicator	Potential demand	Target
Passenger/Year	270,000	t.b.d.
Commuter trips/year	90,000	t.b.d.
Private car trips*year attracted to rail/ride sharing	70,000	t.b.d.
N° of trips managed using Ride 2 Rail platform	-	t.b.d.
Growth of multimodality in the Demo Testing Area	13% (expected in 10 years)	1% (expected in 1 year)
Average passengers per day in Demo Testing Area	76.752	7.310 (Passengers interested in testing RIDE2RAIL services)
Nr. of trips surveyed	60.000	6.000 (Considering a sample of 200 testers)
Incremental traffic by train due to the use of Ride2Rail (passengers/day)	13.000	1.300
Duration of selling session of the integrated transport service	n.a.	t.b.d.
Service Provider Time to market: how much time the Service provider needs to integrated its single offering in the trip offering of RIDE2RAIL when asked by the passenger	n.a.	t.b.d.
Reselling duration: time to resell a solution after the passenger decide to change its trip planning and opt for another transport	n.a	t.b.d.

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services of the portfolio of trip offering services		
Number of after sale: number of trip offering re-planned after a customer has paid for a transport service that it needs to change	n.a	t.b.d.

Table 6 Demand targets of Padua demo

The following table include all risk factors connected to the various phases of the demo. Risks are ranked by their "Risk Priority Number" (see 6.3) value, as calculated following the self-assessment of the value of each risk factor made by demonstration responsible partners.

Risk	Phase	S	O	ND	I	Risk Priority Number	Actions to be taken
Software Release Delay	Implementation	8	5	5	5	200	Definition of clear and consistent Software Release Plan
Difficulties to engage stakeholders in testing activities (also due to the decrease of demand for public transport following Covid-19 emergency	Execution	10	5	5	3	200	Definition of clear stakeholder engagement activities in the Preparation Phase
Technology Incompatibility	Implementation	10	3	5	8	195	Collection of data concerning technology environment of technical partners
Software deployment Quality Plan	Preparation	5	8	5	2	140	Definition of Software quality plan with robust featureas and constrains
Identification of an agreed set of relevant KPIs and Measurement indicators between Demo Leader and Technical partners	Monitoring	8	5	2	5	140	Organization of meetings and KPIs plan to share concerns and inputs about relevant KPIs and measurement on the base of the analysis of RIDE2RAIL Architecture
Limited Support in the Integration of RIDE2RAIL Architecture in Demo Environment	Implementation	10	3	1	2	45	Organization of periodic integration webinars and meeting during phase2

Table 7 Risk analysis for Padua demo

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8. IMPLEMENTATION PLAN: BRNO

The demo has the purpose to encourage RIDE2RAIL users, such as lonely car drivers, to share the capacity of their cars with other travellers. The demo Area involves the South Moravian region, where there are various local hubs used by daily commuters while traveling to work in the city of Brno (CZ). They often travel by their own private cars from their homes to the closest local transport hub, where they transfer to any of the public transport means. Target users will be commuter workers and students.

The following table reports actions and stakeholders connected to each phase of the demo. It must be filled in by the partners according to the indications provided in Section 6.1.

Phase	Actions	Timeframe	Responsible partner	Other stakeholders involved
1. Preparation	1.1 Analysis of demo area and stakeholders 1.2 Identification of demo users 1.3 Identification of potential barriers 1.4 Analysis of transport flows 1.5 Cooperation with stakeholders 1.6 Proposal of implementation methodology	1.1 M6-24 1.2 M6-24 1.3 M6-24 1.4 M18-24 1.5 M18-24 1.6 M18-24	UNIZA	KORDIS
2. Implementation	2.1 Application of implementation methodology 2.2 Removal of potential barriers 2.3 Integration of software components 2.4 Testing of necessary infrastructure, devices and software	M25-30	OLTIS	KORDIS
3. Execution	4.1 Start of demo execution 4.2 Analysis and elimination of operational problems 4.3 Iterative execution updates	M31-36	OLTIS	KORDIS
4. Monitoring	4.1 Definition of monitoring tools and indicators 4.2 KPI validation and data collection 4.3 Data processing and analysis 4.4 Report compilation	4.1 M6-24 4.2 M31-36 4.3 M31-36 4.4 M31-36	UNIZA	KORDIS

Table 8 Activities and stakeholders for Brno demo

The target values of the relevant indicators of the demonstration have been set and described in the following table. As reminded in Chaper 6, the target value of each indicator represents the scope of the demo, e.g. the number of passengers involved and using RIDE2RAIL solutions, the number of trips surveyed, the number of trips attracted to rail or multimodal solutions, etc. The following table reports the potential demand for the demo, as assessed in RIDE2RAIL DoA, and the newly assessed targets for the same indicators and for new ones.

