simpli·city

The Road User Information System Of The Future

WP8 – Use Case II: Enhancing the Driving Experience

D8.1.1: Preliminary Use Case Specification (Use Case II)

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The present deliverable describes scenarios and Use Cases defined in WP8. These scenarios and Use Cases will be used for the real-world validation process within SIMPLI-CITY. Data sources and Use Case requirements are highlighted. This deliverable is a preliminary Use Case specification that will be followed by an extended final one.

SEVENTH FRAMEWORK PROGRAMME

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Disclaimer

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Executive Summary

The SIMPLI-CITY project foresees two Use Case scenarios, which will be the way to test the theoretical structure and software prototypes in a real-world environment. Indeed the work package WP8, analogously to WP7, is aimed to demonstrate the effectiveness of SIMPLI-CITY to provide reliable mobility-related services and apps to be delivered to road users by means of the Personal Mobility Assistant.

In the framework of the work package WP8, this deliverable D8.1.1 presents preliminary specifications for the Use Case II: “Enhancing the Driving Experience”.

The Use Case II is further divided into two topics: “Environmental Awareness Rising” (Use Case topic II.1, defined by CRF and located in Turin) and “Rising the Diver’s Comfort” (Use Case topic II.2, defined by TEMPOS 21 and located in Turin and in Bologna if possible). Those two Use Case topics are strictly connected to each other; they indeed cover two different aspects which the driver is interested in: The sustainability and reduction of consumption from a side and the comfort and peace of mind from the other.

For assessing the Use Case topics, a common layout is used in order to allow comparison among them, and analysis of aspects like goals, actors, exploited data set(s), or pre- and post-conditions. Potential data sets for the feeding of the two topics are listed in this deliverable and assessed, as well as actors and pre- and post-conditions.

The present deliverable reports only an initial description of Use Cases implementation that will be further refined and presented within deliverable D8.1.2.

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1 Introduction

SIMPLI-CITY – The Road User Information System of the Future – is a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 318201. It provides the technological foundation for bringing the “App Revolution” to road users by facilitating data integration, service development, and end user interaction.

Within this document, a preliminary description of Use Cases defined in WP8 (Use Cases II) as well as the list of related potential data sources is provided.

1.1 SIMPLI-CITY Project Overview

Analogously to the “App Revolution”, SIMPLI-CITY adds a “software layer” to the hardware-driven “product” mobility. SIMPLI-CITY will take advantage of the great success of mobile apps that are currently being provided for systems such as Android, iOS, or Windows Phone. These apps have created new opportunities and even business models by making it possible for developers to produce new applications on top of the mobile device infrastructure. Many of the most advanced and innovative apps have been developed by players formerly not involved in the mobile software market. Hence, SIMPLI-CITY will support third party developers to efficiently realise and sell their mobility-related service and app ideas by a range of methods and tools, including the Mobility Services and Application Marketplaces.

In order to foster the wide usage of those services, a holistic framework is needed which structures and bundles potential services that could deliver data from various sources to road user information systems. SIMPLI-CITY will provide such a framework by facilitating the following main project results:

- Mobility Service Framework: A next-generation European Wide Service Platform (EWSP) allowing the creation of mobility-related services as well as the creation of corresponding apps. This will enable third party providers to produce a wide range of interoperable, value-added services, and apps for drivers and other road users.
- Mobility-related Data as a Service: The integration of various, heterogeneous data sources like sensors, cooperative systems, telematics, open data repositories, people-centric sensing, and media data streams, which can be modelled, accessed, and integrated in a unified way.
- Personal Mobility Assistant: An end user assistant that allows road users to make use of the information provided by apps and to interact with them in a non-distracting way – based on a speech recognition approach. New apps can be integrated into the Personal Mobility Assistant in order to extend its functionalities for individual needs.

To achieve its goals, SIMPLI-CITY conducts original research and applies technologies from the fields of Ubiquitous Computing, Big Data, Media Streaming, the Semantic Web, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project website at http://www.simpli-city.eu.

1.2 Document Purpose, Scope and Context

The overall objective of work package WP8 is to demonstrate (together with WP7) the feasibility of SIMPLI-CITY’s approach to build services and innovative mobility-related end

user applications by integrating different data sources and to present them to the end user by means of the Personal Mobility Assistant. In the context of work package WP8, the purpose of this document is to explain how the solutions provided by SIMPLI-CITY are applicable in a real-world setting and to provide valuable insights from real-world tests to the RTD work packages.

Therefore this deliverable D8.1.1 is focused on the initial Use Case definition including a first preliminary description of the scenario (containing the according data sources and their descriptions). A more in depth analysis of the Use Cases will be performed in the following deliverable D8.1.2 Final Use Case Specification (Use Case II), including an estimation of the required equipment for the test bed, and the metrics needed for the later evaluation of the Use Case implementation and taking into account the work undertaken in the RTD project's work packages (namely the work packages WP4 to WP6).

1.3 Document Status and Target Audience

This document is listed as "public", as it contains general, supplementary information helpful for the understanding of the SIMPLI-CITY deliverables. Therefore, it is useful for all readers of SIMPLI-CITY project deliverables.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realization of SIMPLI-CITY as well as a list of abbreviations is available in the supplementary document "Supplement: Abbreviations and Glossary", which is provided in addition to this deliverable.

Further information can be found at http://www.simpli-city.eu.

