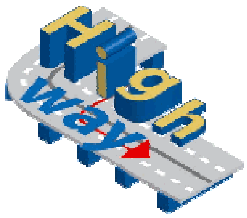

Project no. IST-2003-507260

Breakthrough intelligent maps & geographic tools for the context-aware delivery of e-safety & value-added services

HIGHWAY

Instrument: **SPECIFIC TARGETED RESEARCH PROJECT**

Thematic Priority: 2

D10.2 Final Report

Due date of deliverable: **31 – 12 -2006**
Actual submission date: **12 – 03 - 2007**

Start date of project: **1st April 2004** Duration: **33 months**

Organisation name of lead contractor for this deliverable: **Tele Atlas Italia**

Revision [**Final**]

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Project Number: IST-2003-507260
Project Title: HIGHWAY: breakthrough intelligent maps & geographic tools for the context-aware delivery of e-safety & value added services.
Deliverable Type[1]: PU

Deliverable Number: D10.2
Contractual Date of Delivery: 31/12/2006
Date of Delivery: 12/03/2007
Title of Deliverable: Final Report
Work-Package contributing to the Deliverable: WP 10
Nature of the Deliverable[2]: R
Author(s): HIGHWAY Consortium

Abstract: This report, HIGHWAY Final report includes publishable description of activities carried out and results achieved within HIGHWAY Project. It was prepared according to official guidelines provided European Commission including following main sections:

- Project Execution: summary description, contractors involved, work performed and end results (including an accurate and detailed description of project demonstrators), intensions for use and impact, project logo and web site.
- Dissemination and use: conferences, workshops attended by the Consortium along with articles published, press coverage, developed web site.

Keywords List: eSafety, car navigation, location-based services

[1] Deliverable Type: PU = public; LI = limited; RP = restricted.

[2] Deliverable Nature: P = prototype; R = report; SP = specification; TO = tool; OT = other.

Table of Contents

1 Project Execution

The IST-2003-507260 HIGHWAY Project, whose acronym stands for Breakthrough intelligent maps & geographic tools for the context-aware delivery of e-safety & value-added services, started the 1st of April 2004 and it will be completed by the end of September 2006 and, with respect to the IST WorkProgramme, can be related mainly to the Objective "3.1.10 – eSafety for Road and Air Transport".

HIGHWAY is to offer ***higher safety*** and ***location-based value added services*** where interactions between the person in control, the vehicle and the information infrastructure are addressed in an integrated way.

1.1 Summary description of project objectives

- The provision to European car drivers and pedestrians of eSafety services and *at the point of need interaction* of *multimedia* (text, audio, images, real-time video, voice/graphics) and value-added location-based services. This goal can be achieved through the combination of *smart real-time maps*, UMTS 3G mobile technology, positioning systems and intelligent agent technology, 2D/3D spatial tools and speech synthesis/voice recognition interfaces.

- The delivery of up-to-date information enriched with safety relevant data for both car and human beings. In this context, the role of *smart, querable HIGHWAY maps* is central. These comprise speed limit data to feed speed limit units and dynamic data like relevant traffic or weather information for human and possibly for non-human consumption (e.g., maps will be treated as additional sensors by on-board ADAS systems). HIGHWAY maps will help drivers facing critical driving situation resulting from road topography, e.g., by delaying incoming phone calls or triggering safety mechanisms based on map information like the radius of the curve ahead or speed limits or data like an accident ahead. In addition to decreasing the probability for accidents and minimising potential damage to drivers and property, HIGHWAY services will be more cost-effective, efficient (saving time to customers) and informative (e.g., better informing travellers who can have difficulty discovering what is available or on offer in an area they arrive).

1.2 Contractors Involved

In order to address this opportunity, HIGHWAY Consortium combines a balanced mix of committed:

- eSafety and value-added location-based Service Providers, such as the **Finnish Road Enterprise (FIN)**

- advanced Research Laboratories from Automotive Industry, such as **CRF (ITA)**

- major Geo-Spatial Players, **Tele Atlas (BEL and ITA), Genimap (FIN)**,

- large Mobile Telecommunication Operators, **WIND (ITA), Teliasonera (FIN)**

- Automotive and Handset Manufacturers, **Motorola (ITA)**

- medium-sized LBS System integrators, **Netxcalibur (ITA), ICT (FIN)**

1.2.1 Co-ordinator contact details

Mr. Claudio Clausi
TELEATLAS ITALIA
Via Marco Antonio Colonna 35
20149 Milano, Italy
Tel: +39 02326701
Fax: +39 02 32670122
E-mail: Claudio.clausi@teleatlas.com
http://www.teleatlas.com

1.3 Work performed and end results

1.3.1 Work Performed

HIGHWAY activities were carried out according to the project WorkPlan, reported in the Technical Annex, which encompasses the following main phases:

