



In-vehicle Speed Limit Information and Warning Systems

Recommendations and Roadmap for EU-wide Implementation

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1 Introduction

Nowadays in-vehicle speed information and warning systems (also called speed alert systems) are considered as one of the promising applications that could contribute to improve road safety and road mobility in the next years. The success of future European-wide speed alert implementation relies on a public/private partnership based on the consensus built with key stakeholders from EC, Member states and industry to address last remaining issues.

2 Background

Activities related to Intelligent Speed Adaptation (ISA) started in the mid of 90's with initiatives from Sweden, UK and the Netherlands. Since 2000 several other EC Member States have launched national trials such as Finland, Norway, Denmark, Belgium, France, Austria. These national activities came to highly valuable conclusions about potential benefits of such in-vehicle speed management system to road safety and with very encouraging results regarding user acceptance and transport policy.

From these promising first results, ERTICO with its partners identified the need for cooperation between public and industry sectors to address European level issues and therefore decided in 2001 to set up the SpeedAlert Committee aiming at establishing a discussion platform with key stakeholders from public authorities and industry and developing a sustainable consensus on in-vehicle speed information and warning system. As a first output of these discussions, a strategy Paper produced in 2002 jointly by Public Authorities and Industry presents the common key principles:

- In-vehicle speed information and warning can contribute to improve safety and mobility (in accordance with EC White Paper on European Transport Policy for 2010)
- The driver shall remain in control of the vehicle at all times, and is responsible for driving at a safe speed for the prevailing conditions
- Fitting and use of any system of in-vehicle speed information should be voluntary
- Evolution towards appropriate variable speed limit information relevant to dynamic conditions (traffic, weather, road...)

The second step is the SpeedAlert project (May 2004-April 2005) co-funded by EC DG TREN with a consortium composed of public authorities and industry partners and reinforced by a Consultation Group. SpeedAlert¹ project runs in close cooperation with PROSPER² project also co-funded by EC DG TREN and the two projects have complementary roles and objectives.

3 SpeedAlert objectives and results

A major strength of the SpeedAlert Consortium is the active and complementary participation of key stakeholders from public and private sectors that will combine transport policy and industry

¹ <http://www.speedalert.org/>

² <http://www.prosper-eu.nl/>



perspectives to maximize concrete and efficient exploitation of results for future EU-wide implementation.

The SpeedAlert project's main objectives are to harmonise the in-vehicle speed alert concept definition and to propose the first priority issues to be addressed at the European level, such as the collection, maintenance and certification of speed limit information, to enable a broad take-up of speed alert systems throughout Europe.

SpeedAlert's main results include

- A functional architecture and associated technical building blocks
- Roadmap for deployment taking into account user needs, technical feasibility and available solutions
- List of recommendations to support successful implementation of speed alert systems
- Consolidation of broad consensus through the Consultation Group and its dedicated workshops and intensive cooperation with relevant EC projects (PReVENT IP / MAPS&ADAS, GST IP / Safety Channel, EuroRoadS, PROSPER)

The SpeedAlert Consortium has defined and agreed on a list of recommendations to support successful deployment of speed alert applications. The deployment is presented as a three-phase approach which is presented below and also translated in a SpeedAlert deployment roadmap presented in section three of this document:

- Phase 1: Autonomous system for static speed limits short term (2006)
(limited coverage of road network which is defined by public authorities according to national road safety issues, starting with motorways and main roads)
- Phase 2: Enhanced autonomous system for static speed limits medium term (2009)
(full coverage of road network and incremental map update)
- Phase 3: Cooperative system for variable speed limits long term (2015)

The indicated timing(short, medium and long) shall be considered as recommended time for completion.



4 List of Recommendations

	Recommendation	Who	Timing (Short, Medium, Long Term)	Priority (High, Medium, Low)
	<i>Speed Limit Classification</i>			
1	Harmonise at the European level speed limit classifications by consolidating the SpeedAlert terminology of fixed, variable and temporary speed limits.	<i>P.A., EC, ECMT</i>	<i>medium</i>	<i>medium</i>
	<i>Speed limit data collection, maintenance and certification</i>			
2	Assess technical and economical feasibility of speed limit data collection and maintenance throughout Europe taking into consideration national/local differences (existing infrastructure, organisation, actors, decision-making process, legal aspects...) by means of appropriate public-private partnerships (PPP)	<i>EC-leading P.A. Map maker, infrastructure operators</i>	<i>short</i>	<i>high</i>
3	Establish a joint European roll-out plan to organise speed limit data collection, maintenance and certification involving public sector and private sector (infrastructure suppliers, map makers, automotive industry, and service providers)	<i>P.A., map makers, infrastructure operators</i>	<i>short</i>	<i>high</i>
4	Develop a standardised data model for speed limit information with respects of all different speed limit categories	<i>map makers, service providers, P.A. support</i>	<i>short</i>	<i>medium</i>
5	Harmonise access to speed limit data (static and variable) available from national/local sources , thus laying the groundwork for the availability of pan-European road data (among others speed limit data).	<i>P.A., infrastructure operators, service providers and map makers</i>	<i>long</i>	<i>low</i>
6	Develop adapted procedures and mechanisms to optimise maintenance operations of speed limit data (static and temporary) and reduce update process time from real-world changes to the integration into speed limit data infrastructure accessible by map makers and service providers	<i>P.A., infrastructure operators</i>	<i>medium</i>	<i>high</i>
7	Explore appropriate certification procedures and processes of speed limit information with respects to data quality requirement and legal aspects (see recommendation 17)	<i>P.A. with map makers (e-Safety)</i>	<i>medium</i>	<i>medium</i>
	<i>Speed limit and digital maps</i>			
8	Update existing standards of digital map exchange format (GDF) to facilitate integration of all speed limit information into digital maps	<i>Map makers</i>	<i>short</i>	<i>medium</i>
9	Support market deployment of incremental map updates (e.g. ActMAP concept) to enable cost-efficient and time-efficient provision of static speed limit updates to end-users	<i>map makers, service providers, system suppliers</i>	<i>medium</i>	<i>high</i>
	<i>Provision of variable speed limits</i>			
10	Assess technical and economical feasibility of variable speed limit provision by means of appropriate technologies (broadcast, dedicated short-range communication...) to end-users	<i>Communication system suppliers, infrastructure operators & service providers</i>	<i>short</i>	<i>medium</i>
	<i>Infrastructure-Vehicle communication</i>			
11	Develop standardised infrastructure-vehicle communication to support the provision of dynamic content (variable speed limit,	<i>Communication System</i>	<i>medium</i>	<i>high</i>



