The 5th Plenary Meeting of eSafety Forum "Digital Maps" Working Group

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Background

*e*Safety – Recommendation 11

Digital Map Database

Define requirements for a European digital road map database, with agreed road safety attributes. Create a public-private partnership to produce, maintain, certify and distribute this database. *Mapping industry, 2004*

Organisation

- Co-chaired by TeleAtlas and Navteq
- Public sector representation
- Private sector representation

Meeting scheme:

- Working Group meetings
- Plenary meetings

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Objectives

Objectives of the Digital Map Working Group:

- To define a business model for Public-Private partnerships that will ensure the availability of attributes relevant to eSafety in digital maps;
- To create Public/Private cooperation model to collect, maintain, certify and distribute the eSafety attributes that can be integrated into the digital roadmap database

Objective of eSafety:

- Reduce the number of road fatalities, *increase road safety*.

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The eSafety Map Challenges

- How to realise the uniform European eSafety Map?
  - Extend current navigation maps fundamentally
  - Improve Map Data Quality fundamentally
- High investments required
- Solutions
  - Optimize data collection and processes: No final solution due to inherent latency problem
  - Optimize data flow from public to private sector: No immediate solution due to public sector variance
  - A combined solution is required
  - Clear map requirements to support eSafety
- The private mapping sector started: The eSafety map for the major roads

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Map database a critical success factor

E-safety

- Legal speed limit
- Traffic signs
- Lane information
- Traffic lights
- Crossings
- Accident hot spots
- Slope (gradient)

Traffic

- TMC-codes
- Location reference

For

- Traffic jams
- Accidents;
- Road closures
- lane restrictions;
- Road works
- Road conditions

Traveler

Location reference
For
Static data : e.g POI

- Parking
- Hotel
- Garage
- Petrol station, etc.

Dynamic data

- Events
- Weather etc

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WG Digital Map safety attributes

- Legal speed limit
- Traffic signs
- Lane information (number, width, divider, connectivity)
- Traffic lights
- Crossings (pedestrian, tram)
- Accident hot spots
- Slope (gradient)
- Banking (transverse gradient)
- Accident hotspots
- ….

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Optimise Public Private data flow

- Private collection methods can only register existing information
- A direct information from the birth of the information to the map is required
  - Public authorities are in charge of the Birth
  - A Public-Private Cooperation is required
- Cooperative efforts of both government bodies and private sector

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WG Digital Map Conceptual approach

The following 3 phases are proposed:

Phase 1 : Focuses on ***" COOPERATION "*** (supply of e-safety attributes)

Phase 2 : deals with ***" QUALITY ASSURANCE"*** (quality guidelines and improvement procedures)

Phase 3 : Takes care of ***" OPTIMALISATION "*** (standardization)

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WG Digital map Phase 1

Phase I: How do/can cooperate (Public & private)?

•Phase I supports cooperation between public and private in the provision of the safety attributes and their updates from the public authorities to the public.

•Questions and constraints arising during Phase I were:

- •Are these attributes available with the public authorities and what are the obstacles in finding them?
- •The availability of the safety attributes varies at the Public level among the different public authorities.
- •Can we ask the Public authorities to register the safety attributes?

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Conclusions: Phase 1

It was agreed by the Working Group that:

- The safety attributes agreed in “Maps & ADAS” form the basis of safety attributes of this WG.
- The output be provided to the EC as reference document for safety attributes the public authorities.
- Strive to create synergies with the other related EU funded projects like EuroRoads, SpeedAlert, Highway and INSPIRE and examine conflicts.

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WG Digital map Phase 2

Phase 2: Qualification

- To define and implement guidelines and procedures to qualify the safety attributes. Focus will be on testing the output of the public authorities.
- Quality assurance of the information derlivered will:
  - Lead to quality improvement of eSafety maps and cost reduction
  - Help public authorities improve their quality and methods related to the safety attributes collection, registration, maintenance, etc.

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WG Digital map Phase 3

Phase 3: Optimisation (Standardization)

- The data transfer process will be optimised based on the experience of Phase 1 & 2

After Phase 1, eSafety Working Group "Digital Maps" is recommended to be acting on behalf of the High Level Steering Committee of the eSafety Forum as a Steering Committee to monitor the implementation of all 3 phases.

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Benefits of e-Safety Applications

- Benefits for traffic safety
- Social and economical benefits
- Benefits for public authorities

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Benefits for Traffic Safety

- Safety Applications (ADAS): Interpretation of driving environment by sensor(s) (e.g. radar, vision, map)
  - Map as primary sensor
  - Map as secondary sensor
- Advisory systems: Alerts prompting the driver to act
  - Traditional driving with additional advice
  - Examples: Speed Warning, Curve warning
- Control systems: Actively controlling the vehicle
  - No driver involvement, Driver partly no longer in the loop
  - Examples: Speed Control, Curve Control
  - Liability issues
- Hybrid Systems: Physical Stimuli to the driver
- Evolution: Advice > Hybrid > > > Control (?)