- ***User Requirement and Global Design Phase***: this phase encompasses activities and tasks belonging to WP1 "User Requirements Analysis" and WP2 "Global System Architecture". During this phase, the project started identifying the user requirements for improved eSafety services exploiting widely accepted methodologies. User Requirements were collected exploiting desk researches, interviews, round tables. User needs and system requirements (i.e. functional, non-functional and context requirements) were reported in the D1.1 "User Requirements Analysis" which is a public report and downloadable in PDF format from the Project Web Site (see url below).
  Subsequently, according to the ISO RM-ODP methodology, the Consortium undertook the definition of the project system architecture for open, integrated and secure, geographic, multimedia and multimodal service delivery to satisfy the eSafety needs of European car drivers (and pedestrians). These activities were reported in the D2.1 "Global System Architecture" along with design guidelines for the subsequent design phases were provided. The D2.1 is a public report therefore it is downloadable in PDF format from the Project Web Site.
  The completion of the user requirements analysis and global design architecture allowed the Consortium to achieve the 1st Project Milestone.

- ***Design and implementation of the HIGHWAY Platform Phase***: this phase encompasses activities and tasks belonging to WP3 "Specification of HIGHWAY Toolset" and WP4 "Implementation of HIGHWAY Toolset".
  The project team started carrying out the specification of HIGHWAY Toolset achieved through the use of UML (Unified Modelling Language) providing use case diagrams, components description and diagrams, class diagrams and sequence diagrams. Interaction among the main modules of the toolset and with the external environment were deeply analysed and reported exploiting both UML and XML schema. The work performed is reported in the D3.1 "Specifications of HIGHWAY Toolset".

The implementation of the HIGHWAY Toolset was carried out by partners involved according to the design provided in the previous WP3.
The main objective of the innovative eSafety Management Toolset is the ability to acquire, manage and delivery map-based, multimedia (sensor, audio, text, real-time video) information from distributed sources (vehicle, infrastructure, user profiles, other DBs, etc.).
In order to achieve these goals, HIGHWAY consortium addressed several technical issues, including:

- Exploitation of intelligent agents, ontology and xml-based languages.
- Use of smart maps, able to convey dynamic eSafety information.
- Definition of context-aware and multimodal user interfaces.
- Seamless provision of real-time in-car and personal navigation services.

The work performed is reported in the paper version of D4.1 "Implementation of HIGHWAY Toolset".
The completion of the platform implementation allowed the Consortium to achieve the 2nd Project Milestone.

- ***Design and Implementation of the HIGHWAY Services Phase***: this phase encompasses activities and tasks belonging to WP5 "Design of HIGHWAY Services" and WP6 "Implementation of HIGHWAY Services".
  By means of the power of the HIGHWAY toolset bound to allow "machine-machine" interaction and not only human consumption of information, HIGHWAY Consortium started to design HIGHWAY eSafety Services and value-added location based services including real-time 2D/3D map delivery, provision of time-variant integrated information including weather and traffic, etc. In particular, HIGHWAY services were described according to a service oriented approach (SOA Methodology), where the higher level services are expressed as composition and orchestration of the lower-level ones: in particular, services were firstly defined and then grouped and layered. The interfaces exposed for accessing lower level services, and the activity flows for building higher level services, were identified and described. At the top level, the pilot applications in Italy and in Finland were detailed.
  Some implementation issues related to the components distribution and deployment reported in the report D5.1 "Specification of HIGHWAY Services" were exploited in the implementation of the project services which was carried out by partners involved according to the design provided previously.
  The implementation of the HIGHWAY Services was described in the D6.1 prototype report "Implementation of HIGHWAY Services".
  With the completion of project services implementation the Consortium achieved the 3rd Project Milestone.

- ***Validation Phase***: this phase encompasses activities and tasks belonging to WP7 "Validation". It aims at validating the implemented tools and services.
  The demonstration phase was carried out following the methodology described in the D8.1 "Evaluation Plan" and duly taking into account comments, feedbacks, etc. collected through Peer Review tasks and WP8 "Evaluation" activities. In particular, during the period from April 2006 to June 2006 there was a strong cooperation with tasks and activities belonging to both WP6 "Implementation of HIGHWAY Services" and WP8 "Evaluation".
  Afterwards, two main phases followed: the first one, demonstration-verification mainly focused on testing and tuning of system performances, usability, etc. carried out with a small number of

users; the second phase, demonstration-validation mainly focused on analysis, compilation of results and improvements made according to feedbacks retrieved by larger user sample in both pilot sites (please see D8.2 "Final Assessment").
Suggestions and feedbacks collected allowed the Consortium to improve eSafety HIGHWAY services. Activities carried out are described in D7.1 "HIGHWAY Demonstrators" and D7.2 "HIGHWAY Description of Demonstrators". The latter can be downloaded in PDF format from the official web site.
The completion of validation phase, demonstration of HIGHWAY services, allowed the Consortium to achieve the 4th Project Milestone.