1.5 Document Structure

This document is broken down into the following sections:

- Section 1 provides an introduction for this deliverable, including a general overview of the project, and outlines the purpose, scope, context, status, and target audience of this deliverable.
- Section 2 provides a short description of this deliverable target.
- Section 3 describes the Use Case Topic II.1: "Environmental Awareness Rising".
- Section 4 describes the Use Case Topic II.2: "Rising the Driver's Comfort".
- Section 5 provides a short description of the activity that will be performed for latter evaluation of the Use Case implementation.
- Section 6 provides an overview of the process that will be followed to implement the Use Case.
- Section 7, finally, contains the conclusions.

2 Use Case II: Enhancing the Driving Experience

The present deliverable describes real-world scenarios defined within work package WP8 that will form the base for the real-world validation process. The scenarios will be based on the Use Case topics and services defined for the SIMPLI-CITY project and extend/change certain services if necessary.

In particular this deliverable will provide detailed information about Use Case II “Enhancing the driving experience” with regard to the two defined topics: “Environmental Awareness Rising” and “Rising the Divers’ s Comfort” (see Section 3 and 4). In more details, all available data sets from both topics will be listed and analyzed, as well as actors, pre- and post-conditions, and possible constraints.

In order to make the Use Cases more comparable, the same layout for their analysis has been chosen.

3 Use Case Topic II.1: "Environmental Awareness Rising"

3.1 Domain

The domain addressed by this scenario/topic is the eco-sustainable mobility for supporting the ever-growing need of the society to enhance the driver's eco-driving experience. The eco-sustainability, from the other side, takes main direct advantages to the driver as saving fuel and money and improving efficiency that stimulate her/him to change driving habits adopting eco-behaviour.

3.2 Introduction and Motivation

During the recent years, a growing need for sustainable mobility is noticed that is strengthened on one side by a growing ever stricter legislation and on the other side by an increase in the sensitivity of the population. The effect of this trend is the willingness, shared by all the actors involved in mobility, to reduce traffic congestion and the consequent CO_2 emissions.

The main idea behind this scenario is to collect all information related to usual routes and driving style in order to provide a real time support to the driver, suggesting the better maneuvers for driving in eco way, saving fuel consumption, etc.

Collecting all driving data related to the usual routes, driving style, individual preferences, it is possible to provide real time suggestion for driving in a more eco way, avoiding congested routes.

Eco-driving implies the following advantages for the drivers:

- Fuel saving
- Time saving
- Journey efficiency improvement

Further advantages for the end users are a greater safety and peace of mind, with a possible additional benefit which could result in lower insurance rates in a pay for use scenario. In this scenario indeed the vehicle insurance rates are calculated on the basis of several dynamic data collected during the trip that are analyzed to provide information about the driving style and behavior.

Furthermore, thanks to SIMPLI-CITY, this information could also be exploited by app/service developers in order to provide value-added apps or services.

3.3 Goals and Objectives

The main objective of this scenario/topic is to offer a set of services able to improve the eco-driving during the normal use of the vehicle.

In more details the application provides the following functionalities:

- Current trip information: Destination, expected arrival time, distance from destination, etc.
- Alternative route suggestion.

- Eco-driving monitoring: Continuous calculation of achieved eco-score on the basis of several driving parameters (speed, gear, acceleration, deceleration) and suggestion for increasing it.
- Offline vehicle information: Access through a personal Web Portal to all historical information about travelled trips and driving style.
- Eco-driving Community management: Each driver can compete with all other belonging trying to achieve the best eco-score in the community.

3.4 Actors

The actors of the Environmental Awareness Rising scenario are the following:

- SIMPLI-CITY end users that interact with the eco-driving enabled services through a SIMPLI-CITY application in order to have real-time suggestions and feedbacks during usual trips and route. They are responsible for starting the context i.e., generating information related to the travelled trips and route.
- SIMPLI-CITY developers, contents and data providers can take benefits of the SIMPLI-CITY framework for agile update and customization of services and apps delivered to final users.

3.5 Description

Using SIMPLI-CITY it is possible to offer to the end user a set of services and apps in order to enhance the driver's eco-driving experience. In more details SIMPLI-CITY will support drivers providing the optimal balance among a number of factors, like for example:

- Eco-friendliness (saving unnecessary fuel)
- Estimated travel time (for each single destination and for the total time to the final destination)
- Other specific features (e.g., related to the target destination or the recommended time to reach a destination)

Furthermore, the scenario contains sophisticated functionalities for eco-efficiency comparison between different journeys, routes, and even drivers, including the eco-driving Contest, where drivers will compete with each other to complete a trip with the lowest CO emission.

3.6 Data Set

This 'Environmental Awareness Rising' scenario requires the access to several sets of data related to the vehicle, to the driver and drivers community and to the road and traffic condition. In this section the main data sources are introduced with the description of the main content and the reason because they are required. Such data sets will be illustrated in more details in the deliverable D8.1.2 – Final Use Case Specification (Use Case II), expected in month 18.