	Recommendation	Who	Timing (Short, Medium, Long Term)	Priority (High, Medium, Low)
	incremental update of static speed limit) with European-wide harmonised service	<i>suppliers, infrastructure operators & service providers</i>		
	HMI			
12	Analyse the different interactions with the driver on the basis of an informative system (audio message, visual display, haptic gas pedal), and integration with other in-vehicle applications (e.g. navigation systems...) by exploiting results from national trials	<i>AIDE IP consortium in- vehicle system providers</i>	<i>medium</i>	<i>medium</i>
13	Ensure that the design of the in-vehicle HMI follows the design recommendations specified by the EC „European Statement of Principles on Human Machine Interface“ of information and communication systems which are intended to be used while driving.	<i>P.A., system suppliers, vehicle manufacturers</i>	<i>medium</i>	<i>medium</i>
	ADAS			
14	Identify additional requirements from ADAS applications with regards to speed limit information	<i>MAPS&ADAS consortium</i>	<i>short</i>	<i>medium</i>
	Legal aspects			
15	Analyse legal aspects for speed alert applications(informative and voluntary)	<i>PROSPER</i>	<i>short</i>	<i>medium</i>
16	Analyse legal aspects for ADAS applications with regards to speed limit data	<i>e-safety WG MAPS&ADAS consortium</i>	<i>medium</i>	<i>high</i>
17	Explore how certified in-vehicle speed limit information can be considered as road regulation reference (current reference road signs) <i>* SpeedAlert consortium position</i> <i>** Vehicle manufacturers position</i>	<i>P.A. with industry</i>	<i>Long*</i> <i>Short**</i>	<i>Low*</i> <i>High**</i>
	Business case			
18	Develop a business case of the different speed alert concepts and explore the potential impact of combining speed alert with other safety applications	<i>All stakeholders</i>	<i>short</i>	<i>high</i>
19	Develop further methodologies to measure the safety impact of applications by means of extended accident data statistics.	<i>EC with P.A.</i>	<i>medium</i>	<i>high</i>
20	Investigate tax / insurance incentives to support deployment of first speed alert system generation	<i>P.A. insurance companies</i>	<i>short</i>	<i>high</i>
	User Acceptance & Public Outreach			
21	Communicate general description of speed alert expected benefits and limitations to drivers , including a clear statement of two of the SpeedAlert key principles (informative system and voluntary-based fitting and use)	<i>P.A., FIA, ,automobile Clubs and industry</i>	<i>short</i>	<i>Medium</i>

Table 4-1: List of recommendations

Observation:

The issue was raised that public authorities could take advantage of doing the speed limit inventory work and at the same time also re-evaluate current relevance of speed limits to road network and vehicle categories. Sweden is already reviewing this, and in France, drivers can give feedback on relevance for speed limits as a way to increase their acceptance for road regulations. The issue was however regarded as out of the scope of SpeedAlert, and is therefore not included in the list of recommendations.





5 SpeedAlert Deployment Roadmap

A deployment roadmap has been defined based on the three deployment phases and associated high priority recommendations presented earlier in this document. The roadmap also defines some key milestones that need to be achieved to reach the different deployment phases.

1995 – 2005 Background: Research Phase

Milestones

- Pilot studies are carried out throughout Europe implementing different kinds of systems and validating benefits and user acceptance
- Broad consensus that in-vehicle speed limit information and warning systems can contribute to a reduction of speed-related accidents (SpeedAlert activities)

2006 Phase 1: Autonomous system for static speed limits

Milestones

- Market introduction of first-generation speed alert applications with limited coverage
- Consensus by all stakeholders for speed alert deployment roadmap

Recommendations

- Establishment of European roll-out plan endorsed by public and private sectors
- Assessment of technical and economical feasibility of speed limit data collection and maintenance at European level
- Development of cost/benefit analysis and business case
- Promotion of tax/insurance incentives to strengthen end-user interest in speed alert applications

2009 Phase 2: Enhanced autonomous system for static speed limits

Milestones

- Static speed limits available and up-to-date for complete road network
- Incremental update of in-vehicle digital maps available

Recommendations

- Ensuring the European-wide procurement of speed limit data by progressively establishing appropriate public/private partnerships
- Development of adapted procedures to optimize the speed limit data maintenance process by public authorities
- Development of action plan to support market introduction of incremental map update solutions to enhance in-vehicle speed limit up-to-dateness

2015 Phase 3: Cooperative system for variable speed limits

Milestones

- Provision of variable speed limits in a harmonised way throughout Europe
- Speed alert applications as standard option in all new cars

Recommendations

- Deployment of pan-European standardised infrastructure-vehicle communication service for provision of dynamic content
- Implementation of appropriate certification process of speed limit data to support exploitation by ADAS applications