- ***Evaluation Phase – Cross Phase*:** this phase encompasses activities and tasks belonging to WP8 "Evaluation".
  The Project Team drew up the HIGHWAY Evaluation Plan, taking into account main guidelines provided by the TR 1101 CONVERGE Project, successfully adopted in a number of IST Transport R&D projects in the 4th and 5th Framework Programmes. It took care of detailing indicators and measures for the operational goals to be achieved within the project. In particular, an Evaluation Framework was prepared including generic evaluation issues, the European added value of the project and generic impacts and method of Assessment. Afterwards, due to the fact that, apart from appraisal groups and particular functionalities of the services to be delivered, the two pilot sites present more or less the same characteristics, the definition of expected impacts and related activities (impacts, indicators and assessment methods) were identified and reported grouping together the two sites. All these activities are reported in the D8.1 "Assessment and Evaluation Plan". Safety aspects were further enlighten taking into account the results of the SAFEMAP project, a French-German project focusing on analysis of societal benefits of safety-related map data. Indeed, according to a deep analysis carried out by the SAFEMAP (see SAFEMAP paper on digital maps for road safety assessment and database content definition), we can assume that, quoting the paper itself, a 5% decrease in average speed would lead to a 20% drop in the number of fatal accidents.
  As anticipated above, assessment activities were carried out first in the verification phase and then in the validation phase, the latter involving a much larger number of users. Finally, an analysis of the possible project impacts was performed through the involvement of those stakeholders who already had contributed in the user requirement analysis. Results of evaluation tasks were fully described and detailed in D8.2 "Final Assessment" which can be downloaded in PDF format from the official web site.

- ***Exploitation and Dissemination of Project Results – Cross Phase*:** this phase encompasses activities belonging to the WP9 "Exploitation and Dissemination of Project Results".
  The Consortium prepared the D9.1 "First Knowledge Use and Dissemination Plan" including identified essential features along with main benefits of HIGHWAY Toolset from the Service Provider's executive point of view; future developments including the analysis of competitive technologies emergence and the need for replacement products/services.
  It carried out markets and marketing analysis where the market segmentation considered for this analysis includes: Information Communication Technologies (ICT); Telecommunication (TLC); Information Technology (IT); Navigation and Positioning; Safety.
  Each partner provided its own individual business plan focusing on HIGHWAY results exploitation products/services, company main competitors and the market.
  The Consortium provided a dissemination plan including dissemination strategy in terms of goals, materials and channels along with a description of dissemination activities undertaken by the project.
  Afterwards, D9.1 was updated and provided input to D9.2 "Final Knowledge Use and Dissemination Plan". Main achievements focused on working out a strategy which could help to

differentiate from current eSafety platforms and services, addressing the market analysis of related products as well as the competitive scenario. HIGHWAY participants are ready to take advantage of the unique features of the HIGHWAY system and they are well positioned in their respective market as reported in the deliverable. Moreover, the Finnish and the Italian markets appear to be a good target for HIGHWAY as:

- In Italy (the market in which there is the strongest presence of HIGHWAY partners), the mobile services sector shows high growth (a 2.8% rate is expected in 2006 in the area of GPRS-UMTS services). The nascent infomobility market has been estimated in the reach of euro 600 millions by 2009 and there could be opportunities for follow-up sales of HIGHWAY products/services in the country.
- The Finnish market of mobile services is estimated at euro 250 million (2004), whereas the ITS market is establishing. The potential for the growth of these segments is quite high.

During whole project duration, partners took part in important events and published articles on project main results disseminating HIGHWAY main aims and goals achieved.

1.3.2 Results Achieved

The D10.1 Project Presentation was prepared according to the Guidelines provided by the EC and it is downloadable in PDF format from the Project Web Site (see url below).

Starting from the Project Presentation, the Project web site was designed and published. The Official project flyer was designed and printed (around 5.000 copies) and it is also downloadable in PDF format from the web site.

The first phase was completed by the Consortium, as scheduled and the First Milestone "HIGHWAY User Requirements / Global System Architecture" was successfully achieved. Moreover, the D2.1 "Global System Architecture" was submitted to Peers, two project independent experts, for evaluation. This first operational goal was achieved and one common HIGHWAY System Architecture was both defined and positively assessed by Peers.

The design of the HIGHWAY Toolset was carried out. It is worth highlighting that an important goal achieved, while designing the interface between the Crawler and the Manager, was the design of a GDF application profile for GML carried out to bridge the gap between in-vehicle embedded and personal navigation systems.

The implementation of the HIGHWAY Toolset was carried out and its completion allowed the project to achieve the 2nd Milestone "Implementation of HIGHWAY Platform". Two Peers were involved in evaluating results achieved with HIGHWAY toolset development.

Design of HIGHWAY Services was drawn and taken into account during their implementation. External Peers were involved in assessing HIGHWAY Services: their comments allowed the Consortium to improve HIGHWAY developed services and to achieve the 3rd Project Milestone "Implementation of HIGHWAY Services".