The final list of indicators and targets will be provided in D4.2.

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Indicator	Potential demand	Target
Trips surveyed during the demo	1200	tbd
Volunteers testing RIDE2RAIL	200	tbd
Private car commuters	2000	100
Trips during the demo	4000/day	800
Rails and bus commuters	1500	40
Trips during the demo	3000/day	100

Table 9 Demand targets of Brno demo

The following table include all risk factors connected to the various phases of the demo. Risks are ranked by their "Risk Priority Number" (see 6.3) value, as calculated following the self-assessment of the value of each risk factor made by demonstration responsible partners.

Risk	Phase	S	O	ND	I	Risk Priority Number	Actions to be taken
Impact of worldwide COVID-19 pandemic to commuters preferences	Execution	8	5	1	10	220	Explaining the benefits, encouraging commuters to ride sharing
Delay of SW components implementation	Implementation	6	5	5	5	150	Improving cooperation with WP3 and other collaborating projects leaders responsible for SW implementation and its integration into the IP4 ecosystem
Language barrier	Implementation / Execution	8	6	3	3	144	Translation into Czech language or narrowing of the target group
Reluctance to change travel habits	Execution	7	3	1	6	73,5	Explaining the benefits, encouraging commuters to ride sharing
Poor internet coverage in rural areas	Execution	8	3	5	1	72	Change of demo location or reporting opportunity for improvement
Change of demo area conditions	Preparation	7	3	1	1	21	Change of demo location

Table 10 Risk analysis for Brno demo

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9. IMPLEMENTATION PLAN: ATHENS

The objectives of the demo are: a) to examine and provide input on smart multimodal solutions integrating carpooling (thus increasing both car occupancy and rail ridership), demand-responsive carpool connections with rural Attica parts, integration of carpooling road pathswith the urban rail network in conjunction with a nexus of peripheral urban rail hubs; b) to serve as test site for the platform assessment taking into account new forms of shared mobility; c) to evaluate innovative concepts of multimodality.

The demo area will be the 20km-long air-rail corridor between Athens Airport - Doukissis Plakentias (metro station & P+R), along Attiki Odos toll road. Metro and suburban rail serve also 3 intermediate stations in Eastern Attica: Pallini, Kantza, Koropi.

The following table reports actions and stakeholders connected to each phase of the demo. It must be filled in by the partners according to the indications provided in Section 6.1.

Phase	Actions	Timeframe	Responsible partner	Other stakeholders involved
1. Preparation	1.1 Stakeholder identification 1.2 Stakeholder outreach 1.3 Preparatory meetings with stakeholders 1.4 Cooperation agreements with participating stakeholders (COLAs)	1.1 Finalized 1.2 Ongoing – M20 1.3 Ongoing – M21 1.4 Ongoing – M21	CERTH, AMETRO	POLIS PARK, Municipalities of Koropi, AgiaParaskevi, Penteli, Vrilissia, Pallini, Paiania
2. Implementation	2.1 Software tools customization & integration with local service 2.2 Smartphone app deployment, internal test 2.3 App usability testing, performance user test 2.4 Testing of infrastructure & software integration and debugging	M25-28	CERTH, AMETRO with the collaboration of EURECAT, FSTECH	
3. Execution	3.1 Demo outreach&recruitment 3.2 Demo execution (8-month period) with incremental levels of end-user involvement	3.1 M24 – M30 3.2 M28 – M35	CERTH, AMETRO	POLIS PARK, Municipalities of Koropi, AgiaParaskevi, Penteli, Vrilissia, Pallini, Paiania
4. Monitoring	4.1 Definition of monitoring tools 4.2 Indicators & KPI validation 4.3 Data collection 4.4 Data processing 4.5 Monitoring report	4.1 M6 – M30 4.2 M18 – M36 4.3 M28 – M34 4.4 M32 – M35 4.5 M32 – M36	CERTH AMETRO with the collaboration of FIT, UNEW,	

Table 11 Activities and stakeholders for Athens demo

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The target values of the relevant indicators of the demonstration have been set and described in the following table. As reminded in Chaper 6, the target value of each indicator represents the scope of the demo, e.g. the number of passengers involved and using RIDE2RAIL solutions, the number of trips surveyed, the number of trips attracted to rail or multimodal solutions, etc. The following table reports the potential demand for the demo, as assessed in RIDE2RAIL DoA, and the newly assessed targets for the same indicators and for new ones.