- Vehicle data are necessary input for the calculation of travelled path, eco-driving scores, fuel consumption and carbon footprint. The vehicle information can be listed as follows:
    - Gps positions
    - Speed
    - Acceleration

    - Deceleration
    - Gear
    - Consumption
- End-user data are all data about usual trips travelled by a single driver, including achieved eco driving score and possible preferences set by each user. These data are necessary for the provision of information related to the current trip, the calculation of alternative route and the real-time suggestions to improving driving style. User Data belong to the following three categories:
    - Trip data: Trip, route, starting time, end time, trip duration, intermediate stops and related statistics, etc
    - Driving style data: Eco-driving score for each/trip route or specific route segment
    - Preferences: A predefined number of preferences and information related to journey and road set by each user
- Community data are all data used for the managing of the eco-driving contest:
    - Eco-driving scores and further relevant data of users belonging to the community
- Maps data are all data providing route directions and detailed information about Point of interests useful for the provision of trip information and the calculation of alternative routes.
- Traffic data or road event are all data impacting on the usual journey path, relevant to predict a possible delay and suggest alternative routes.

The specific data source for maps and traffic data will be selected later on in the project on the basis of specific needs and synergies with other Use Cases.

3.7 Pre-Conditions and Post-Conditions

The conditions that must be true for the 'Environmental Awareness Rising' scenario to start are:

- Availability of vehicle data about current speed, gear, acceleration, current vehicle position, etc.
- Access to historical data about past journeys.
- Access to data about traffic, congestion, road works, and road closures: real-time data on when the trip is made.
- Access to data about eco-driving community.

The conditions that must be true for scenario to complete successfully are:

- During the trip:
    - The app provides real-time information about the current trip, calculating and suggesting alternative route in case of traffic event detection.
    - The app calculates live eco-driving score providing suggestions to improve it.
- For the web-portal:
    - The end user can access to all the historical information about past trips
- For the eco-driving contest:
    - The end user is able to access to the eco-driving community, publishing his/her eco-driving score and comparing individual score with the community.

3.8 Trigger

The SIMPLI-CITY end user, who starts a trip after having installed/subscribed the eco-driving apps is the initiator of the Environmental Awareness Rising scenario. Once the eco-driving scenario application is activated, two possibilities are offered to the SIMPLI-CITY end user:

- During the trip:
  - Getting real-time suggestions to improve the driving style during the current journey
  - Suggesting possible alternative route in case of traffic event detection according with destination and driving style
- After the trip:
  - Searching and visualizing historical information related to own travelled routes, related driving style, and eco-driving scores

The latter possibilities can be easily interpreted by the end user through various visualisation techniques i.e., map-based, chart based, diagram-based representation of eco-driving results.

Anyway the multimodality of the user interface provided within SIMPLI-CITY is still under discussion between the project partners. The different multimodal options that will be made available by the Multimodal Dialog Interface component to generate User Interface (UI) will be further regarded within next deliverable D8.1.2, where final Use Case specification will be presented.

Going beyond the end user functionalities, all information collected during the trips could also be exploited by app/service developers in order to provide value-added apps or services.

3.9 Main Flow

In the context of the Environmental Awareness Rising topic, the end user interacts with the application following the process reported below.

The first step consists in the installation/subscription of one or more of SIMPLI-CITY eco-driving apps.

The end user can start to use the apps after the installation and preliminary configuration that involves the setting of several preferences.

Before/during the trip in real time, the user enters the destination (optional) and/or further information about current trip (intermediate stops and Point Of Interests POI). After a minimal training, the system could be able to guess the right destination without any interaction with the user.

As soon as the trip starts information about current route (expected arrival time to destination, expected arrival time to each intermediate destination, etc.) are provided to the driver.

In case of traffic or special events an alternative flow is followed as described in the paragraph below.

During the trip the system visualizes eco-driving score, carbon footprint and fuel consumption for each travelled segment of the route.

Moreover the system interacts with the driver providing personalized suggestions to improve driving style achieving a better eco-driving score.

After the trip or any moment in the future the end user can access a customized web portal where he/she can:

- Set specific preferences (preferred route for a given trip, intermediate stop, special POIs, etc.).
- Search and visualize historical information about trips and route and driving style.
- Publish own eco-driving score and visualize the eco-driving contest comparing individual score with the community.

3.10 Alternative Flow

This section describes any variation that occurs along the road during a trip.

In particular the events that can affect the trip are the detection of a high traffic level or any events that can influence the traffic along the current route.

All these events may create a constraint in the route (i.e., if the arrival time calculated in real time by the system exceeds the threshold set by the user), in this case a quicker alternative route should be calculated by the specific service and communicated to the driver. The user can choose if accepting the suggestion obtaining the related directions or not.

3.11 Relationship With Other Use Cases

Figure 1: The Trip Cycle and the Aspects which the Driver is Interested in

The present scenario is part of the larger Use Case II: “Enhancing the Driving Experience” as well as the topic Rising the Driver’s Comfort described in the next chapter.

The two topics indeed cover two different aspects which the driver is interested in: The sustainability and reduction of fuel consumption from a side and the comfort and peace of mind from the other.

The Figure 1 shows on the left the main trip stages and on the right the main aspects in which the driver is interested during the trip.

SIMPLI-CITY can potentially offer a set of services and applications that cover the whole trip from the preparation to the arrival to the destination, enhancing the driving experience.

3.12 Graphical Description

This section shows an initial mock-up of the envisioned SIMPLI-CITY "Environmental Awareness Rising" application, with a focus on the following features:

- Trip assistance
- Live eco-driving
- Offline Vehicle information
- Eco-efficiency comparison

This is an initial mock-up aimed to show a potential graphical interface highlighting the user interactions. It is to be stated that while the screenshot shows a graphical user interfaces, SIMPLI-CITY will provide a multimodal user interface, combining speech, haptics, and other modalities. The different multimodal options that will be made available by the Multimodal Dialogue Interface will be further regarded within the next deliverable D8.1.2, which presents the final use case specification.