Verification and validation of HIGHWAY Services was carried out in cooperation with WP "Evaluation" activities in both test site: Finland and Italy. Feedbacks retrieved from Peers and user sample were duly taken into account to improve user interface. Completion of these tasks allowed the Consortium to achieve the very final milestone "Demonstration of HIGHWAY Services".

Concerning dissemination activities the following main activities were carried out:

- The first project paper "Towards seamless real-time in-car and personal navigation service delivery: the HIGHWAY integrated Architecture" was officially presented the 2nd of June 2005 during the ITS Europe 2005 held in Hannover.
- The second project paper "Integration of safety-relevant and added-value data for in-vehicle and personal navigation services using the HIGHWAY Platform" was successfully submitted to the ITS World Congress Committee in San Francisco. Tele Atlas BE officially presented the paper in November during the above mentioned event.
- The third HIGHWAY paper "HIGHWAY Development Toolset for e-Safety services rapid implementation" was successfully submitted and presented at IST Mobile Summit held the 4th – 8th of June 2006 in Myconos.
- HIGHWAY results were presented at the project stand at TRA Conference held the 13th of June in Goteborg.
- On November 2006 two main parallel events allowed the Consortium to show results achieved:
    - HIGHWAY Conference at Telemobility 2006 (Turin – Italy).
      A live demo with Fiat Car was at people disposal for a trip in Turin 3D area. Users will have the opportunity to exploit a 3D urban navigation with warnings on speed limits, traffic events, etc. Moreover, Italian partners, led by Tele Atlas Italia (chairman), presented the results achieved both in Italy and Finland during HIGHWAY Conference.

    - HIGHWAY Stand at IST 2006 held in Helsinki. HIGHWAY Consortium presented the results achieved: Finnish partners presented their pilot to attendees and the Italian pilot was presented through a live video demonstrating HIGHWAY in-car services on the field.
- Project main aims and results were disseminated by partners during important events (main details are reported in related section below, please see 2.1).
- Synergies with other projects were performed and the Consortium was continuously active in this task.

1.3.3 Expected end results

1.3.3.1 Added Value of the HIGHWAY System in the e-safety and efficiency arenas

HIGHWAY added value with regard to e-safety and efficiency arenas are:

- a *set of advanced, multimedia, location-based, interactive and personalised safety and navigation services* devoted to *drivers and pedestrians.*
  Through HIGHWAY higher safety services to decrease the probability for accidents and minimising potential damage to drivers and property was implemented along with a better quality, more efficient and cost-effective travel services.
  This included seamless navigation service delivered through both in-vehicle and personal navigation (off board and onboard) systems in very different pilot sites in urban (Turin, Italy), and rural (E18 in Finland) situations, targeting different scenarios.
- a *development Toolset*, *rapidly implementing such a set of services*.
  HIGHWAY toolkit allows the access of spatial and multimedia information sources by means of GML/XML/Java through UMTS networks, delivering location-based services.
  As a result of the project activities, the HIGHWAY software tools and services allow:

- drivers to access directly the required multimedia and geographic information coupled with a set of integrated services related to safety and other subjects
- fast integration and on the move delivery of data and information stored in car sensors, web pages, web databases, GIS systems, and other sources (maps, weather reports, etc.), including support to popular geographic standards such as GDF and GML
- distribution of time-variant and geo-referenced data over the wireless Internet
- implementation of intelligent services for safety and navigation exploiting unique HIGHWAY features such as 3D navigational maps and maps used as sensors for ADAS systems

1.3.3.2 Detailed description of the demonstrators

This section aims at providing a detailed description of demonstrators suitable for both novice users and also technical readers.
HIGHWAY demonstration phase was carried out in project test sites:

- E18 typical motorway usage in Finland where severe meteorological conditions could have serious consequences along highways in Finland and bad weather conditions are present for a large part of the year making driving conditions problematic.
- Turin town in Italy representing a typical urban usage scenario with high traffic level, many road-works and accidents number higher than outside built-up areas.

1.3.3.2.1 Finnish Pilot Site – E18

Finnish Pilot site along E18 represents a typical motorway usage where severe meteorological conditions could have serious consequences along highways in Finland and bad weather conditions are present for a large part of the year making driving conditions problematic.

The HIGHWAY services in the Finnish pilot focused on delivering of use of maps as advanced sensors. The eSafety information services were implemented in relation to incidents caused by severe weather, accidents and road works. In addition, “Intelligent Yellow Pages” services provided services such as breakdown centre closest to user current position, and provision of location-enabled information, such as locations of places of common interests, garages, pharmacies, hospitals, etc. Examples of Finnish pilot application services include:

- *eSafety Alert Notification Service* in relation to following incident types:

  1. Weather information: HIGHWAY service will provide real time information about weather conditions. Multichannel delivery will be supported, e.g., text messages may contain information about road and air temperature, whereas multimedia messages could contain frequently updated traffic camera picture or map on congested roads.