The final list of indicators and targets will be provided in D4.2.

Indicator	Potential demand	Target
Passenger trips estimated	80,000 trips (30,000 commuter trips) p.a.	2,000 p.a.
Maximum number of car trips potentially attracted to rail/ride sharing	40,000 p.a.	200 p.a.
Number of parking spaces designated for Ride2Rail at the urban gate D. Plakentias	50	20 (during demo)
Number of parking spaces designated for Ride2Rail at the extra-urban Koropi station	50	5 (during demo)
Number of app users during demo		50
Number of carpool trips performed with the app during demo		10

Table 12 Demand targets of Athens demo

The following table include all risk factors connected to the various phases of the demo. Risks are ranked by their "Risk Priority Number" (see 6.3) value, as calculated following the self-assessment of the value of each risk factor made by demonstration responsible partners.

Risk	Phase	S	O	ND	I	Risk Priority Number	Actions to be taken
Data collection issues (e.g. errors in individual data items, systematic errors, problems with individual site performance)	Monitoring	10	5	8	10	450	Data collection monitoring
Persistent COVID-19 impacts on travel demand & supply	Execution	8	5	1	10	220	Use of mock data/modeling/simulation
Data processing issues (loss of raw data)	Monitoring	10	3	8	10	216	Regular back-up of data

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Unresolved app bugs	Implementation	8	3	5	1	72	Proper bug reporting & debugging monitoring; Regular use of app by all partners to identify pending bugs
Limited user participation	Execution	8	8	1	1	64	Use of mock data/modeling/simulation
Limited stakeholder participation (e.g. no COLAs)	Preparation	4	3	1	6	42	Assignment of awards to use POLIS PARK
Software tools customization & integration with local service, low app usability	Implementation	7	3	1	1	21	Reduced demo functionalities

Table 13 Risk analysis for Athens demo

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10. IMPLEMENTATION PLAN: HELSINKI

The Helsinki demo focuses on improving access to rail and metro, for the first and last mile of commuter journeys. The demo addresses the mobility needs of people in Helsinki's most Eastern neighborhood Vuosaari, who are not served sufficiently by the current bus lines. The demo will focus on on-demand services.

The Vuosaari district covers a large area of 17.07 km² and is geographically the largest district in the city of Helsinki. It has several lowly populated areas. The district does not have any train stations, but it is served by two metro stations: Rastila and Vuosaari. The metro was used by 67.5 million passengers in 2017 (Helsinki, overall). The metro stations are served by at least 5 regular bus lines.

The demo will include two parts, which both focus on reducing single-occupant private car trips. Forum Virium Helsinki is the demo leader, closely supported by Metropolia University of Applied Science:

- Testing the use of an automated shuttle bus in more rural areas, as part of a multi-modal last-mile journey, integrated in relevant travel planning applications
- Testing the RIDE2RAIL ridesharing platform, as much as possible integrated with existing mobility platforms (e.g. public transport routeplanner)

The following table reports actions and stakeholders connected to each phase of the demo. It must be filled in by the partners according to the indications provided in Section 6.1.

Phase	Actions	Timeframe	Responsible partner	Other stakeholders involved
1. Preparation	1.1 Stakeholder mapping 1.2 Stakeholder workshops and (at least one local engagement event) 1.3 Route selection; stage location; charging 1.4 Planning and providing a checklist of all technical and organisational activities needed for deploying the demonstration execution	1.1 M6-M12 1.2 M6 - M12 1.3 M6 - M19 1.4 M6 – M12	FVH / Metropolia	HSL, Traficom, city traffic planners, shuttle provider
2. Implementation	2.1 Technical set-up of RIDE2RAIL components. 2.2 Customisation of software tools and Software integration 2.3 Route selection, planning, mapping, preparation 2.4 Transport of vehicle, storage, charging	2.1 M24 – M28 2.2 M24 – M30 2.3 M6 – M19, M28 – M30 2.4 M6 – M24	FVH / Metropolia	HSL, Traficom, City traffic planners, shuttle provider
3. Execution	3.1 Operation of crowd-based TSP and Travel Companion enhancements 3.2 Operation of the shuttle	3.1 M29 – M33 3.2 M21 – M24	FVH / Metropolia	HSL, Traficom, City traffic planners,