3.12.1 Trip Assistance

Figure 2: Map and Information of the Current Route

During a (usual) trip, all useful information related to the trip are also visualized by the SIMPLI-CITY PMA.
The Figure 2 shows the information visualized during a trip:

- A route map
- The Expected arrival time
- The trip length

In the case in which the application detects an event that could be the cause of a slowdown on the estimated route (i.e. traffic congestion), and an alternative route with shorter duration is available, the screen below is shown ().

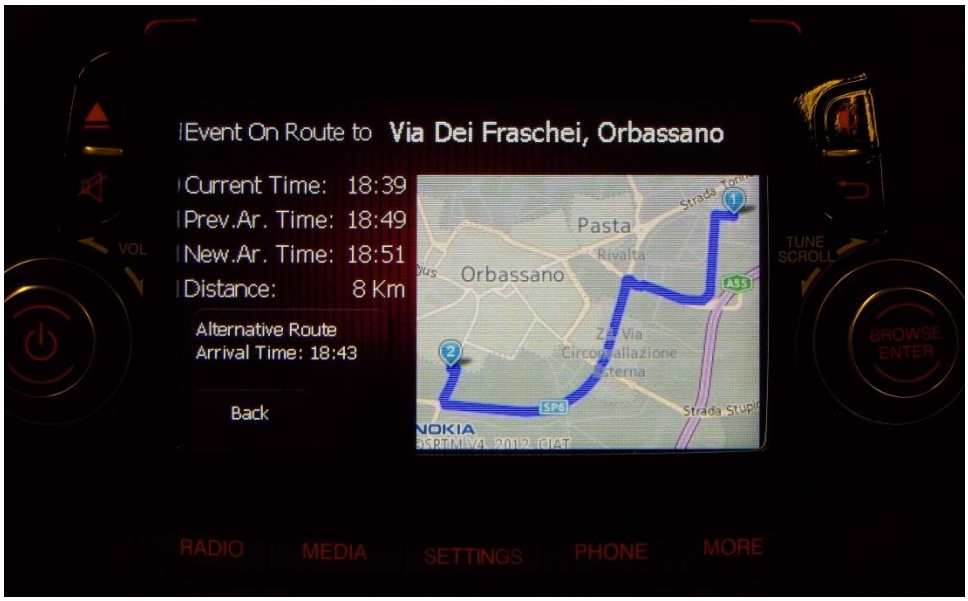

Figure 3: Event Detection

In the Figure 3 indeed all information relevant to make the trip more efficient are shown. Choosing by voice the <Alternative Route>, the map of this specific route is shown with all related information (see Figure 4).

Figure 4: Alternative Route Details

3.12.2 Live Eco-driving

Figure 5: Live Eco-driving Score

During a trip the Personal Mobility Assistant (PMA) provides live feedback about the driving style in order to reduce the current CO_2 emission and save fuel.

In more details, the live eco-drive service visualizes the achieved punctual score and provides possible recommendations to proactively follows an ecological-aware driving style.

3.12.3 Offline Vehicle Information

After the trip, accessing offline to the web, the driver can browse and visualize information related to the travelled trips and routes, comparing eco-driving scores, fuel consumption and carbon footprints of different journeys.

Moreover a predefined list of preferences that are to be considered by the application during the trips (i.e. usual POIs, car passengers, preferred route type, etc.) can be set by the driver In order to personalize the functionality.