     Typical bad weather notification scenario could be the following:

     A user is subscribed to the service and while on journey gets the weather condition in form of text, image or voice output through the mobile device (GPS / Cell ID). This is done by HIGHWAY platform that gathers information from external source (FINNRE database) in order to notify through text / graphical messages or voice output.

  2. Road maintenance information: Drivers will be informed about nearby road works and alternative routes to bypass them well before they arrive to queues.

     Typical road maintenance scenario could be the following:

     A user has subscribed for the HIGHWAY e-safety services and is travelling across the highway. HIGHWAY platform provides warning notifications continuously for road maintenance which is retrieved from the FINNRE database. The warning notifications are sent in form of text and multimedia messages.

  3. Accidents and other traffic incidents: Service will deliver information to mobile device. For example multimedia message will include map with information about exact location of accident and suggestion about alternative routes.

     Typical incident information scenario could be the following:

     A user is travelling in the outskirts of Turku. The user has subscribed to Highway e-safety services in order to get information about accidents along the journey continuously. Highway platform gathers information (traffic situation) from FINNRE Database and sends the incident information through text or multimedia message. If the user is following his trip in the Highway's map view on his mobile device he can see incidents marked also on the maps.

- *Intelligent Yellow Pages Service* which provides location-enabled information about breakdown centres, pharmacies, service stations etc.

  Typical scenario could be the following:

  A user is searching hospital in a new city driving by car. He asks HIGHWAY system to search for a hospital near his position through context-aware user interface.
  HIGHWAY system consults its Intelligent Yellow Pages and suggests the nearest hospital to the driver; however hospital can be reached only by walking and HIGHWAY suggests the place to park the vehicle.

- *Safe Route Service* which provides navigation aid to road users.

  Typical scenario could be the following:

A User is driving in a highway while HIGHWAY system alerts him about a long queue caused by an accident in the proximity of his position. The user asks HIGHWAY system, via context-aware user interface, for alternative routes differentiated on the basis of quickest routes. The HIGHWAY system elaborates a list of alternative routes ordered by travelling time and delivers

to the user a rerouting that best fit with his/her own profile and preferences.

Live demonstration of HIGHWAY Services implemented in Finland is shown below

1.3.3.2.2 Italian Pilot Site – Turin

Pilot site in Italy is based in Turin and it represents a typical urban usage scenario with high traffic level, many road-works and accidents number higher than outside built-up areas.

As mentioned above, HIGHWAY Application in Italy aims to offer e-Safety services for a typical urban usage scenario. The HIGHWAY services in the Italian pilot focused on delivering of use of maps as advanced sensors. Moreover, the user can access HIGHWAY services in a seamless way both through his/her phone and the in-car navigation instrument. The information is provided with a rich content presentation (photorealistic images, 3D reconstructions).

HIGHWAY services for the Italian Application include:

- *E-Safety Alert Notification Service*. The E-Safety Alert Notification Service is a push service adopting publish/subscribe schema. The user can subscribe/unsubscribe to service specifying the required Alert. The service provides Alerts basing on new event arrivals. The main available alerts for the Italian application are Traffic, Traffic Forecast, Road Works and Speed Limit Exceeding Alert. Also Special Events, Weather alert and Weather Forecast alert can be provided to interested users.

  1. Traffic, Traffic Forecast information provision: the user can receive notifications about Traffic, Traffic Forecast (e.g. advanced Urban Area Traffic Management).

     Typical traffic info provision usage scenario is the following.

     A user has to join a customer for an important meeting at 10 o'clock sharp, but the traffic in Turin and outskirts is particularly heavy due to a fair. HIGHWAY system is able to provide an advanced Urban Area Traffic Management interacting with Infoblu (a company of Gruppo Autostrade SPA) and the public administrations involved in the project Italian user group to gather information on traffic and traffic forecast. Therefore, according to the context (heavy traffic) and the user profile, the system can promptly alert the user about the situation providing up-to-date information and a 3D visualisation to better serve him/her (in this way, real-time traffic situation can be provided in a multimodal manner: voice, graphics, text, video, etc.): Moreover, the user can interact with the system opening a dialogue with a selected service provider exploiting UMTS support.

  2. Weather (e.g. presence of deep fog) information provision.

     Typical scenario could be the following

     A user is driving along the main motorway to Turin; unfortunately, fog is particularly deep tonight and can cause accidents and critical road circulation problems. While approaching the motorways intersections to enter the town, HIGHWAY system interacting with external information provider (e.g. local public administrations involved in the Italian User Group) promptly alert him providing assistance and showing the right direction to be taken.