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	3.3 Communication on demo and stakeholder involvement. Incl group / site visits	3.3 M21 – M23, M28 – M33		shuttle provider
4. Monitoring	4.1 Validation of indicators and KPIs 4.2 Establishing baseline and targets 4.3 Data collection as per requirements of Travel Companion and WP Evaluation / Impact leader 4.4 User acceptance / passenger satisfaction survey? Possible use	4.1 M6 – M16 4.2 M6 – M16 4.3 M21 – M24, M29 – M33 4.4 M21 – M24, M29 – M33	FVH / Metropolia	HSL

Table 14 Activities and stakeholders for Helsinki demo

The target values of the relevant indicators of the demonstration have been set and described in the following table. As reminded in Chaper 6, the target value of each indicator represents the scope of the demo, e.g. the number of passengers involved and using RIDE2RAIL solutions, the number of trips surveyed, the number of trips attracted to rail or multimodal solutions, etc. The following table reports the potential demand for the demo, as assessed in RIDE2RAIL DoA, and the newly assessed targets for the same indicators and for new ones.

Indicator	Potential demand	Target
Passenger*year	8,000	4,000
Commuter trips * year	4,000	1200
Private car trips*year attracted to rail/ride sharing	3,000	1200
Inhabitants of Vuosaari testing RIDE2RAIL	38,155	6,000/8,400**
% single-occupant private car trips	24%	tbd
** the demo execution period is one quarter, so ¼ year's target is 3,000 (robot bus users) and 1,200 (ride sharing app purely, also users living outside of the Vuosaari area). The sum of these demand indicators combined together is 4,200.		

Table 15 Demand targets of Helsinki demo

The following table include all risk factors connected to the various phases of the demo. Risks are ranked by their "Risk Priority Number" (see 6.3) value, as calculated following the self-assessment of the value of each risk factor made by demonstration responsible partners.

Risk	Phase	S	O	ND	I	Risk Priority Number	Actions to be taken

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Schedule: inaccurate estimates, e.g. The Travel companion is delayed, or the Travel companion service is not produced in time for the demo purposes in Helsinki.	Implementation	9	7	8	7	472,5	Project management and close monitoring of the work by activity and task leaders. Partners share viewpoints based on their experience. Schedule to be regularly reviewed and corrective actions taken as necessary.
No shuttle suppliers will offer a solution for the demo considering the available budget and duration of the demo.	Implementation	7	5	3	7	175	Potential suppliers to be contacted beforehand and making sure the demands of the project are in line with the budgets and fees paid to the supplier.
Dependency on HSL cooperation - not full partner in project but working with FVH/Metropolia	Execution	6	4	5	8	156	Involve HSL from the beginning. In case proper support is not received from HSL, use shuttle operations to promote Travel Companion, e.g. via QR codes, messages on bus stops.
Stakeholder risks: general attitude changes due to robot vehicle accidents in or outside the project	Execution	6	2	7	7	84	Maintaining good working relationship with the local regulators and media before and during the project. Pre-planning for managing potential accidents in the communication plan and underlining the safety improvements that the autonomous vehicles will bring in future.
Uncertainty about APIs and possibility to integrate in existing systems (e.g. in the shuttle supplier's systems)	Implementation	7	3	4	3	73,5	See above.

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Force majeure events such as environmental crisis (earthquake, volcano outburst ,...) or pandemic (e.g. Covid-19 virus) restrict or delay movement of people and goods for a significant period of time, causing delays to the implementation of the field tests.	Execution	7	2	1	2	21	Shorten demo period in case needed- not ideal as setting up the demo takes so much time and preparation that it hardly becomes worthwhile. Also it's questionable if all capabilities of the solution can be shown in such short period.

Table 16 Risk analysis for Helsinki demo

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11. Conclusions – the way forward for the demonstrations

The process followed by demo responsible partners to draft implementation plans evidenced the current status of the preparation phase of each demo.

The preparation has started at all demo sites, and all basic features of the demos (location, target areas, main stakeholders to be involved) are confirmed as they were indicated in the DoA. Changes and fine-tuning of action of the preparation phase will be possible during the forthcoming months, until the scheduled end of preparation phase (M24).