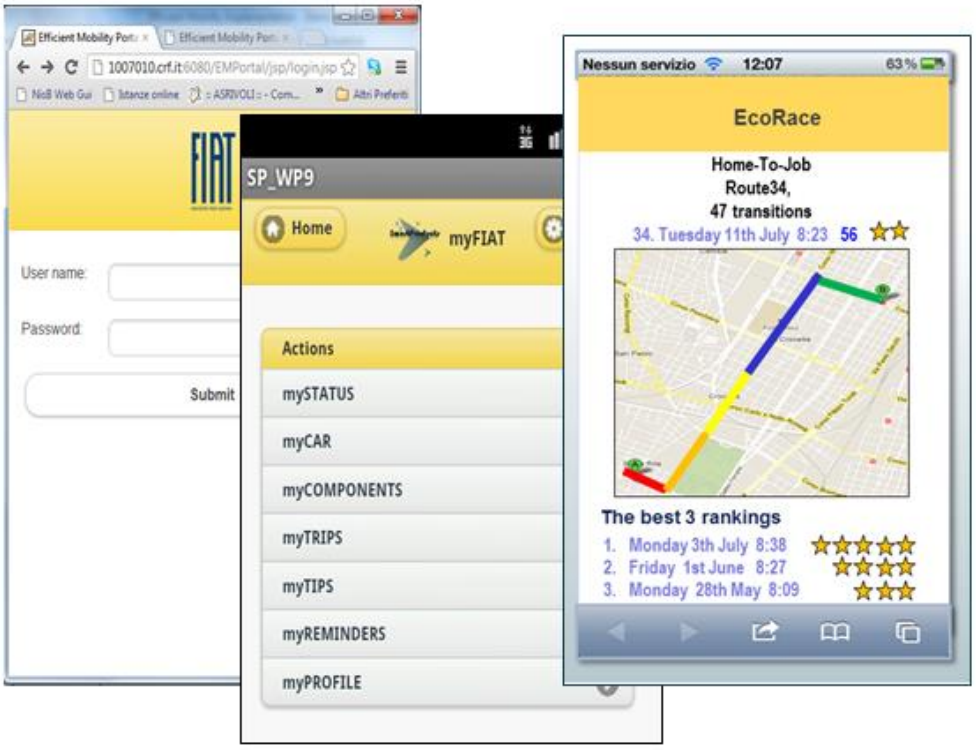

Figure 6: Vehicle Information Management

3.12.4 Eco-driving Contest Management

A further service allows managing the whole eco-driving community. The subscribed users can publish their driving performance in social networks like Facebook or Google Plus having the possibility to:

- Compare the individual (eco-)performance against the performances of other drivers with comparable parameters (see Figure 7 and Figure 8).

Figure 7: Eco-efficiency Comparison

- To be awarded if “winners” (i.e., the best 10 eco-drivers) with discounts on the next parking ticket or a free ticket for the bus.

Figure 8: Eco-driving Contest

4 Use Case Topic II.2: “Rising the Driver’s Comfort”

4.1 Domain

The domain targeted by this scenario is the provision of safety and entertainment services to the driver and passengers of the vehicle.

4.2 Introduction and Motivation

The presence of a road user information system in the car connected to the Internet and with (potential) access to the hardware of the car opens a new full range of value-added applications to be provided to the driver and passengers of the vehicle with the aim of increasing their experience during a journey, by providing road safety and entertainment services.

The availability of Internet connection within the road user information system permits to make use of all the services and data sources available in the Internet. This Use Case scenario will explore different options for leveraging these external services and data sources for providing useful applications to the driver and passengers of the car aimed at safety and entertainment.

4.3 Goals and Objectives

The ”Rising the Driver’s Comfort” Use Case scenario has the objective to provide services and applications aiming at the safety and leisure time of the driver and passengers of the car. Thus, it will permit to show the possibilities of the SIMPLI-CITY road user information system as an in-vehicle entertainment system.

The use case scenario will make use of external services and data sources to provide applications that improve the experience of the passengers of the vehicle. These external services and data sources include APIs of well-known services such as Google Maps or Google places, multimedia streaming data, and social network services.

The Use Case scenario will integrate different services related with safety and entertainment, including:

- Route planning and navigation.
- Multimedia guide integration and reproduction.
- Radio streaming access.
- Accident prevention warning.
- Social network integration.

The Use Case scenario will be implemented in Bologna. Nevertheless, most of the envisioned services are not location-dependent, except the accident prevention warning service, which needs local data sources.

4.4 Actors

The actors of this scenario are the following:

- SIMPLI-CITY end users, who will interact with the PMA in order to use entertainment services during a journey, including route navigation, multimedia streaming, and publishing information in social networks.
- External services and data sources providers, which are the companies and public administration bodies that provide services and data sources that will be used within the applications of the Use Case.

4.5 Description

The Use Case scenario will encompass different sub Use Cases, which will be integrated forming the overall Use Case. Each of the sub Use Cases will make use of specific external services or external data sources, and will aim at providing entertainment or safety to the driver and passengers of the car.

The sub Use Cases will be the following ones:

- Route planning. It will permit to plan a route. It will allow specifying the origin, destination (or multiple destinations), and different Points of Interest along the route. The route and associated Points of Interest will be saved in a database and they will be downloaded to the route app when the user starts the trip.
- Route navigation. It will provide real-time information about the current location of the car during the journey, information about the planned route, and it will notify about the proximity of saved Points of Interest along the route.
- Multimedia reproduction. It will permit to reproduce multimedia information (images, audio, or video) associated to a Point of Interest when the car is close to the location of the Point of Interest.
- Media streaming. This sub Use Case will connect to an online radio station to receive radio data via streaming.
- Accident prevention warning. It will make use of open data containing information of road accident black spots to notify the driver about the proximity to one of these spots depending on the location of the car.
- Social network integration. This functionality will allow publishing information like the location of the car to a social network.

4.6 Data Sets and APIs

This scenario will require the following data sets and external services:

- Google Maps directions API (https://developers.google.com/maps/documentation/directions/). This API provides directions between locations. Directions may specify origins, destinations, and waypoints, and the response may be specified as multi-part directions using a series of waypoints.
- Google Places API (https://developers.google.com/places/). This API provides detailed information about places and Points of Interest across a wide range of categories. It is based on the same database used by Google Maps and Google+.

The API allows searching for places either by location or by text. It also provides an Autocomplete API, returns Place information based on text search terms.
- Youtube API (https://developers.google.com/youtube/). This API provides access to the content stored in Youtube. It allows searching and reproducing videos stored in Youtube.
- Radio streaming sources. Different sources of radio streaming stations will be used.
- Road accident black spots data from Bologna.
- Facebook API (https://developers.facebook.com/). This API permits to integrate into applications functionality of the Facebook service. The functionality that will be used within the Use Case is the one related with the publication of information in the timeline of the user like comments or the user's location.