3. Road Works information provision.

   Typical scenario could be the following

   A user is driving in Turin. In this period the road situation is continuously changing due to road works in different areas of the town. In particular, new roundabouts and new lanes are under constructions. These dynamic data are at project disposal giving the interaction of the project platform with local Public Administrations (involved in the Italian User Group) DBs. Before joining the proximity of a new roundabout, the user is immediately warned about the new construction. Moreover, the HIGHWAY system, according to context, the user location and profile settings, automatically switches from a 2D visualisation to a 3D one to better visualise the right directions to be taken representing the environment in a more realistic way. Obviously the vocal interaction remains active providing turn by turn instructions as chosen by the user in his/her preferences.

4. Speed Alert Limit Exceeding information provision.

   Typical scenario could be the following

   A person living in Turin outskirts has to join the city centre at least once a day for work and/or for pleasure (e.g. going to the cinema, a theatre, a nice restaurant, etc.). He/she is not aware of different speed limits in different areas of the town and wants to be kept informed about that well in advance before entering an area with a different (e.g. lower) speed limit. Therefore, having subscribed to HIGHWAY services he/she can include in his/her own profile these preferences and be warned as soon as he/she exceeds the current speed limit.

- *Safe Route Service*: The system is able to perform re-routing service, automatically, or on user request according to traffic, road work situation, etc.
  In particular, the following main functionalities are provided to a user who subscribed to HIGHWAY Services:
  - The user is always presented with his/her current position highlighted on both 2D/3D fly-view/3D map.
  - The user can drive in Turin area being assisted with a rich content presentation (photorealistic images, 3D reconstructions, 3D fly-view) to better highlight next turn, new round-about, etc.
  - The user can choose a route to a destination being turn-by-turn assisted with the provision of warnings depending on:
    - Speed Limits
    - Traffic Conditions
    - Weather Conditions
    - Road Surface
  - The user can be suggested by the system for an alternative routes in case the street along his/her journey is closed (e.g. car accident, traffic jam, etc.)

  Typical scenario could be the following

  A young person is driving on Saturday night to reach a disco in Turin. He has selected to be turn-by-turn guided there by the HIGHWAY system. Unfortunately, a fatal accident occurred, due to black ice on the street, on his route to the disco. According to the user settings, the

system interacts with him providing alerts about ice presence on the road and recommending him to slow down. Moreover, it asks for a new route calculation which will be performed taking into account the best route in terms of traffic avoidance, distance and travelling time to join the final destination.

- *Intelligent Yellow Pages Service*: the user can search POIs for a selected area.

  Typical scenario could be the following

  During peak hour, a person is driving in Turin to join a customer for an important appointment. HIGHWAY system warns him about the particular traffic situation and, according to his preferences and settings, it drives him to the parking area closest to his final destination providing both vocal instructions and a 3D photorealistic model of the area to allow him to "better get his bearings".
  After the meeting, while coming back home, the user found his car has some troubles. Through HIGHWAY Intelligent Yellow Page service he is driven to the most convenient car breakdown centre situated on his route home.

- *Road Network Service*: The user can retrieve information about the road network in a selected area.

  Typical scenario could be the following

  A user heard about bad weather condition on his way to Turin and before leaving, he wants to retrieve more information on the road network situation: presence of black ice, slipping of roadside verge, etc. He interacts with HIGHWAY system that dealing with different sources (e.g. local public administrations) is able to retrieve latest dynamic information on current road network situation and to provide it to him.
  After having retrieved the information, he started his trip to Turin and according to his profile (settings, preferences, context, etc.) he is continuously warned by HIGHWAY system about new and unexpected worsening of road network conditions.

Live demonstration of HIGHWAY services implemented in Italy is shown below.

1.3.4 Intensions for use and impact

HIGHWAY main aim is to be instrumental to the to the objective of 50% reduction of road fatalities set by the European Commission, and on the other side, to have a strategic impact in the establishment and re-enforcement of a European marketplace for the provision of integrated ITS and location-based services.
The project exploitation and dissemination strategy has been updated in the D9.1 and was finalised in the D9.2 “Final Knowledge Use & Dissemination Plan”

1.3.5 Project Logo

1.3.6 Project Web Site

http://www.ist-highway.org

2 Dissemination and use

In this section, publishable results of the final plan for using and disseminating the knowledge are presented according to European Commission guidelines.