Targets of the demonstrations have been set and new indicators have been proposed. The current panel of targets and indicators appears to be appropriate to enable the preparation of the monitoring phase, which first action is the definition and validation of KPIs, in cooperation with WP5. Some targets still have to be set, during the preparation phase and following specific preparatory actions (e.g. local meetings with the involved stakeholders). Some targets appear to deviate from the values of potential demand set in the project preparation. However, this is a natural effect of a fine-tuned demand assessment against more generic and "universal" values indicated in the DoA.

The implementation plans include a detailed assessments of risks, developed taking into account local peculiarities, project and external factors. Risks listed and assessed by demo responsible partners can be clustered into seven categories, to which all risks identified at demo level appear to pertain. The following table reports the sum of Risk Priority Numbers (as defined in 6.4) of each risk category per demo. In case two or more risks identified in one demo belong to the same category, the sum of their specific Risk Priority Numbers have been summed up.

Risk category	Phase	Risk Priority Number				
		Padua	Brno	Athens	Helsinki	Total
Delay in Software and Travel Companion release	Implementation	340	150	42	472,5	**1004,5**
Data processing and collection issues	Monitoring	140	0	666	0	**806,0**
Decrease of travel demand and change of travel habits due to Covid-19 pandemic	Execution	200	220	220	21	**661,0**
Uncertain possibility to integrate RIDE2RAIL in existing/proprietary systems	Implementation	201	0	93	73,5	**367,5**
Lack of cooperation with local stakeholders	Preparation	0	21	0	331	**352,0**
Limited participation from potential users	Execution	0	73,5	64	84	**221,5**
Language and geographical barriers	Implementation/ Execution	0	216	0	0	**216,0**

Table 17 Risk analysis – Overview of Risk Priority Numbers per risk category

The ranking of perceived risk factors leads to the following conclusions:

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- The timely implementation of demonstrations is strictly depending from the release of the software and the Travel Companion. The lack or the delayed release of even preliminary components of RIDE2RAIL features from M12 to M24 – either due to the current time schedule of WP3 activities or to delayed interaction with complementary projects may hamper the start of the demonstrations. This risk category is less relevant for Athens demo, which is relying more on the organisation of survey, i.e. on human factors. Nevertheless, the availability of the SW backbone is necessary for Athens demo as well.
- Connected to the previous topic, any delay or mismatching between the schedule of different RIDE2RAIL WPs may increase the uncertainty to achieve the integration of RIDE2RAIL solutions in existing/proprietary systems at each demo site. This risk category is ranked in fourth place, with a relevant score, although significantly lower than the first three risks in the ranking.
- Risks connected to data collection are considered as very relevant for Athens demo only, for reasons mentioned above. In the same category, Padua demo leader reports a risk connected to the identification of an agreed set of relevant KPIs and Measurement indicators between Demo Leader and Technical partners. However, the activity plan of WP4 and WP5 already provides a robust recovery plan to tackle the latter risk.
- Covid-19 pandemic has affected demand and supply of public transport services during the lockdown period in all countries where a demonstration is planned. At the present time no demo responsible is in the position to foresee the medium-long term effects on public transport supply and – even more relevant – on the demand of public and shared transport. The effect of pandemic was already evident in the setting of targets, which are now very cautionary for every demonstration, and need to be fine-tuned during the preparation phase, by M24. The implementation phase, and even the actions of the preparation phase, are strictly depending on the evolution of pandemic and connected supply of services on which the demonstrations are focusing.
- A persistent attitude of the public against the use of shared transport, and even the still ongoing regulations on social distancing in some Member States, may affect the execution of demos, since they would enhance the risk of limited participation by potential users. This risk is perceived and assessed by three demo responsibles.
- The lack of participation or connection with local stakeholders is particularly relevant for Helsinki demonstration: this appears to be connected to the need of cooperation with the provider of the robot bus service, which is going to start in Autumn 2021, and which level of use and success among users and commuters still have to be demonstrated.
- One demonstration (Brno) has assessed the language risk as very relevant. This leads to the need to translate RIDE2RAIL tools in demo country languages, to ensure the effective use by the potential target of commuters and other users.

The above-mentioned conclusions suggest to leave the possibility to review each implementation plan by the end of the preparation phase.

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