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Maps as sensor in Safety App's

Map as Primary Sensor	Map as Secondary Sensor
Speed Limit Assistance	Advanced Front Lighting
Curve Warning	Adaptive Cruise Control
Predictive Powertrain Control	Lane Keeping Assistant
Intersection Assistance	Lane Change Assistant
Curve control	Stop&Go
Hotspot Warning	Collision Avoidance

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Map requirements

E-Safety Map: Existing Navigation Maps extended

- Extra map content: Safety Attributes
  - Legal Speed Limits
  - Traffic Signs (Hazard, Right-of-Way)
  - Lane Information (Number, Width, Divider, Connectivity)
  - Traffic Lights
  - Crossings (Pedestrian, Tram)
  - HotSpot (accident statistics)
  - Slope (Longitudinal road gradient)
  - Banking (Transversal road gradient)
- Extra Quality Requirements
  - Enhanced geometric accuracy
  - Reduction of Map Errors
  - Reduction of Time-to-Market (Up-to-dateness)

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Safety Attributes and Safety

Safety Attribute	Safety Application	Safety Effect
Legal speed limit	Speed Limit Assistance (e.g. Speed Alert)	Speed limit adherence, less speed accidenta
Traffic signs (curve ahead), Enhanced geometry, Banking	Curve Warning	Safe speed drive, Less speed accidents and collapsed trucks
Slope (gradient)	Predictive Powertrain Control	Less fuel consumption, air pollution
Traffic signs (right of way), Lane information, Traffic lights	Intersection Assistance	Intersection related accident reduction
Traffic signs (curve ahead), Enhanced geometry, Banking	Curve Control	Safe speed drive, less speed accidients and collapsed trucks
Accident hot spots	Hotspot Warning	Warning for danger spots ahead
Enhanced geometry	Advanced front-lighting system	Enhances night vision
Legal speed limit, Lane information, Crossings	Adaptive cruise control	Less head-tail collisions
Lane information	Lane keeping/change assistance	Less unsafe lane deprtures
Legal speed limit, Lane information, Crossings	Stop & Go	Less head-tail collisions in traffic jams
Enhanced geometry, Lane information, Slope, Banking	Collision avoidance	Less accidents

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Benefits of Public-Private Cooperation

- Updating via traditional field data capturing: Detect information only after real world change: Too late
- Public Private Cooperation
  - Public Authorities manage real world information represented in Safety Attributes
  - Delivery of available safety attributes to map providers at the time or in advance of reality change
    - timely inclusion in E-Safety Map
    - reduced data collection/compilation costs
    - contribute to reach quality requirements of vehicle industry
  - For use in cost efficient safety applications in vehicles

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Social and Economic Benefits

- Reduction of Traffic Accidents and related social costs: example of speed alert application
- Reduction of Traffic Jams
- Reduced fuel consumption and air pollution

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Benefits for Public Authorities

- Safety attribute information will become available in a uniform way
  - The e-safety map as a repository
  - Compliant to international standards
  - Increased ease-of-use
  - Enhanced internal processes
- Public Participation requires no investment in phase 1
  - Safety Attributes will be delivered as is.
- Public Participation investments in phase 2 have short term pay back through enhanced quality management system

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Related initiatives

- EuroRoads
  - EU funded project
  - creation of a standardised exchange mechanism for relevant road network data 'owned' by PAs
- INSPIRE
  - Infrastructure for Spatial Information in Europe
  - agreement reached on draft directive, to create a legal framework
- HIGHWAY
  - EU funded 6FP project (April 2004-December 2006)
  - integrated safety and added-value services for navigation devices (in-vehicle and nomadic)
    - user requirements
    - architecture and specification
    - implementation and validation in 2007

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Related initiatives

- MAPS&ADAS
  - 3 year sub-project of EU funded PReVENT Integrated Project
  - (1) ADAS Interface Specification
    - ADAS Horizon, preview of road and attributes ahead of the car
    - ADASIS Forum
  - (2) data sourcing for safety-related map data
    - survey of data storage, maintenance and availability across Europe
    - Public Authorities Consultation Platform
    - certification and business model
    - list of top priority safety attributes identified

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Related initiatives

- SpeedAlert
  - harmonise of in-vehicle speed alert concept definition
    - common classification of relevant speed limits
    - definition of system and service requirements of in-vehicle speed alert system
    - definition of functional architecture
    - identify requirements for standardisation
  - important issues to be addressed at European level
    - collection, maintenance and certification of speed limit information

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Related initiatives

- SafeMAP
  - DEUFRAKO project, German/French project, 2004-2005
    - cost of safety attributes in digital maps
    - societal benefits in terms of enhanced road traffic safety
  - Germany: focus on accident statistics and derived 'hot spots'
  - France: focus on road characteristics and derived 'safe' speed
- INTERMAP

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Meetings in 2005

Working Group Preparation Meeting	Working Group Plenary Meeting
Kick off meeting – April 18th, 2005	
Prepare Draft Document - May 30th, 2005	
	1st Plenary meeting – July 1st, 2005
Collect, discuss feedback and prepare 2nd Draft Document – Sep. 9th , 2005	
	2nd Plenary meeting – Sept., 30th 2005
Discuss feedback and prepare final "Recommendation" – Nov. 2005	
	3rd Plenary meeting – Nov. 18, 2005
	eSafety Steering Committee Meeting, 6 Dec. 2005

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Final Report: Recommendation

- Presented to the eSafety Forum Steering Committee on 6 Dec. 2005, Brussels
- Final report available on the eScope website: http://www.escope.info/en/esafety_activities/esafety_working_groups/digital_maps.htm
- EC to distribute the report to authorities participating the 14th Dec. HLM on Road Safety.
- EC and WG to discuss how to translate the Recommendation into actions.

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Thank you for your attention

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