2.1 Conferences and/or Workshops attended by the project

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
31/08/04	*Congress – "ITS Finland" – Helsinki/Finland*	*ITS industry Governmental Players*	*Finland*	*Many players*	*FINRE*
09-10/09/04	*Exhibition – "Mapping Finland" – Espoo/Finland*	*Mapping, content providers, GIS Industry sectors*	*Finland*	*Many participants*	*Genimap*
05-06/10/04	*Workshop – "ActMap Workshop" – Wurzburg/Germany*	*EC Automotive, telematics, map updating industry sector*	*All countries*	*Many participants (around 60)*	*Tele Atlas BE NetXcalibur*
05-06/10/04	*Conference – "GIS National Conference" – Helsinki/Finland*	*GIS industry sector*	*Finland + European countries*	*200-300 GIS experts*	*Genimap*
13-14/10/04	*Conference & Exhibition – "National Transport Infrastructure – Väylät ja liikenne" – Jyväskylä/ Finland*	*Transport infrastructure industry sector*	*Finland*	*500-700 delegates*	*FINRE*
18-22/10/04	*Congress – "ITS World Congress" – Nagoya/Japan*	*ITS industry sector*	*All countries*	*Thousands of participants*	*Tele Atlas BE*
21-25/10/04	*Exhibition – "SMAU" – Milan/Italy*	*All IT industrial sectors*	*All countries*	*250.000 attendees*	*Tele Atlas ITA – all Italian partners*
08-09/11/04	*EC Meeting – "ICT Clustering Meeting" – Brussels/Belgium*	*EC Actors involved in 6th FP Projects*	*European Countries*	*Many participants*	*NetXcalibur*
10-11/11/04	*Congress & Exhibition – "ITF Infomobility & Telematics Forum" – Turin/Italy*	*Telematics, Automotive and ITS sector*	*Italy*	*Several thousands of attendees*	*All Italian partners*
11/11/04	*Workshop – "HIGHWAY Workshop" – Turin/Italy*	*Telematics, Automotive and ITS sector*	*Italy*	*Around 30 infomobility decision makers*	*Organised by Tele Atlas ITA, NetXcalibur officially presented the project*

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
15-17/11/04	*Conference – "IST 2004 Conference" – Le Hague/Netherlands*	*EC Different industrial sectors Public administrations Universities, etc.*	*All countries*	*4000 participants*	*NetXcalibur*
14-17/02/05	*Congress – "3GSM World Congress" – Cannes/France*	*Main industrial sectors*	*All Countries*	*Thousands of participants*	*NetXcalibur*
10-16/03/05	*Exhibition – "Cebit"*	*ICT industrial sector*	*All countries*	*300.000 attendees*	*Main HIGHWAY partners*
03/05/05	*Conference – Telematics Conference – Turku/Finland*	*Telematics and e-safety industrial sector*	*Finland*	*Hundreds of attendees foreseen*	*ICT*
1-3/06/05	*Congress – "ITS Europe 2005" – Hannover/Germany*	*ITS industry Governmental Players*	*All countries*	*Many players and participants*	*NetXcalibur Tele Atlas BE*
12/07/05	*Conference – Oracle Mobile Community" Milan/Italy*	*IT & Industrial Players*	*All countries*	*Many players and participants*	*Tele Atlas ITA*
10-13/10/05	*Developer Forum & World Congress OSGI (Open Services Gateway Initiative)– Paris/France*	*IT & Industrial Players*	*All countries*	*Many players and participants*	*NetXcalibur*
12-14/10/05	*Conference – Tele Atlas EU partner – Budapest/Hungary*	*Industrial Players*	*All countries*	*Many players and participants*	*Tele Atlas*
19-23/10/05	*Exhibition – "SMAU" – Milan/Italy*	*All IT industrial sectors*	*All countries*	*250.000 attendees*	*Italian partners*
01/11/05	*Conference – GIS Theme Day at the Helsinki University of Technology – Helsinki/Finland*	*Industrial and University Players*	*Finland*	*Many participants*	*Genimap*
03-05/11/05	*Conference – Tele Atlas US partner – USA*	*Industrial Players*	*All countries*	*Many players and participants*	*Tele Atlas BE*
06-10/11/05	*Congress – "ITS World Congress" S.Francisco/USA*	*ITS industry sector*	*All countries*	*Thousands of participants*	*Tele Atlas BE*
23/11/05	*Congress & Exhibition – "ITF Infomobility & Telematics Forum" – Turin/Italy*	*Telematics, Automotive and ITS sector*	*Italy*	*Several thousands of attendees*	*Tele Atlas ITA – All Italian partners*
13-	*Congress + Exhibition -*	*Main industrial*	*All*	*Thousand*	*HIGHWAY*

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
16/02/2006	*3GSM World Congress – Barcelona/Spain*	*sectors*	*Countries*	*s of participants*	*main partners*
13-15/03/06	*Exhibition – "Cebit"*	*ICT industrial sector*	*All countries*	*300.000 attendees*	*ICT*
04-08/06/06	*Conference - IST Mobile & Wireless Communications Summit – Myconos/Greece*	*IST, EC, Industrial Players*	*All countries*	*Thousands of participants*	*Motorola*
12-15/06/06	*Conference+Exhibition – TRA (Transport Research Arena) Europe 2006 – Goteborg/Sweden*	*ITS & Automotive Players*	*All countries*	*Thousands of participants*	*NetXcalibur*
05-06/07/06	*Concertation Meeting – Brussels/Belgium*	*EC ICT for Transport*	*EU Countries*	*Many players*	*NetXcalibur*
04-07/10/06	*Exhibition – "SMAU" – Milan/Italy*	*All IT industrial sectors*	*All countries*	*250.000 attendees*	*Tele Atlas ITA – all Italian partners*
08-12/10/2006	*Congress – "ITS World Congress" – London/UK*	*ITS industrial sector*	*All Countries*	*Thousands of participants*	*NetXcalibur – All partners*
21-23 November 2006	*Conference – "IST 2006 Conference" – Helsinki/Finland*	*EC Different industrial sectors Public administrations Universities, etc.*	*All Countries*	*Thousands of participants*	*NetXcalibur – All partners*
23rd November 2006	*HIGHWAY European Conference*	*EC, ITS, industrial players*	*European Countries*	*Many players*	*Tele Atlas ITA NetXcalibur*