Some web pages provide extensive lists of online radio available on the internet:

Table 1: Web Pages Providing Lists of Online Radios

Web page of online radio lists	URL
Internet Radio	http://www.internet-radio.com/
Mike's radio world	http://www.mikesradioworld.com/

4.7 Pre-Conditions and Post-Conditions

The conditions that must be true for the 'Rising the Driver's Comfort' scenario to start are:

- Availability of an Internet connection for accessing external services and data sources.
- Browsing/downloading/installing the applications of the Use Case scenario through the Application Marketplace (implemented in task T5.4).
- Accessing the installed applications through the Personal Mobility Assistant.
- Accessing the Google Maps Directions API.
- Accessing the Google Places API.
- Accessing the Youtube API.
- Accessing the radio streaming data sources.
- Availability of the road accident black spots data sources in Bologna.
- Accessing the Facebook API.
- Accessing the Voice-based Multimodal User Interface (implemented in tasks T6.1 and T6.2), that allows the interaction with the end-user in a non-distracting way.

The conditions that must be true for the 'Rising the Driver's Comfort' scenario to complete successfully are:

- For the Route planning and navigation sub Use Case: The app provides real-time information about the current location of the car during the journey and about the planned route.
- For the Multimedia guide integration and reproduction sub Use Case: The multimedia guide is reproduced.
- For the Radio streaming access sub Use Case: The selected radio station is reproduced.

- For the Accident prevention warning sub Use Case: The app notifies the user about the proximity of a road accident black spot.
- For the Social network integration sub Use Case: The end user has published his/her location in the social network.

4.8 Trigger

The SIMPLI-CITY user, who plans the route and takes the trip, is the initiator of the ”Rising the driver’s comfort” scenario. The planning of the route is done before starting the trip, and once the trip starts, the application supports the user during the journey.

Depending on the location of the user, the application assists the user by:

- Showing the current location of the user along the route.
- Informing the user about the proximity of Points of Interest.
- Notifying the user about the availability of multimedia guides associated to a Point of Interest.
- Notifying the user about the proximity of road accident black spots.

The user is also the initiator of the radio streaming functionality, provided by the radio streaming app, and the initiator of the social network sharing functionality, included within the navigation app.

4.9 Main Flow

The SIMPLI-CITY user and system interact as described hereafter.

The first activity done by the user is to plan the holiday route. This functionality is provided by the holiday route app, and allows the user to specify the origin and destination of the route, as well as intermediate waypoints. Moreover, the user can also specify Points of Interests along the route. The user can save the created route for a later use.

When the user wants to start a journey, selects one of the saved routes and he/she starts driving the car through the route. The app guides the user through the saved route, by displaying the current location of the car along the route.

When the car is close to a Point of Interest saved within the route, the application notifies the user of its proximity. Moreover, if the point of interest has a multimedia guide available, it informs the user. The user can select to reproduce the multimedia guide.

When the system detects that the car is close to a road accident black spot, it notifies the user through the holiday route app about this proximity, through the backend service of the app.

In any moment through the journey, the user can start the radio app and select a radio station among the available ones. In this case, the system connects to the radio station and receives the streaming data.

The user can use the social network functionality provided within the holiday route app to publish information in the social network. This information can include the current location of the car or a comment. In case of publishing a comment, it will be recorded using the voice-based multimodal user interface of the PMA.

4.10 Relationship With Other Use Cases

The route planning functionality of this Use Case scenario can be integrated with the Use Case I: “Meeting the Increased mobility Demand” scenario, which provide road traffic diagnosis, road traffic prediction, and personalized traffic restrictions.

4.11 Graphical Description

This section provides the initial mock-up of the ”Rising the Driver’s comfort” Use Case scenario. This is an initial mock-up with the objective to show a potential graphical interface, the final graphical interface will be provided in the second version of this deliverable. One main feature that is still not clear is how the popups will be shown through the multimodal user interface of the PMA, so in this initial mock-up these popups are shown in a standard format.

The use case scenario will be composed of two applications: the Holiday Route App and the Radio App. The former will include the following sub Use Cases: route planning, route navigation, multimedia reproduction, accident prevention warning, and social network integration, while the later will include the media streaming functionality.

The main view of the Holiday Route App will be a map. It will allow the user to create and save routes, and to use previously created routes.

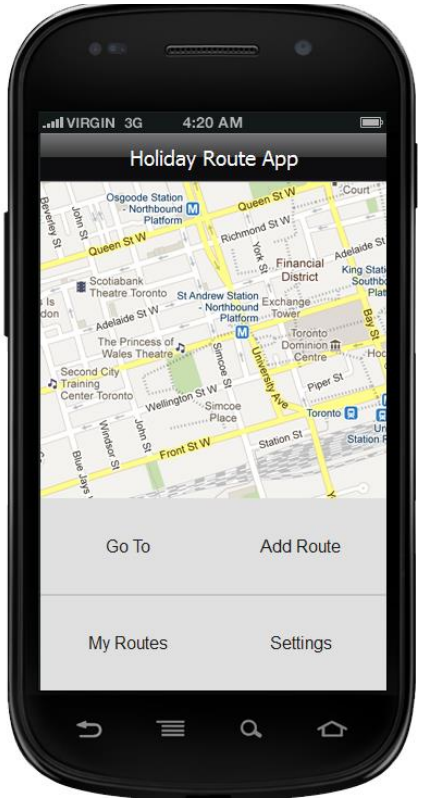

Figure 9: Holiday Route App

4.11.1 Route Planning

This sub Use Case will allow creating a new route, by specifying the following information:

- Route name.
- Route origin.
- Route destination or multiple destinations (waypoints) of a route.
- Points of Interest.