2.1.1 Articles Published, Press coverage, development web sites, etc.

Below papers and articles published are reported along with press coverage, development web sites, according to European Commission Guidelines.

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
30/06/04	*Web Site- "Official Project Web Site"*	*General Public*	*All countries*	*Hundreds of visits every month*	*NetXcalibur*
30/06/04	*Flyer – "Official Project Flyer"*	*General Public*	*All countries*	*5.000 copies printed. PDF version downloadable from the web site.*	*NetXcalibur*
30/06/04	*Web Site - "Turku Science Park Web Site"*	*General Public*	*All countries*	*Many visits each*	*ICT Turku*

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
				month	
November 2004	*Publication – "Mappae Mundi"*	*Mapping, content providers, GIS Industry sectors*	*Finland*	*6000 copies*	*Genimap*
8/12/04	*Online Press Release – "ITviikko Magazine"*	*General Public*	*Finland*	*Many web site visitors*	*ICT*
8/12/04	*Online Press Release – "Digitoday Magazine"*	*General Public*	*Finland*	*Many web site visitors*	*ICT*
December 2004	*Web Site - Official "HIGHWAY Web Site" Important Updating*	*General Public*	*All Countries*	*Hundreds of visits every month*	*NetXcalibur*
14/01/05	*Publication – "HIGHWAY Abstract of Paper" – ITS World Congress – San Francisco/USA*	*ITS industrial sector*	*All countries*	*Thousands of participants*	*Tele Atlas BE NetXcalibur*
15/03/05	*Publication – "HIGHWAY Paper" – ITS Europe – Hannover/Germany*	*ITS industrial sector*	*All Countries*	*Thousands of participants*	*NetXcalibur Tele Atlas BE CRF FINRE*
May 2005	*Newspaper article – "Turku Region" Newsletter*	*General Public*	*Finland*	*Many readers*	*ICT*
July 2005	*Publication HIGHWAY Paper – "Integration of safety-relevant and added-value data for in-vehicle and personal navigation services using the HIGHWAY Platform"*	*General Public ITS industry Governmental Players*	*All countries*	*Many players and participants*	*Tele Atlas BE NetXcalibur*
06-10/11/05	*Publication – "HIGHWAY Paper" – ITS World Congress – San Francisco/USA*	*ITS industry sector*	*All countries*	*Thousands of participants*	*Tele Atlas BE NetXcalibur*
24/01/06	*Publications – Official HIGHWAY Brochure*	*General Public*	*All Countries*	*Many players and EC web site visitors*	*Tele Atlas ITA NetXcalibur*
28/02/06	*Newspaper article - Finnish financial newspaper "Kauppalehti"- Finland*	*Industrial Players*	*Finland*	*Many readers*	*Genimap*
February 2006	*Publication - HIGHWAY paper "HIGHWAY Development Toolset for e-Safety services rapid implementation" - IST Mobile Summit – Myconos/Greece.*	*General Public IST Industry Governmental Players*	*All Countries*	*Many players and participants*	*Motorola*
04/04/06	*Newspaper article - Finnish newspaper ""Turun Sanomat""- Finland*	*Industrial Players*	*Finland*	*Many readers*	*Genimap*

Planned /actual Dates	Type	Type of audience	Countries addressed	Size of audience	Partner responsible /involved
04-08/06/06	*Official presentation of 3rd HIGHWAY Paper - "HIGHWAY Development Toolset for e-Safety services rapid implementation" - IST Mobile & Wireless Communications Summit – Myconos/Greece*	*IST, EC, Industrial Players*	*All countries*	*Thousands of participants*	*Motorola*
21 December 2006	*Publication - Newspaper article on "Turun Sanomat" about Highway Finnish pilot*	*Industrial and academic audience*	*Finland*	*Many actors*	*ICT Turku*
December 2006	*Publications – HIGHWAY Demo DVD*	*General Public*	*EU countries*	*Many actors*	*Tele Atlas ITA NetXcalibur*
Q4 2006	*Publications – Paper "HIGHWAY Platform for E-Safety Services Rapid Prototyping", accepted for publication in the Motorola Software Technical Journal*	*Industrial audience*	*All countries*	*Many players and actors*	*Motorola*
Open date	*Publications - Motorola Internal Newsletter*	*Motorola*	*All countries*	*Many players and actors*	*Motorola*