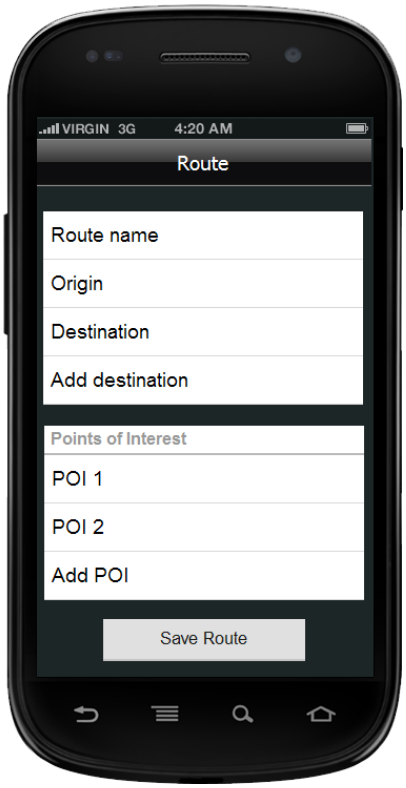

Figure 10: Add Route

The information of the origin, destination(s), and POIs will be introduced by a screen that will allow searching the place by means of the address or name of the place, similarly as shown in the following screen mock-up.

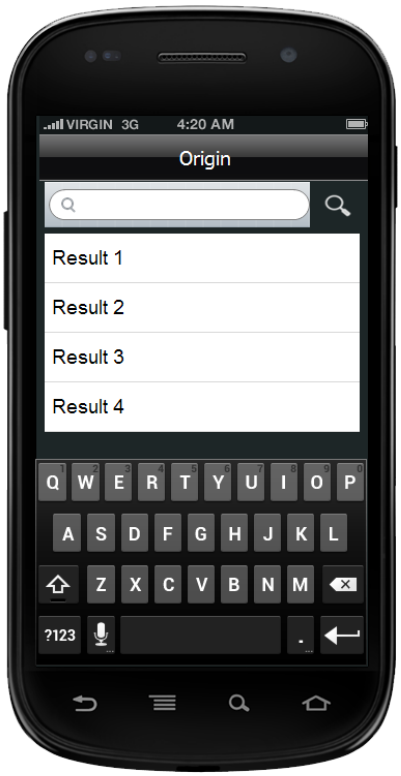

Figure 11: Origin Selection

Once all the information of a route is introduced, the route can be saved for a later use.

4.11.2 Route Navigation

Before starting a trip, the user can select a route from all the previously created and saved routes.

Figure 12: Route Selection

When the user selects a route, a screen shows all the information of the route.

Figure 13: Route Information

When the user selects the ‘Start Route’ option, the application provides information of the route and the car location along the trip.

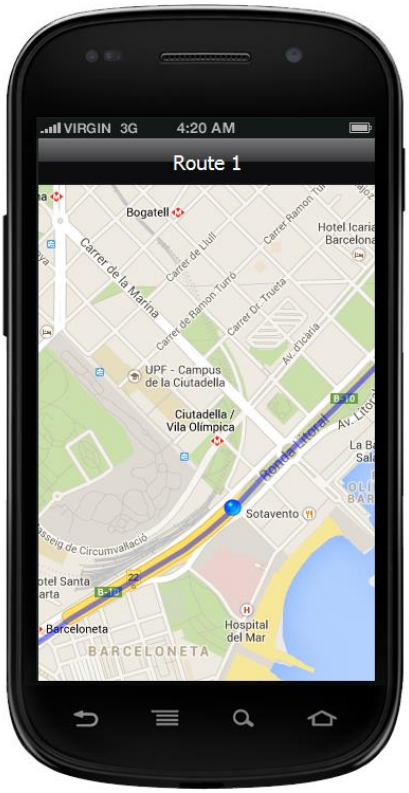

Figure 14: Route Navigation

When the car is close to the location of a POI of the route, the application notifies the user.

Figure 15: POI Proximity

The user can select to view the detailed information of the POI.

Figure 16: POI Detail

4.11.3 Multimedia Reproduction

If the POI has a multimedia guide available, the application notifies the user about its presence and permits to reproduce it.

Figure 17: Multimedia Reproduction

4.11.4 Accident Prevention Warning

If the system detects that the user is close to a black spot, it notifies the user.

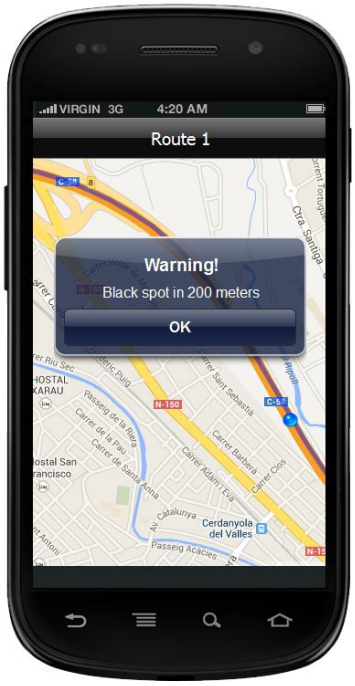

Figure 18: Accident Prevention Warning

4.11.5 Social Network Integration

The user can share information in social networks, like its current location or a comment. The social networks supported will be the ones already installed in the device of the user. The social networks supported may include, among others, the following ones: Facebook, Twitter, Linkedin, and Google+.

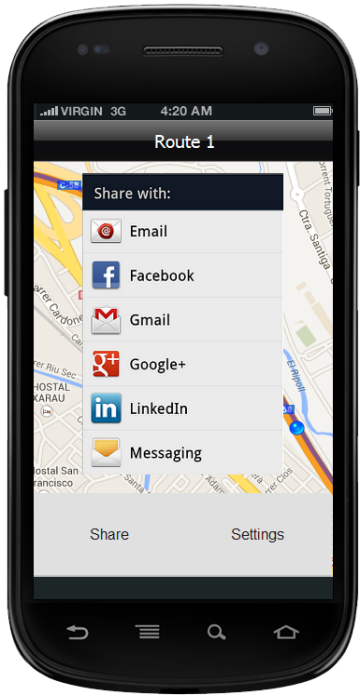

Figure 19: Social Network Integration

4.11.6 Media Streaming

The Radio App has different radio stations stored and allows the user selecting one for its reproduction.

Figure 20: Radio App

5 Envisioned Approach to Implement the Use Case II

The process that will be followed in order to implement and validate the Use Case II (Enhancing the Driver Experience aka EDE) foreseen the following steps:

- Specification of EDE Use Case
- Integration of the SIMPLY-CITY platform in the car:
  - Identification and wrapping of data sources
  - Identification and realizing of new and revised services
  - Customization of the PMA for EDE Use Case

The Figure 21 shows the logical architecture of the EDE Use Case highlighting the expected components developed using the SIMPLY-CITY platform and their interaction.

Below the components used by the end user for interacting with the EDE services are showed:

- The EDE PMA installed on the smartphone allows a real time interaction during the whole trip
- The EDE Web Portal allows the access to all historically information collected during the trip

The other components that reside in the cloud and constitute the core of the application are:

- The EDE Data Sources that are necessary for the feeding of the services
- The EDE services built with the SIMPLI-CITY platform
- The SIMPLI-CITY Service Runtime Environment (SRE) that makes the EDE services operational

Figure 21 Logical Architecture

6 Evaluation Plan

The evaluation plan describes the motivation and strategy for the assessment of the Use Cases. The aim of this chapter is simply to give the rationale for testing and evaluation and a guideline that will be followed for the evaluation of the Use Cases described in this deliverable.

The methodology and the metrics adopted for the later evaluation of the Use Cases implementation will be presented in more details in deliverable D8.1.2 Final Use Case Specification (Use Case II) while the deliverable D8.3 Evaluation Report will report the assessment results.

The evaluation in this case will mainly imply:

- Technical performance evaluation.
- Usability performance evaluation.
- Live tests (on vehicle).

6.1 Technical Evaluation

The technical evaluation is aimed to determine if the implementation covers the requirements.

It will be conducted by technician in CRF in the first instance and then by FGM for the final validation. An evaluation session will be organized involving people from FIAT Group Automotive in order to validate the prototype from a technical perspective.

6.2 Usability Performance Evaluation

The usability performance will be evaluated by CRF Human Machine Interface HMI experts in the first instance and then from FGM for final validation. No involvement of the end users is required.

6.3 Live Tests

This evaluation will be conducted driving the demonstrator vehicle along the selected test-sites in Turin and possibly in Bologna according with a detailed plan that will be defined later on in the project.

The target group of the Use Case II is the car-driver. The evaluation activities will be performed by expert-drivers. End users will not be involved and their will not be asked about their needs and opinion before and/or during the development since a demonstrator is going to be developed.

7 Conclusions

The aim of this deliverable D8.1.1 is to present an initial specification of the Use Case II: “Enhancing the Driving Experience”, that will be used to test the SIMPLI-CITY platform and solutions and the reliability of the Personal Mobility Assistant prototype in the real world.

Two scenarios will be tested in the city of Turin dealing with the provision of services and applications that support the whole trip from the preparation to the arrival to the destination “Enhancing the Driving Experience”.

The two topics indeed cover two different aspects in which the driver is interested: The sustainability and reduction of consumption from a side and the comfort and peace of mind from the other.

The first scenario addresses the sustainability and reduction of consumption, i.e., how to improve the eco-driving score reducing from one side fuel consumption and from the other side improving efficiency. The second scenario addresses the comfort and peace of mind, providing road safety and entertainment services.

Both tests will be useful to evaluate if and at what level the SIMPLI-CITY’s PMA could be suitable to road users in planning and conducting their displacements in cities, potentially becoming the “Road User Information System of the Future”.

As already done for the Use Case I described in deliverable D7.1.1, for each case, a first initial description of the scenario has been provided, with the description of its domain, motivation and main objectives; all actors involved have been individuated and their roles have been described; potential data sets required and main flows have been illustrated; finally, requirements and conditions for the Use Cases’ tests have been presented.

The present deliverable D8.1.1 has presented some preliminary specifications. The Use Case’s specification is an iterative process, and thus as the work package WP8 and the RTD activities are on-going, it is possible that some SIMPLI-CITY issues could either be enhanced or modified. And thereby services and functionalities to be tested could be different. Thus within the forthcoming deliverable D8.1.2, a final and improved Use Case specification will be prepared, which will be based on results from the RTD work packages WP4-6, for which this deliverable provides additional inputs.